

3880024 00/42

Amendment

PD-AAJ-828

ISN-1423

PROJECT PAPER

BANGLADESH

388-0024

FERTILIZER DISTRIBUTION IMPROVEMENT

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT PAPER FACESHEET	1. TRANSACTION CODE <div style="border: 1px solid black; display: inline-block; padding: 2px;">A</div> A ADD C CHANGE D DELETE	PP 2. DOCUMENT CODE 3
--	---	---------------------------------

3. COUNTRY ENTITY <p style="text-align: center;">Bangladesh</p>	4. DOCUMENT REVISION NUMBER <div style="border: 1px solid black; display: inline-block; padding: 2px;">1</div>
--	---

5. PROJECT NUMBER (7 digits) <div style="border: 1px solid black; display: inline-block; padding: 2px;">388-0024</div>	6. BUREAU/OFFICE A. SYMBOL ASIA	B. CODE <div style="border: 1px solid black; display: inline-block; padding: 2px;">04</div>	7. PROJECT TITLE (Maximum 40 characters) <div style="border: 1px solid black; display: inline-block; padding: 2px;">Fertilizer Distribution Improvement</div>
---	---------------------------------------	--	--

8. ESTIMATED FY OF PROJECT COMPLETION FY <div style="border: 1px solid black; display: inline-block; padding: 2px;">8</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">5</div>	9. ESTIMATED DATE OF OBLIGATION A. INITIAL FY <div style="border: 1px solid black; display: inline-block; padding: 2px;">8</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">1</div> B. QUARTER <div style="border: 1px solid black; display: inline-block; padding: 2px;">4</div> C. FINAL FY <div style="border: 1px solid black; display: inline-block; padding: 2px;">8</div> <div style="border: 1px solid black; display: inline-block; padding: 2px;">2</div> (Enter 1, 2, 3, or 4)
---	--

10. ESTIMATED COSTS (\$000 OR EQUIVALENT \$) -						
A. FUNDING SOURCE	FIRST FY			LIFE OF PROJECT		
	B. FX	C. L/C	D. TOTAL	E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	(29,500)	(500)	(30,000)	(84,500)	(500)	(85,000)
(LOAN)	()	()	()	()	()	()
OTHER U.S.	1.					
	2.					
HOST COUNTRY		173,000	173,000		378,000	378,000
OTHER DONOR(S)	160,000		160,000	348,600		348,600
TOTALS	189,500	173,500	363,000	433,100	378,500	811,600

11. PROPOSED BUDGET APPROPRIATED FUNDS (\$000)									
A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. 1ST FY <u>78</u>		H. 2ND FY <u>79</u>		K. 3RD FY <u>80</u>	
		C. GRANT	D. LOAN	F. GRANT	G. LOAN	I. GRANT	J. LOAN	L. GRANT	M. LOAN
(1) FN	130	111		43,000		57,000		18,000	32,000
(2)									
(3)									
(4)									
TOTALS				43,000		57,000		18,000	32,000

A. APPROPRIATION	N. 4TH FY <u>81</u>		Q. 5TH FY <u>82</u>		LIFE OF PROJECT		12. IN-DEPTH EVALUATION SCHEDULED MM YY <div style="border: 1px solid black; display: inline-block; padding: 2px;">09 82</div>
	O. GRANT	P. LOAN	R. GRANT	S. LOAN	T. GRANT	U. LOAN	
(1) FN	30,000		55,000		203,000	32,000	
(2)							
(3)							
(4)							
TOTALS		30,000		55,000		203,000	32,000

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.

2

 1 = NO
 2 = YES

14. ORIGINATING OFFICE CLEARANCE			15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION		
SIGNATURE					
TITLE	William T. Oliver Acting Director	DATE SIGNED	MM	DD	YY
			0	5	2
			9	8	1
			0	6	8
			2	8	1

Bangladesh
Fertilizer Distribution Improvement Project (388-0024)
Project Paper Amendment #1

TABLE OF CONTENTS

	<u>Page</u>
I. <u>Project Amendment Summary and Recommendations</u>	<u>1</u>
II. <u>Project Background and Detailed Description Update</u>	<u>6</u>
A. Project Background Update	6
1. Development of Fertilizer Use in Bangladesh	6
2. Constraints to Increased Fertilizer Use	6
3. The AID Role	8
4. Other Donors	9
B. Detailed Description Update	11
1. Goal and Purpose	11
2. Outputs and Inputs	14
III. <u>Project Specific Analyses</u>	<u>25</u>
A. Technical Analysis Update	25
1. Storage	25
2. Fertilizer Imports	27
B. Economic Analysis	32
1. Farm Level Financial Analysis Update	32
2. Macro-economic Assessment (Summary)	35
3. Balance of Payments Update	37
C. Social Soundness Assessment	40
D. Administrative Feasibility	45
IV. <u>Financial Plan</u>	<u>48</u>
V. <u>Implementation Plans</u>	<u>52</u>
A. Implementation Schedule	52
B. Evaluation Plan	55
C. Conditions Precedent and Covenants	56

VI. Revised Annexes

B. Updated Project Technical Details

1. Fertilizer Offtakes
4. Local Fertilizer Production
8. Fertilizer Subsidies
14. National Fertilizer Storage Plan
Sites, Capacities, and Financing Sources
15. Fertilizer Imports
16. Bulk Handling/Bagging Proposal

C. Environmental Assessment

D. Logical Framework Matrix

E. Statutory Checklist

F. USAID Director's Certification

G. Government Application for Increased Assistance

I. Draft Grant Amendment Authorization

J. Project Benefit/Cost Analysis

K. Summary of G.A.O. Audit and USAID Response

**L. Preliminary Scope of Work for External Project
Evaluation**

PART IPROJECT AMENDMENT SUMMARY AND RECOMMENDATIONSA. Recommendations

1. Additional AID grant financing of \$85 million over two years, for a new project total of \$235 million.

Original Authorization (FY 1978, 1979, 1980)	\$ 150,000,000
Project Amendment (FY 1981, 1982)	\$ 85,000,000
	<hr/>
Total Project Funding	\$ 235,000,000

2. Extension of the Project Activity Completion Date from July 28, 1982 to July 28, 1985.
3. Fertilizer purchases from Code 941 countries.

B. Summary Project Background and Progress to Date

The project began in 1978 as an integration of three separate USAID projects for fertilizer storage, bulk handling, and agricultural input supply. Its purpose, then as now, was to increase fertilizer use on an equitable basis. To achieve this purpose, the project has addressed constraints to both supply of and demand for fertilizer.

Since this project was originally approved, fertilizer use has grown from 715,000 MT in Bangladesh fiscal year 1977-78 to a projected offtake of over 900,000 tons in FY 1980-81. Over half of Bangladesh's farmers use some fertilizer, and fertilizer use is most intensive on smaller landholdings. A start has been made on restructuring the marketing system, improving the efficiency of fertilizer handling and distribution, eliminating the storage problem, and gaining acceptance of more fertilizer products. A sampling of specific project achievement to date includes the following:

1. Marketing

A New Marketing System (NMS) for fertilizer has transferred much of the distribution and marketing function from the Bangladesh Agricultural Development Corporation (BADC) to private dealers. Instead of maintaining its vast system of 423 retail outlets at the thana level, BADC has begun to retrench to a more manageable network of about 90 regional sales points and has increased allowable dealer markups. As a result, a class of wholesalers has emerged, a network of private dealers has taken over the local distribution function, and competition among dealers has actually lowered prices to farmers in some areas.

2. Handling and Distribution

- In the course of this project, BADC has become convinced of the value of bulk handling and has become committed to bulk importation with local bagging. USAID, the World Bank, the Dutch, the FRG, ADB, IFAD, and CIDA have either already begun or plan to import fertilizer in bulk in the upcoming year.
- USAID has gained the agreement of government, port management, stevedoring contractors, and labor to eliminate the use of hand-held hooks in fertilizer unloading and movement operations. This innovation may save an estimated 30,000 MT in unnecessary fertilizer spillage annually.
- Several improvements in the public fertilizer distribution system have been developed and introduced as a result of this project. Improved movement contracting, lifting agreements with all the fertilizer factories, and improved import programming, for example, all increase the operating efficiency of the BADC.

3. Storage

- In the course of this project, 27,000 MT of fertilizer storage capacity (previously funded under the Fertilizer Storage Construction Project 388-0030) was completed.
- This project has produced the National Fertilizer Storage Plan, which was rationalized the location of needed warehouses to maximize the use of the existing transportation system and dealer access to fertilizer. USAID and several other donors (World Bank, IFAD, ADB, Dutch, and West Germany) are now using the NFSP to locate warehouse construction sites.
- Bids have been opened and evaluated for 162,000 MT of additional storage capacity to be constructed with AID financing.
- A standard for quality - durability, minimal maintenance, and operational efficiency - has been set for the BDG and other donors to follow.

4. Fertilizer Imports

- Since the project began, USAID has imported 280,000 MT of fertilizers to help meet the need for fertilizer supplies beyond local production capability.
- USAID has introduced diammonium phosphate (DAP) - a concentrated, compound fertilizer with significant economic advantages over Bangladesh's traditional simple macronutrient fertilizers. Because early sales results indicate encouraging rates of farmer acceptance, the World Bank has also begun to import DAP and the Ministry of Agriculture has recently requested the Dutch, West Germans, and IFAD to do so.

- In response to research findings that indicate micronutrient deficiencies in the soils of several regions of Bangladesh, USAID has begun to finance the importation of micronutrient fertilizers for experimental and demonstration purposes.
- The project has financed promotional campaigns for newly introduced fertilizer products.

The USAID Mission had intended to seek approval of a two year extension to the Fertilizer Distribution Improvement Project at the end of FY 1980. But in July, 1980 Senator Frank Church, Chairman of the U.S. Senate Committee on Foreign Relations, requested the General Accounting Office to examine the planning and implementation activities of the project so that the Committee could better assess whether more AID resources should be committed to the project. At the request of the Asia Bureau, USAID delayed submission of this project paper amendment until after findings of the audit team were known. The audit report was published on March 31, 1981.

Although USAID believes that the GAO audit report contains a few unsupportable conclusions, the Mission finds it to be, for the most part, constructive and notes that the audit recommendations are supportive of continued and expanded project activity in each of the major areas of project concern. The audit calls for:

- a systematic approach to the planning of imports,
- the effective marketing of DAP,
- development of a reliable agronomic data base on fertilizer use,
- collection of information on the performance of Dealers under the NMS so that the system may be fine tuned to ensure equitable farmer access to fertilizer,
- refinement of BADC's dealer discount policy to encourage more dealers to enter the field,
- gradual removal of officially administered retail prices for fertilizer,
- collaboration among USAID, BADC, and the project's consulting engineer for storage construction to speed implementation of the Phase II fertilizer warehouse construction program, and
- coordination between AID and IFAD in the establishment of bagging facilities for bulk fertilizer imports.

These recommendations implicitly call for the continuation of each major area of project endeavor. USAID supports them all and will continue to work with the BDC to accomplish them during the period of the project extension. The full text of the audit report's conclusions and recommendations, along with the Mission's responses, appears in Annex K.

C. Summary Amendment Description

Under this amendment the project will continue to address many of the same constraints to increased fertilizer use on which it has focused for the last three years, but with added emphasis on the demand side.

To increase fertilizer supplies at the local level the project will provide a portion of the country's phosphate import requirements, construction of warehouses for transit and district stocks of fertilizer, technical assistance to improve the efficiency of public distribution, and incentives to encourage expanded private sector participation in fertilizer marketing.

To increase farm demand, the project will provide BDG credit for fertilizer purchases and increased information as to proper use of fertilizers - both through the private dealer network. It will also attempt to increase the effectiveness of (and thereby the demand for) the major fertilizers through the introduction of secondary and micronutrient fertilizers.

AID funding for this amendment is proposed as follows, in millions of dollars:

	<u>FY 1981</u>	<u>FY 1982</u>
Fertilizer Purchase	8.0	24.6
Storage Construction	18.6	26.8
Marketing and Distribution System Improvements	2.0	1.0
Contingency	<u>1.4</u>	<u>2.6</u>
Total	30.0	55.0

D. Statutory Criteria and Mission Director's Certification

The amended project meets all applicable statutory criteria; the statutory checklist is attached hereto as Annex E. The Mission Director has certified that Bangladesh has the capability to maintain and utilize the project effectively; his certificate is contained in Annex F.

E. Project Issues

From the start of this project, a major issue has been the extent to which private dealers can play an active role in increasing the use of fertilizer in Bangladesh. For the past three years this project has broadened that role by transferring a significant portion of the marketing function from public to private hands. This amendment will expand that role further through a Dealer Development Program, to include a dealer credit component (banks extend credit for fertilizer purchases to dealers, who, in turn, pass some of it on to farmers), dealer training in simple fertilizer use technology, and the fostering of dealer associations.

Another important issue is the ability of the Bangladesh Agricultural Development Corporation to increase its efficiency and effectiveness in distributing fertilizer and promoting sales. In spite of the recent curtailment of public sector involvement in marketing, BADC still plays an active role at the national and regional levels, and any increase in the efficiency of its operations will mean more timely supply of fertilizer and a lower effective public subsidy on fertilizer products. This project amendment addresses the operational efficiency of BADC through conditions precedent to disbursement of funds, through technical assistance, to BADC, and through a management training program.

A third issue is the incidence of the benefits of this project. Are the small farmers who form the project's target population increasing their use of fertilizer, and are the benefits of increased fertilizer use accruing to these small farmers? Preliminary results of the project funded study "Bangladesh - Equity Effects of Fertilizer Use" (discussed in the body of this paper) indicate that the use of fertilizer is slightly higher on smaller land holdings than on large farms. A final report on the first phase of the study, which covers four crop seasons, will be published in September, 1981.

The programming of AID funding for this project is also an issue. The Mission has determined that \$85 million is required to implement the project amendment. Yet most recent budget planning figures indicate that the full \$55 million obligation requested for FY 1982 may not become available. The 1983 Annual Budget Submission, for example, allocates only \$36 million to the Fertilizer Distributor Improvement Project in 1982. The Mission hopes that further funds will become available to fully fund the amended project in 1982. But to the extent that full project funding cannot be achieved by 1982, the Mission will seek to obligate the difference early in FY 1983.

F. USAID Project Committee

Jonathan Conly, F&AGR, Chairman
 Charles Antholt, F&AGR
 Phillip Church, F&AGR
 Larry Crandall, PRO
 H.S. Plunkett, PRO
 Richmond Allen, PRO
 Paul Caouette, RDE
 William Miller, CONT
 James Rogan, RLA

PART II

PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. Project Background Update

1. Development of Fertilizer Use in Bangladesh

Growth in the use of chemical fertilizers, from the early popularization of ammonium sulphate in the 1950's through the establishment of a state distribution system in 1962-63 to sales of half a million tons in 1976-77, were outlined in the original Project Paper. Since 1976-77, sales have increased at an average annual rate of 18.4% to 842,000 tons in Bangladesh fiscal year 1979-80.

The most profound development in the subsector in the past three years has been in the system of fertilizer distribution and marketing. The Bangladesh Agricultural Development Corporation's tightly controlled system of distribution (described on pages 4-6 of the original version of this document) has been streamlined and opened up to the private sector. The complex system of 423 inefficiently placed Thana Sales Centers (TSC's), each supplying a regulated market, is being replaced by fewer than 100 Primary Distribution Points (PDP's) located at the confluence of major transportation systems throughout the country. Licensing of limited fertilizer dealerships has given way to unrestricted competition among wholesalers and dealers who are free to transport and sell fertilizer wherever farmer demand leads them. The resulting increased efficiency of resource allocation should lead to lower real costs of fertilizer distribution. BADC's New Marketing System (NMS) is described in more detail in section II.B.2(d) below.

2. Constraints to Increased Fertilizer Use

A great number of factors have constrained the increase of fertilizer use in Bangladesh. Some of these constraints lie outside the scope of this project but are addressed by other USAID and foreign donor activities, some are already being addressed in the first three years of this project, and others will be newly addressed under this project extension. These constraints (on increasing both supply of and demand for fertilizer) are listed here to established the context into which Bangladeshi, USAID and other donor efforts have been and/or must be directed in order to increase fertilizer use and, ultimately, food production.

(a) Supply Side Constraints

(1) Erratic and inadequate production has long constrained the supply of fertilizers in Bangladesh. Considering its abundant supplies of natural gas, it makes sound economic sense for Bangladesh to produce urea locally. Yet outmoded physical plants, production bottlenecks, and an undertrained workforce have kept production at well below rated capacity at the three existing fertilizer plants. Many trained technicians have emigrated to the Middle East. The TSP complex in Chittagong is totally dependent on imported raw materials and, at the time of this

writing, is closed down for lack of sulphur (normally imported from Iraq). Bangladesh has neither the raw materials nor the manufacturing facilities to produce potassic fertilizers. (Actual production figures for the Fenchuganj and Ghorasal urea factories and the Chittagong TSP complex are presented in Annex B.4.)

(ii) Inadequate import capability. A lack of foreign exchange earnings and reserves severely limits Bangladesh's ability to import the fertilizers it cannot produce domestically. The current account chronically runs in deficit (about \$1.5 billion in FY 1979-80), and only large capital inflows from the major international donor and lending institutions enable the country to import the basic commodities and capital goods necessary for its development program.

(iii) Poorly programmed imports have also constrained the orderly supply of fertilizer. Poor timing of imports has resulted in glutted transportation and transit facilities or, at the other extreme, in regional shortages of one or more major fertilizer products.

(iv) Limited transportation and handling capabilities A lack of rail wagons and poor scheduling have limited Bangladesh Rail Corporation's ability to move large amounts of fertilizer quickly and have made BADC dependent on more expensive truck transport. Inadequate port facilities have increased the time and costs required to unload imports. And the absence of fertilizer bagging facilities has forced BADC to import bagged fertilizer rather than the cheaper bulk product.

(v) Limited Storage Capacity. A shortage of good quality, efficiently located warehouses has forced BADC to transport fertilizer further than necessary and to store it in substandard conditions. It has also meant periodic shortages of fertilizer in areas where warehousing capacity is completely lacking.

(vi) Until recently, an inefficient, state controlled marketing mechanism repressed the inclination of the private commercial sector to efficiently distribute fertilizer and to promote increased sales. Restrictions on markups, a lack of dealer training and credit, and restrictions on movement, prices, and choice of product constrained the ability of the private wholesalers and dealers to effectively market the product.

(vii) Management inefficiency on the part of BADC increases the operating costs of the public distribution system and with it the real costs to Bangladesh of increased fertilizer use.

(b) Constraints on Demand

(i) Lack of Credit. Increased use of inputs is constrained by the availability of credit for their purchase. In spite of recent efforts to expand some limited institutional credit mechanisms, most Bangladeshi farmers cannot get credit from non-traditional sources for fertilizer purchases.

(ii) Land Tenure. Overpopulation and the distribution of land in Bangladesh have forced many farmers into sharecropping arrangements. In such circumstances where a sharecropper bears the entire cost of his production inputs but only realizes a portion of the incremental production derived from these inputs, the incentive for investment in inputs like fertilizer is reduced.

(iii) Micronutrient Deficiencies. Deficiencies in some soil micronutrients, such as zinc and sulphur, limit the effectiveness of the traditional macronutrient fertilizers. Until these micronutrient-deficient soils are identified and corrective micronutrient fertilizers made available, the major fertilizers will not be as beneficial as they could be in those areas where the deficiencies exist. (To date, Bangladeshi soil scientists have tentatively identified micronutrient deficient areas in eleven districts comprising about six million acres.)

(iv) Lack of Complementary inputs. Farmer demand for fertilizer will, to a certain extent, be linked to the spread of the technological packages that make effective use of fertilizers. A slow growth in the use of irrigation and of high yielding grain varieties will retard the growth of fertilizer use.

(v) Farmer knowledge. Lack of information concerning the optimal use of fertilizer in various soil conditions and on various crops limits both farmer demand for fertilizer and the effectiveness of its use.

3. The AID Role

Most of AID's past support to the fertilizer subsector has addressed supply constraints, primarily in the form of fertilizer imports and more recently in the construction of storage facilities. During the 1960's, AID played a leading role in encouraging fertilizer use in East Pakistan by financing a large proportion of fertilizer imports. (See annex B.15). In the period from the War of Liberation to the commencement of this project, AID imported a total of 260,000 metric tons of urea, 300,000 MT of TSP, 40,000 MT of rock phosphate (for local manufacture of TSP), and 10,000 MT of MP. Financing for these commodities was provided under the Relief and Rehabilitation Grant of 1973-76 and under the Agricultural Inputs I, II, and III Projects of 1974, 1975, and 1977.

The Fertilizer Storage Construction Project (303-0030) financed design and construction of 27 small and intermediate sized godowns and ancillary buildings with a combined storage capacity of 27,000 metric tons. These warehouses were built between 1977 and 1980.

AID is also contributing to development of domestic fertilizer production capability by participating in the financing of the Ashuganj Urea factory. The factory is due to begin test production in July, 1981 and has a rated annual production capacity of 525,000 tons. AID has contributed \$53 million toward the \$432 million overall cost of the facility through the Ashuganj Fertilizer Project (388-0016).

Other AID projects are contributing to lessening the constraints on demand for fertilizer. Rural Electrification (388-0023) will promote HYV technology by bringing irrigation to small farmers. Agricultural Research (388-0003) has helped to develop the agronomic recommendations brought to the farmers by the extension service. And the Rural Finance Experiment Project (388-0025) has attempted to improve the credit system servicing both owner-cultivators and share-croppers.

4. Other Donors

Development assistance to the fertilizer subsector from the international lending and donor communities has been regular and increasingly comprehensive. A complete listing of all externally assisted activities affecting fertilizer supply and demand is not possible. But mention of those recent projects most directly affecting the subsector establishes a useful context in which to set this USAID project. Most of these activities address supply-side constraints.

(a) Production. The World Bank, ADB, ODA, USAID, IFAD, OPEC, the EEC and the Governments of Iran, Switzerland, and West Germany have combined resources to provide \$258 million in loan financing to construct and equip the Ashuganj urea factory, due to begin production in 1981. The remaining \$174 million in capital costs is being funded by the BDG. The World Bank has also undertaken to increase the efficiency of operations at Bangladesh's three existing fertilizer plants at Fenchuganj, Ghorasal, and Chittagong through the Bangladesh Fertilizer Industry Rehabilitation Project which is designed to eliminate technical production bottlenecks, train personnel, and provide foreign exchange for the importation of spare parts, catalysts, and chemicals. The Netherlands has agreed to provide a granulator for the TSP complex in Chittagong in 1982 so that locally produced TSP (now considered by farmers to be inferior because it is in powdered form) can compete with imported granular TSP. The Asian Development Bank leads an international consortium which plans to finance a 524,000 MT capacity urea factory, to be constructed in Chittagong from 1982 to 1985. And lastly, the People's Republic of China is preparing for construction of a new 100 000 ton/year urea plant at Ghorasal. This last facility may come on stream in 1985.

(b) Fertilizer Imports. Twenty international agencies and foreign governments have financed the importation of 2.8 million tons of fertilizer since Liberation. These imports are listed by product, funding source, and year in appendix B.15.

(c) Transport and handling. Several major externally financed projects are currently underway to alleviate existing constraints to the efficient handling of fertilizer imports and the efficient internal transport of both imported and locally produced fertilizers. The Government of Yugoslavia has financed the construction of jetties and port facilities at the Port of Chalna which will be used, in part, to receive approximately half of Bangladesh's future fertilizer imports. IFAD has included in its current Fertilizer Sector Project minor improvements to a dedicated fertilizer jetty and bulk unloading, handling, and bagging equipment (to complement possible USAID financed bulk handling equipment). The World Bank's Fertilizer Transport Project will broadly address many of the bottlenecks in the fertilizer handling and transportation systems. It will include: (i) development of the inland port at Baghabari to supply fertilizer to Pabna and Bogra districts, (ii) development of barge and rail handling facilities and expansion of transit storage capacity at the inland fertilizer port of Shiromoni, (iii) test dredging of the Karnaphuli River to allow access to larger ocean-going fertilizer vessels at Chittagong Port, (iv) feasibility studies for bulk fertilizer unloading facilities at the Port of Chalna, (v) rehabilitation of rail wagons and establishment of unit/block train operations to increase railway carrying capacity for fertilizers from the ports and factories, (vi) upgrading of the railway ferry across the Jamuna River, (vii) establishment of a rail operations control center, and (viii) rail siding improvements at the fertilizer factories.

(d) Storage. The World Bank, IFAD, ADB, and the Governments of the Federal Republic of Germany and the Netherlands have joined USAID and the BDG in financing transit and local storage facilities under the National Fertilizer Storage Plan. The NFSP is discussed in sections II.B.2 and III.A.1.

(e) BADC Management. The Ford Foundation has funded short term technical assistance to help BADC develop a management information system for the efficient collection, maintenance, and distribution of records. The World Bank has provided BADC with a consultancy team to develop and recommend a financial accounting system for the Corporation.

B. Detailed Project Description Update

1. Goal and Purpose

The original goal and purpose of this project stand unamended. The program goal to which this project contributes is increased food production, especially by small farmers. The purpose is to increase fertilizer use on an equitable basis.

(a) Progress towards goal

Measured from 1977-78, the agricultural year preceeding this project, foodgrain production has increased by 13 percent over a three-year period. The project's goal of a four percent annual growth in foodgrain production has, therefore, been met thus far. Progress, however, has been very irregular, as shown in Table 1, and the time frame is too short for any meaningful estimate of change. Due to the nation-wide drought of 1979, total grain production held almost constant from 1977-78 to 1979-80. Almost the entire gain resulted from the 1980-81 harvests.

TABLE 1

	<u>Foodgrain Production 1977-78 to 1980-81</u> (millions of long tons)			
	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>
Aus	3.10	3.29	2.80	3.60
Man	7.42	7.43	7.30	8.00*
Boro	2.24	1.93	2.43	2.20*
Wheat	0.34	0.49	0.81	1.00*
Total :	<u>13.11</u>	<u>13.13</u>	<u>13.34</u>	<u>14.80*</u>

* estimates

Progress toward the other goal indicator, a 6% annual increase in production on land holdings of 2 acres or less, cannot be assessed yet. The International Fertilizer Development Center is coordinating the measurement of crop yields on various sized land holdings, as part of the project-funded study "Bangladesh-Equity Effects of Fertilizer Use". When these data have been collected for two or more years, we will be able to estimate annual increases in production by farm size.

(b) Achievement of Purpose

Increased fertilizer use on an equitable basis is measured in terms of both annual increases in overall fertilizer sales and studies of fertilizer use by farm size and tenure status.

(i) Fertilizer Use Since FY 1977-78

In 1977-78, the year before the start of this project, fertilizer sales in Bangladesh increased by 42%. Fertilizer use increased by 2.7% during 1978-79 and by 14.7% in 1979-80. This progress is measured against an objective of a 15% annual increase. The drought of 1979 is seen as largely responsible for holding down sales in spite of an improved supply and stock situation. It also appears that in a number of areas sales have been sluggish due to a lower than normal yield response to the basic macronutrient fertilizers. This is suspected to be the result of micronutrient deficiencies in the soils.

(ii) Equity of Fertilizer Use

The project funded study, Bangladesh: The Equity Effects of Fertilizer Use (discussed more fully in the Social Soundness Analysis) has generated some results concerning the equity of fertilizer use in Bangladesh. A preliminary draft report on the 1979 aman season indicates that use of fertilizer is slightly more common on small farms than on larger land holdings (Table 2). Some advance data on the 1980 boro season indicate the reverse. Data from both seasons, however, show that application rates are higher on the smaller holdings in all tenure groups except for the boro cash renters (Table 3). But measurement of progress toward the purpose indicator of a 22% annual increase in fertilizer use on farms of two or fewer acres will not be possible until the equity study has analysed data over at least two years. A report on the 1980 boro, wheat, aus, and aman seasons will be completed in September 1981, and data collection is nearing completion for the 1981 boro and wheat seasons.

TABLE 2

Incidence of Fertilizer Use

<u>Farm Size</u>	<u>Percentage of Fertilizer Users</u>	
	<u>Aman</u>	<u>Boro</u>
Landless Tenants	68	50
0 < FS < 1 acre	71	67
1 < FS < 2.5 acres	61	66
2.5 < FS < 5 acres	63	67
5 < FS < 7.5 acres	60	79
7.5 < FS	61	74

TABLE 3

Average Levels of Fertilizer Use
(Maunds per acre)

	1979 Aman Season		1980 Boro Season		
	Owner operated <u>Land</u>	Rented <u>Land</u>	Owner Oper- <u>ated Land</u>	Share <u>Cropped</u>	Cash Rented <u>Land</u>
Landless Tenants	-	.80	-	2.20	-
0 < FS ≤ 1 acre	1.00	.49	1.24	1.41	2.74
1 < FS ≤ 2.5 acres	.91	.31	1.20	1.09	2.24
2.5 < FS ≤ 5 acres	.94	.10	.92	1.06	3.33
5 < FS ≤ 7.5 acres	.79	.13	1.11	.92	-
7.5 < FS	.68	.06	1.13	1.42*	3.33

* one farmer only

(c) Link Between Project Purpose and Goal

The link between purpose and goal is only partial; fertilizer use is just one of many factors affecting the level of foodgrain production in Bangladesh. To maximize domestic food production over the long run, Bangladesh's human, natural, and financial resources must be optimally allocated in the development of those factors contributing to agricultural productivity. The USAID Mission has scheduled for 1981-82 an Agriculture Sector Assessment, designed to develop a comprehensive sector development strategy, which will define the roles and relative importance of all of the determinants of food production, including fertilizer.

At this time, however, the Bangladesh Government and USAID remain convinced that increased fertilizer use is one of the most practicable means of affecting yields. Under average Bangladesh farm conditions, one ton of fertilizer can be expected to increase food production by about 3.5 tons, as discussed in annex B.6. (This yield response is still an unproven rule of thumb; in September, 1981 results of the Equity Study will give us a more reliable figure). By this standard, a 15% annual increase in fertilizer use over the period 1979-80 to 1984-85 (an increase from 846,000 to 1,700,000 tons) could be responsible for as much as three million tons of additional foodgrain production in the year 1984-85 alone.

2. Outputs and Inputs

The specific activities comprising this project are directed at the constraints on fertilizer supply and demand outlined above. All outputs are designed to contribute to the project purpose of increased fertilizer use.

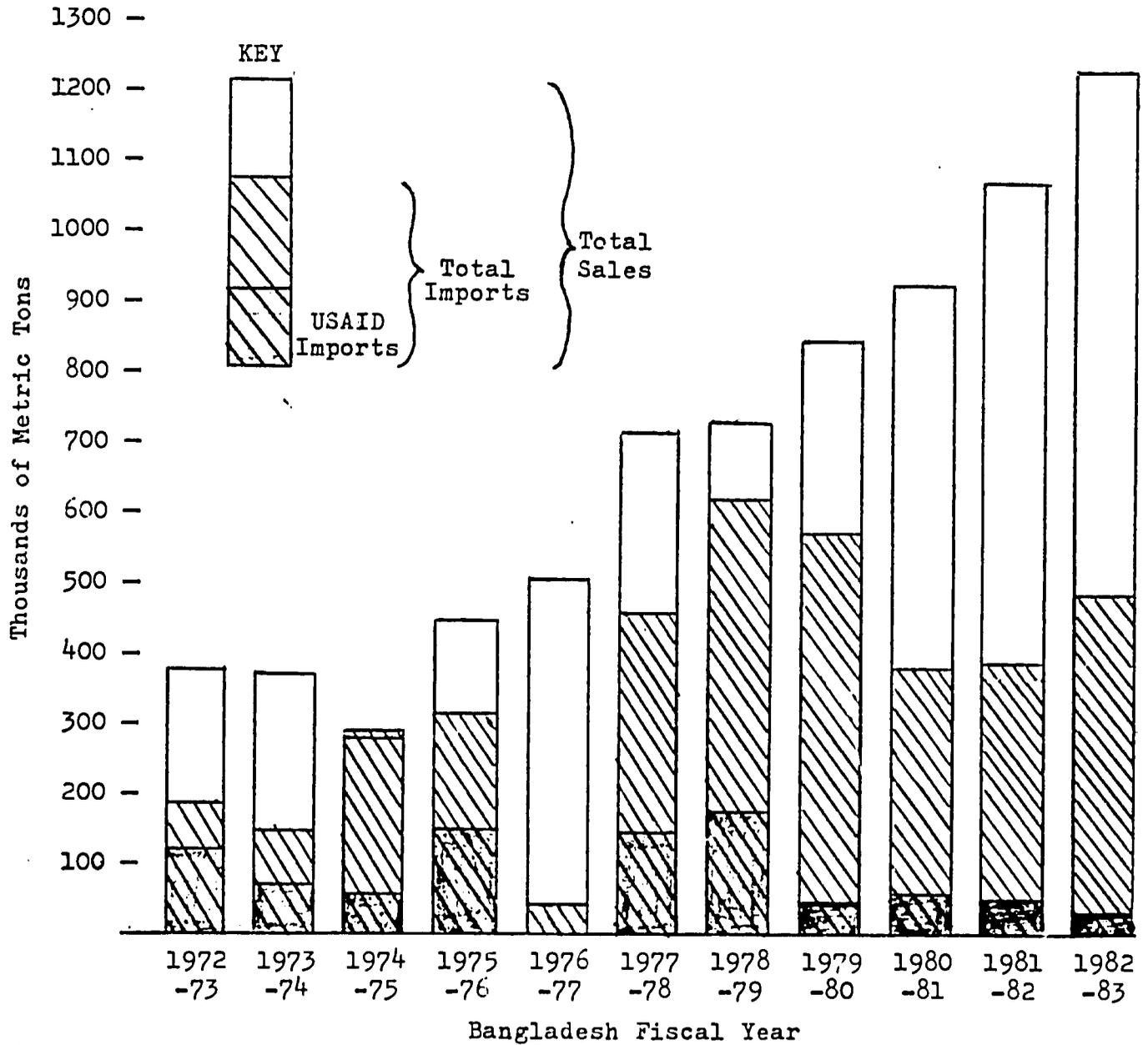
(a) For the Constraints on Imports

BADC is committed to keep domestic fertilizer supplies at such a level that local shortages do not occur and local stocks are sufficient to push sales. The strategy of the government is to manufacture as much of these supplies as possible in Bangladesh. But needs for phosphates and potassium will always have to be met through imports, and for the foreseeable future Bangladesh will need outside assistance to supply the foreign exchange for these import requirements. Projections of sales, local production, stock levels and import requirements through 1984-85 are presented in the Technical Analysis, table 7.

Thus far, USAID has financed the importation of 30,000 metric tons of TSP and 156,000 tons of DAP under this project. These imports have constituted 28 percent of Bangladesh's phosphate imports and 7 percent of its overall fertilizer supply in BDG fiscal years 1978-79 through 1980-81. (The project has also imported a small quantity of micronutrient fertilizers. See Section II.B.2(g) below.) Under this amendment, the project will supply 75,000 MT of DAP in fiscal years 1982-82 and 1982-83. This quantity will constitute 26 percent of DAP imports, 14 percent of total phosphate imports and 8 percent of all macronutrient fertilizer imports over the two year period. Figure 1 indicates the role that USAID financing has played and is expected to play in meeting import requirements and overall supply needs for fertilizer, since the War of Liberation.

Figure 1

USAID Fertilizer Imports in Relation to Bangladesh's
Total Fertilizer Imports and Sales: 1972-73 to 1982-83



USAID Imports	Bangladesh Fiscal Year										
	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83
As % of Total Imports	61%	52%	24%	49%	0%	33%	29%	7%	16%	12%	5%
As % of Total Sales	32%	19%	24%	33%	0%	21%	24%	5%	6%	5%	2%

While assisting the BDG to meet its import requirements, the project has also undertaken to introduce diammonium phosphate (DAP) in place of some of the country's supply of TSP and urea, on an experimental basis. Since one ton of DAP has the nutrient equivalent of a ton of TSP plus 0.39 tons of urea, it offers economic advantages in terms of product cost, ocean freight costs, domestic transport costs, and storage requirements. These savings and other advantages are enumerated in Section III.A.2. The import savings alone amount to \$99 ton in 1981.

With USAID financing, BADC began to import DAP in 1978-79 on an experimental basis. Since then, the new fertilizer has sold well enough that the BDG has made a major commitment to its promotion. In FY 1981-82, BADC will concentrate supplies of DAP, as the major source of phosphorous, in Rajshahi Division, an area accounting for 30 percent of national phosphate consumption in recent years. After a one year trial, farmer preferences will become apparent when DAP and TSP are supplied in equal quantities and compete bag-for-bag. BADC and USAID believe that, once they have tried it, Bangladeshi farmers will understand the advantages of the higher nutrient content in DAP. The first supplies of DAP for this 1981-82 experiment are being provided by the World Bank and USAID. Other donors will finance the rest of the necessary DAP imports throughout the year. Beginning in July, 1981, BADC will establish separate sales and stock targets for DAP and will program DAP imports, just as it does now for TSP, urea, and MP.

The mechanism for programming adequate imports has been improved in the course of this project. With guidance from the International Fertilizer Development Center (IFDC), BADC publishes a Monthly Fertilizer Newsletter which establishes monthly sales targets for each district a year at a time and projects stock positions based on expected production and sales and on planned arrivals of imports. The scheduling of imports has improved somewhat as a result, although occasional situations of oversupply or undersupply do occur.

(b) For the Constraints on Handling and Transportation

(1) Handling: An estimated five percent of the cost of all fertilizer imports in Bangladesh result from the fact that fertilizer is imported in bags rather than imported in bulk and then bagged mechanically in Bangladesh. Bulk importation and mechanical bagging of all imported fertilizer would save Bangladesh about \$15 per ton or over \$6 million in 1981/82. These savings, which derive principally from reduced handling and freight charges and from the fact that bagging operations are cheaper in Bangladesh than in most fertilizer exporting countries, are enumerated in Annex B.16.

In April, 1979, Soros Associates, Inc. completed their feasibility study of bulk handling at Chittagong and Chalna Ports, funded by this project. Three addenda to the study were produced in December, 1979. Soros' principal recommendation was construction of a high speed mechanical offshore unloading system at Chittagong and construction of large bulk storage facilities along with bagging operations at both Chittagong and Chalna. Although the capital cost of this alternative was high, it appeared also to offer the greatest potential cost savings in terms of quick unloading of ships and a maximum draft, allowing a larger, more economical vessel size.

The principal feasibility issue remaining unresolved in the Soros Study was the human and organizational element involved in such large handling facilities. Also, the World Bank financed test dredging of the Karnaphuli River had not yet begun at Chittagong. Considering these unknowns and the risk of committing so much capital to an endeavor of such a scale, BADC decided first to test only a smaller portable bagging operation in the ports.

In response to this decision, a request for technical proposals was prepared by USAID, at the request of BADC, and was issued by BADC in July, 1980. (Technical details of the proposed 360,000 ton per year bagging operation are presented in Annex B.16) Detailed technical and cost proposals for provision of bagging machines and handling services were solicited in December 1980. Although the deadline for submission of these proposals was thrice extended (the latest to May 11, 1981) it is now apparent that there will be no bidder response. If this project is to proceed with the establishment of bagging operations, the RFTP will have to be revised and reissued.

Subsequent to the issuance of the RFTP, a local subsidiary of an international fertilizer supplier was formed with the stated purpose of bagging bulk fertilizer imports, first in Chittagong, then in Chittagong and Chalna. Bulk Management (Bangladesh), Ltd. ordered bagging equipment and has been awarded a contract to bag 15,000 MT of DAP to be imported by BADC in May, 1981 with World Bank financing. USAID and BADC will closely watch this handling operation. If it appears that (1) Bulk Management (Bangladesh) Ltd. can efficiently handle bulk imports in sufficient quantities and at rates that allow BADC to realize significant savings over bagged imports, (2) the company offers its bagging services to all suppliers of bulk fertilizer, and (3) competition is free to enter the fertilizer bagging business, then the USAID-revised RFTP need not be issued. If, however, the new company proves incompetent or too costly or if an enforced monopoly situation should emerge, the revised RFTP will be issued and bagging equipment will be purchased by BADC with the project funds reserved for that purpose under the original project authorization. In the latter case, BADC officials would tour bagging facilities in

other Asian countries prior to revision and reissuance of the RFTP. bids would be evaluated in August 1981 and a contract awarded in September. Mobilization of the equipment and services would require an additional six months, allowing operation of the portable bagging machine scheme early in 1982. Foreign exchange costs of the equipment would be funded by USAID and all taka costs of the operation would be borne by BADC.

The bagging component of this project has been designed in conjunction with the bulk handling component of the IFAD Fertilizer Sector Program, which will include minor improvements to a dedicated fertilizer jetty, bulk unloading and conveyor equipment, and more bagging machines (of the same type as those financed by AID), all at Chittagong Port.

(ii) Transportation: AID will finance construction of rail sidings at 14 of the fertilizer warehouses constructed under the Phase II construction program and at others built under the Phase III program funded by this amendment. More extensive use of the Bangladesh rail system will allow for quicker and cheaper movement of fertilizer from transit godown to PDP.

The project will also fund construction of wharfs for barges and country boats at USAID-financed godowns located on the Bangladesh inland waterway system. This will allow increased use of the country's cheapest transport mode both by BADC, in its distribution role, and by private wholesalers and dealers who offtake fertilizer by boat.

(c) For the Storage Constraint

To generate the project output of increased fertilizer storage capacity, the project has employed engineering consultancy services and plans construction of warehouses for 282,000 tons of bagged fertilizer.

The International Engineering Company (IECO) was contracted in September 1979 to select sites, design facilities, and supervise construction of a USAID Phase II fertilizer warehouse program, (Phase I was financed by the Fertilizer Storage Construction Project 388-0030). When it became apparent that BADC did not have an adequate medium-term and long range masterplan to govern site selection, determine storage requirements, and make most efficient use of Bangladesh's rail and inland waterway transport systems, IECO was requested to assist BADC in the formulation of a National Fertilizer Storage Plan. A draft document was completed in June 1980, and a revised final plan is expected in May, 1981. The plan identifies a need for 657,500 tons of transit and local storage capacity to meet BDG fertilizer sales targets for 1985/86.* (The criteria for deter-

*USAID estimates that the BDG sales target of 2,030,000 tons will not be achieved until 1986-87. Therefore, the NFSP, as presently conceived, will be sufficient for 1986-87 storage needs. In fact, as Bangladesh's transport system is improved, stock turnover rates may be increased, and the 657,500 MT NFSP may suffice beyond 1987.

mining size and location of the warehouses are outlined in the Technical Analysis.) 127,800 MT of this requirement is already in place. USAID will finance construction of up to 282,000 tons under this project. The remaining 233,700 tons of capacity will be financed by the BDG and other donors. (The Dutch, Germans, World Bank, IFAD, ADB, and others).

In December, 1980 BADC issued an invitation for bids for construction of 162,000 MT of storage constituting USAID's Phase II program. Bids were opened on March 25, 1981, and a contract should be awarded late in May. It is expected that the last of the 26 sites constructed under this program will be completed by September, 1983.

A Phase III storage construction program, to be funded under this amendment, will consist of approximately 120,000 MT capacity. BADC hopes to contract for engineering design and supervision services in July, 1981 and to engage the first construction contractor early in 1982. In the course of evaluating the bids for the Phase II construction program, the Mission noted that bids by American construction firms were about 20 percent higher than the costs (after allowing for inflation) of the Phase I program, which was built by Bangladeshi contractors. It is therefore anticipated that BADC will contract several local firms to build the Phase III program. The final sites should be completed in the first half of 1985.

(d) For the Marketing Constraint

Perhaps the project's most significant contribution to development of the fertilizer subsector has been the introduction of the New Marketing System (NMS) for fertilizers. The thrust of the NMS is to transfer local distribution and marketing operations from public to private hands in the belief that private wholesalers and retailers will be more responsive to demand signals and will transport fertilizer more efficiently than BADC.

Project inputs directed at reforming the marketing system (the old fertilizer marketing system is described in section II.A.1 and Annex B.5 of the original project paper) have consisted primarily of BADC's revision of its regulations and procedures and AID-financed technical assistance in fertilizer distribution and marketing to analyze marketing problems and to recommend and evaluate BADC reforms. BADC adopted the NMS first in Chittagong, on a

trial basis, in December 1978, then in Dacca and Khulna Divisions, beginning January 1980, and finally in Rajshahi Division, beginning July 1980. The major reforms embodied thus far in the NMS include:

- consolidation of BADC sales points to a smaller and more efficient number of primary distribution points (PDPs) and retention of Thana Sales Centers only in inaccessible areas not adequately served by PDP dealers,
- open registration of dealers in place of the former restrictive licensing requirements,
- increased dealer profit margins at PDP's to encourage entry into the business and wider distribution,
- reduced prices on large purchases at PDP's to encourage wholesaling,
- unrestricted private movement of fertilizer anywhere in the country, except in the border areas, and
- elimination of fertilizer "rationing", whereby dealers were sometimes required to buy various fertilizer products in fixed proportions.

An IFDC evaluation of the NMS after a full year of operation in Chittagang Divisions found that:

- farmers' access to fertilizer increased by 130 percent since the introduction of the NMS (measured in terms of retail sales points),
- prices farmers paid for fertilizers under the NMS were lower than those paid under the old system,
- 44 of the 114 thana sales centers had been closed because their sales had fallen by over 50 percent (replaced by sales from PDPs), and
- a new class of fertilizer wholesalers had developed. (44 percent of the active PDP dealers sold over 50 percent of their fertilizer stocks to sub-dealers.)

A new evaluation of the 1980 performance of the NMS is being conducted in April-June, 1981. A preliminary glimpse at sales figures indicates that 56 more TSC's may be closed because their sales have fallen by at least half as a result of increased dealer offtake from PDPs. (A 50 percent decline in sales under the NMS is BADC's criterion for phasing out the old TSC's).

Under this amendment to the project, BADC will further strengthen the efficiency of the New Marketing System by eliminating controlled prices at the retail level and by setting dealer prices for various imported fertilizer products in proportion to their costs to BADC. The first measure will allow farmers situated near PDPs to enjoy retail prices lower than the current administered prices. It will also make it worthwhile for dealers to transport fertilizer to remote areas where transport costs are too great for dealers to make a profit under the current, controlled pricing system. The latter measure will more equitably distribute the BDG's subsidy among the various fertilizer products. At present, for example, the subsidy on DAP is smaller than that on the equivalent nutrient purchases of TSP plus urea.

Another new marketing system initiative to be funded under this amendment will be a Dealer Development Program, consisting of dealer training, dealer credit, and the fostering of fertilizer dealer associations. USAID will provide technical assistance and training materials for this program in order to address the demand constraints (lack of farm credit and limited farmer knowledge) discussed in subsections (f) and (h) below.

(e) For the Management Constraint

In the course of this project, the IFDC marketing consultants to BADC have identified numerous deficiencies in the management practices of the organization which result in day to day operational inefficiency and increased costs of fertilizer distribution in Bangladesh. Specifically, the consultants have recommended adoption of a financial accounting system, restructuring of the BADC warehouse management system, adoption of a fertilizer stock accounting and reporting system, decentralization of decision making authority (both to the district level and within the headquarters staff), reform of the system of contracting for movement by truck, transfer of local distribution to the private sector (NMS), improvement of handling practices, and refinement of the import programming mechanism. Current activities include participation in the development of a National Fertilizer Use Policy Study (to establish long term goals for production, distribution, and introduction of new products) and development of a least-cost movement plan. Training of mid-level management in fertilizer marketing continues with IFDC assistance. All of these activities, and others, are aimed at increasing the operating efficiency of the organization and thereby minimizing the costs of getting fertilizer to the dealer and, ultimately, to the farmer.

Some of the recommended operational and administrative reforms have been adopted already. For example, movement contracting procedures have been revised, physical handling practices have been

improved, more efficient lifting agreements have been reached with all the fertilizer factories, buffer stock targets have been reduced to more cost effective levels, stock loss allowances for storekeepers have been discontinued, and controls have been established to reduce short landing losses in the ports. Other reforms will be conditions precedent to the disbursement of funds approved under this project amendment (see Section V.C, below). Furthermore, to assist BADC in instituting management reforms during the period of the project extension, USAID will fund a resident consultant to work with the planners in BADC's Implementation Division in drafting the project pro formas which govern the operations of all BADC activities and in incorporating reforms within the corporation's management information system. Once the recommended efficiency measures are instituted in the regulations of the organization, they can be expected to bear results.

Yet, while BADC is receptive to most specific suggestions for cost cutting, the predominant management attitude within the institution is a belief that, in order to multiply fertilizer sales, BADC must multiply its operating personnel and administrative structures proportionately. Less attention is given to increasing the productivity of the present 35,000 employees of the organization. Most meaningful decisions are still referred to the top management levels, and as BADC grows it becomes more and more unwieldy. Subordinates are not adequately used, trained, or encouraged. Superior performance is rarely rewarded.

Therefore, under this amendment, a management study and intensive training program will identify and promote a system of management that will tap the potential of those levels of management now denied sufficient responsibility or authority. By training top and middle-level managers to delegate authority, to train subordinates, and to encourage suggestions from the rank and file, it is hoped that the productivity of the current personnel will be able to keep pace with or outstrip a rapidly growing volume of sales of agricultural inputs.

Project funds will be provided for:

- a pre-training study to identify the fundamental management problems of BADC and suggest improvements,
- the design of a training curriculum for improved management,
- a training program,
- follow-up and evaluation services,
- institutionalization of the new management training program within the BADC Staff Training Institute, and

- design of a performance incentive system aimed at rewarding operating divisions for superior performance in the achievement of established goals.

(f) For the Credit Constraint

Inadequate availability of credit constrains both the supply of and demand for fertilizer in Bangladesh. Most dealers are relatively small operators with limited capital to finance the fertilizer stocks necessary to fully meet farmer demand. At the same time most small and tenant farmers have difficulty in obtaining institutional loans to finance their fertilizer purchases. This project will seek to increase both supply and demand by making credit available directly to the dealers and indirectly to farmers through the dealers. The BDG will establish dealer credit through local branches of the Bangladesh Krishi Bank in one Division of Bangladesh on a trial basis in 1981-82. BDG has requested the central bank for an allocation of 150 million taka for this purpose, and will request up to 600 million taka in 1982-83, should the program warrant expansion to the rest of the country. Credit will enable dealers both to increase their own inventories and to increase sales by being better able to finance their customers. An underlying assumption is that the dealer is more likely than a bank to extend credit to farmers because of his interest in increasing his sales volume and because of his personal knowledge of his customers.

Although the details of the program have yet to be worked out, BADC and BKB have agreed in principle on several major points. BADC will select eligible dealers from a list of active dealers - those who lift fertilizer at or above certain minimum rates. Participation in dealer associations and/or dealer training programs may also be criteria for participation in the dealer credit program. A qualified dealer will be eligible for a revolving line of credit in the form of bank drafts in favor of BADC for given quantities of fertilizer. This credit may be replenished upon repayment of cash receipts from fertilizer sales or presentation of credit vouchers issued to farmers to whom he has, in turn, sold the fertilizer on credit. Credit will be extended on a seasonal basis at a 15.5 percent annual rate.

USAID will provide consultancy services to design, monitor, and evaluate the credit program with funding provided under this amendment for the Dealer Development program.

(g) For the Micronutrient Deficiency Constraint

Within the last two years, interest in problems of secondary nutrient and micronutrient soil deficiencies has grown rapidly within the Ministry of Agriculture and Forests. In particular, zinc and sulphur deficiencies have been observed to reduce the effectiveness

of macronutrient fertilizers in various parts of the country. While soil mapping is carried out to identify more accurately the micronutrient deficient areas, agronomic experimentation has begun to determine optimal applications of new fertilizers to redress chemical imbalances in the soils. To aid in this research and to provide for demonstrations and for farmer purchases in soil deficient areas, BADC imported 1,500 tons of zinc sulphate and zinc oxy-sulphate in December, 1980, with project funding. USAID has also recently offered to procure a small quantity of granular soil sulphur for experimentation. Funds provided by this amendment are budgeted for the importation of another 4,000 MT of micronutrient fertilizers during the next three years.

(h) For the Constraint on Farmer Knowledge

The project output of increased knowledge of correct fertilizer use will be approached, like the credit component, through the fertilizer dealers. To supplement the Ministry of Agriculture and Forests' agricultural extension program, the project will train fertilizer dealers in the correct use of all fertilizer products available in Bangladesh. The dealer is in a unique position to disseminate technical information and to encourage increased application of fertilizer, because he has a degree of farmer contact unrivaled by any extension service and because he is the last informed person the farmer sees before applying his fertilizer. This project will supply technical assistance to train Bangladeshi instructors, who will form several mobile dealer training teams to visit all the district subdivisions of Bangladesh giving short courses (two days) to dealers. It is believed that increased farmer knowledge of fertilizer use, imparted through an informed cadre of dealers, will increase the effectiveness of fertilizer on crops and thereby increase demand for fertilizer products.

(i) For the Constraint on Complementary Farm Inputs

Rapidly increasing fertilizer use is linked, in part, to the spread of the HYV technologies which are more fertilizer responsive. So to promote the project purpose and to diversify crop production, 21,312 tons of high yielding wheat seed were imported with project funds in 1979 and 1980. As a result of the increased availability of good quality seed, wheat planting has increased from 654,000 acres in 1978-79 to 1.07 million acres in 1979-80 and 1.5 million acres in 1980-81. BADC has developed a seed multiplication system using both BADC farms and contract seed growers. This local production capacity, together with BADC-held seed stocks and some importation financed by the BDG and West Germany, is projected to be adequate to meet wheat planting requirements for 1981-82.

PART IIIPROJECT SPECIFIC ANALYSESA. Technical Analysis Update1. Storage

BADC's National Fertilizer Storage Plan (compiled with project funded technical assistance) identifies a need for 657,500 tons of public storage capacity at the PDP (495,000 tons) and transit godown (162,500 tons) levels to meet projected fertilizer demand under the New Marketing System in 1985. This storage requirement was calculated on the bases of:

- (a) BDG projections of fertilizer sales for each PDP service area for 1986 (totalling 2,030,000 tons nationally);
- (b) a required storage capacity at each PDP of between 2 and 4 months' fertilizer requirement (3 to 6 stock turnovers per year), depending on the remoteness of the PDP and seasonal transportation constraints; and
- (c) a required storage capacity at each transit warehouse, calculated at one month's projected annual fertilizer sales of the PDP's serviced from the transit warehouse.

127,800 tons of this total requirement are already in place at National Fertilizer Storage Plan (NFSP) sites. Of the 529,700 tons additional required storage capacity, 162,000 tons are being financed under the original authorization for this project (USAID's Phase II Storage Construction Program), 14,000 tons are still under construction under BADC's ongoing domestically financed "hard core" program, 120,000 tons will be built under this project amendment (USAID's Phase III Storage Construction Program), and the remaining 233,700 tons will be financed by other donors.

At this time, financing arranged to complete the National Storage Plan is as follows:

Existing capacity at NFSP sites	127,800 tons*
USAID Phase II Program	162,000 tons
Remaining BADC "Hard Core" Program	14,000 tons
IBRD financed	33,400 tons
German financed	22,000 tons
Dutch financed	5,000 tons
IFAD financed	19,000 tons
Asian Development Bank	25,000 tons
USAID Phase III Program	120,000 tons
Other Donors (to be identified)	129,300 tons
Total NFSP requirements	<u>657,500 tons</u>

The projected sales volume, required storage capacity, and financing source for each of the 88 sites in the National Storage Plan can be found in Annex B.14.

* includes 19,000 tons capacity built by USAID's Fertilizer Storage Construction Project (388-0030)

To develop the National Fertilizer Storage Plan, BADC and USAID jointly conducted a point-by-point and thana-by-thana review of the agronomic fertilizer requirement, likely fertilizer demand, and transportation facilities of the entire country. The major considerations for selection of the Primary Distribution Points were: (1) to locate them at the intersections of major transport modes and (2) to minimize their numbers, while (3) selecting a sufficient number of points so that the private sector could feasibly supply fertilizer to all areas of the country from one or another of the PDPs. Transit warehouses are located where required to facilitate transfers from one major mode of transportation to another (i.e. ship-to-barge, ship-to-train, ship-to-truck, barge-to-train, barge-to-truck, train-to-truck). The temporary storage capacity provided at transit facilities reduces the need to intimately schedule and coordinate transshipments and provides the necessary flexibility to the movement system. To consolidate operations where possible, transit facilities serving some PDP's are located at other PDP's which lie along major water and rail routes.

The warehouses included in the National Fertilizer Storage Plan will be built according to the standard for construction of permanent buildings in Bangladesh. The buildings will consist of reinforced concrete columns, brick and mortar walls, slab concrete floors with reinforcing mesh, and beam and slab reinforced concrete roofs. The modular designs used in USAID's Phase I and Phase II construction programs (12 x 24 ft. and 20 x 20 ft. column grid configurations, respectively) will be available for use in the Phase III program.

At rated storage capacity, fertilizer will be stocked at an average density of seven square feet of floor space per stored ton. All warehouses will have truck loading platforms. Those located along rail lines will feature rail sidings and rail loading platforms, and riverside sites will include barge wharfs. Perimeter fences and ancillary buildings will be constructed at all sites.

Until this system is completed, BADC will continue to rely on a hodgepodge of owned and rented storage facilities, some located at NFSP designated sites and others poorly located for supply and for sales to dealers. At this moment, BADC-owned fertilizer storage amounts to 198,900 tons capacity, 127,800 of which will be incorporated into the NFSP. This rest, mostly small 500 and 1,000 ton godowns, will be turned over to other BADC operating divisions (storage of seed or irrigation pumps), operated as Thana Sales Centers in remote thanas, or sold or rented to the private sector.

In addition to its own storage facilities, BADC rents 232,352 tons of warehouse space in the ports, at transit and intermediate warehouses, and at the PDP and thana levels. Since Liberation, USAID has monitored fertilizer movement through all these levels in the course of several projects and has visited almost all the warehouses. The rented facilities in use have consistently been found to be unsuitable for fertilizer storage and acceptable only as a short term expedient. The reasons for this situation are not hard to discern. There is a scarcity of good quality storage throughout Bangladesh, especially in the rural areas. Where

suitable warehouses do exist, however, the owners prefer to rent them to other clients for storage of items such as jute or foodgrains, thus avoiding the corrosive effects of fertilizer (especially TSP and Urea). Therefore, fertilizer is almost invariably stored in the only available facilities, typically those with mud floors, cracked walls, and leaky roofs. Some is even stored in mud and thatch huts. The fertilizer gets dripped on from above and absorbs moisture from the ground below, turning the fertilizer first mushy, then solid as a rock, and reducing its chemical potency and marketability. As warehouses are built under the National Fertilizer Storage Plan, BADC will release these substandard rented godowns.

2. Fertilizer Imports

The major fertilizers in use in Bangladesh during the last decade have been the following simple macronutrient fertilizers:

- Urea : 46 percent nitrogen, N
promotes vigorous plant growth; increases protein content
- TSP : 46 percent phosphate, P₂O₅
promotes cell division, root growth
- MP : 60 percent potassium, K₂O
promotes fruit formation, disease resistance;
prevents wilting and lodging.

Before the introduction of DAP in 1979, these three fertilizers constituted 99% of BADC's fertilizer sales in Bangladesh. (Annex B.1 presents sales of all fertilizers since 1962).

In the course of this project, the Bangladesh Government and USAID have agreed to introduce DAP as a substitute for TSP and as a source for some of the local nitrogen requirements. A compound macronutrient fertilizer, DAP contains 18 percent nitrogen plus 46 percent phosphate. The major and compelling reasons for the planned shift from TSP to DAP are as follows:

- (1) The higher nutrient concentration (a ton of DAP is the nutrient equivalent of a ton of TSP plus 0.39 ton of urea) affords considerable foreign exchange savings in terms of product cost, ocean freight, and bags. The savings are estimated at about \$99 per ton of fertilizer purchased under this grant*.
- (2) DAP is compatible in storage with urea and, unlike urea and TSP, has little or no damaging effect on bags, warehouses, and transportation equipment.

* Current import prices (C.I.F.) are \$315/ton for TSP, \$345 for DAP, and \$330 for urea (all bagged). A ton of imported DAP is therefore calculated to be \$99 cheaper than its imported nutrient equivalent of a ton of TSP plus .39 tons of urea.
\$315 + (.39) \$330 - \$345 = \$99.

- (3) The higher nutrient content will mean a 28% reduction in storage requirements and domestic transportation and handling costs, thus facilitating a more rapid expansion of nutrient use.
- (4) DAP is an excellent basal (before planting) fertilizer.

To touch, sight, and smell, there is little difference between granular TSP and DAP. Both are commonly applied prior to planting. Once farmers appreciate the higher nutrient content in DAP, there should be little difficulty in introducing DAP in place of TSP. In fact, most countries in the region, including Afghanistan, Pakistan, and India, have made the switch. Some districts of Bangladesh (i.e. those in the Northwest Division) are already using considerable amounts of DAP when they can get it.

In the two years that DAP has been available to the Bangladesh farmer, no clear picture has yet emerged as to the farmer's relative preference for DAP or TSP. The volume of DAP available in any given area of Bangladesh has not yet been adequate to carve out a large share of the phosphate market. So to test farmer acceptance of and demand for the new product, BADC and USAID have agreed to make DAP the sole source of phosphates (an advantage that TSP has enjoyed for the last 17 years) available for sale in Rajshahi Division during the 1981-82 fiscal year. At the end of a year, enough farmers will have used it that DAP and TSP will be able to compete bag-for-bag, as long as supplies are adequate, in future years. To aid in this experiment, BADC has embarked on a DAP publicity campaign in the five districts of Rajshahi Division to inform dealers and farmers of the advantages of the double-ingredient fertilizer. World Bank and USAID-supplied fertilizer will provide the initial stocks of DAP for the program.

The other recent development to affect future fertilizer use is a growing awareness of the potential roles of micro-nutrients in increasing crop yields in Bangladesh. In 1979 zinc deficiencies and sulphur deficiencies were observed in the field and confirmed in laboratories in many parts of the country. These nutrient deficiencies are especially prevalent in soils that are intensively cropped and remain wet all year. Zinc deficiencies are observed to be resulting in irregular and patchy rice seedlings, poor tillering, stunted growth, and uneven maturity of the rice crop. Sulphur deficiencies, the extent of which are not yet known, are reducing both plant yields and protein quality. In response to the zinc problem, USAID financed the importation of 1500 tons of zinc sulphate and zinc oxysulfate in December 1980 and recently offered to supply a very small quantity of experimental granular soil sulphur (to complement ongoing experiments with sulfate fertilizers and gypsum). The zinc fertilizers were distributed to the various organizations engaged in agronomic research in Bangladesh and to the known zinc deficient areas for supervised demonstrations and for sales to farmers. If results are favorable and sales go well, BADC will ask USAID and other donors to supply more zinc in 1981. The volumes of these micronutrient sales, however, will be modest during the life of this project.

Although fertilizer sales have increased dramatically since the War of Liberation (see appendix B.1), the level of fertilizer use in Bangladesh is still one of the lowest among the rice growing countries of Asia, due to many of the constraints discussed in the Project Background (Section II. A.2). But because the Ministry of Agriculture and Forests has planned a concerted attack on these constraints during the current (1979-80 to 1984-85) Five-Year Plan Period, BADC and the Planning Commission are confident that fertilizer sales continue to rise at 15%/annum. The storage and transportation constraints, for example, should be greatly reduced in the plan period. And the rapid expansion of irrigated land should increase demand for accompanying inputs like HYV seed and fertilizers. The Government plans to expand irrigated acreage from 3.66 to 7.2 million acres during the plan period.

A 15% annual increase in fertilizer offtake is consistent with USAID projections in the original version of this document, and USAID still believes it to be an appropriate target. Leaving aside for a moment the importation of DAP, the following fertilizer equivalent tonnages reflect an overall sales growth rate of 15% per annum.

TABLE 4

Fertilizer Sales Projections to 1984-85
(thousands of long tons)

	<u>N(46%)</u>	<u>P₂O₅(46%)</u>	<u>K₂O(60%)</u>	<u>TOTAL</u>
1979-80	552	248	46	846
1980-81	630	288	55	973
1981-82	718	334	66	1118
1982-83	819	387	79	1285
1983-84	931	449	95	1478
1984-85	1065	521	114	1700

If one then takes into account the fact that 37%* of phosphates will likely be DAP, beginning in 1981-82, and that each ton of DAP provides the nutrient equivalent of one ton of TSP plus 0.39 ton of urea, the following mix of fertilizers will provide the same nutrients as presented in table 4 above.

TABLE 5

Fertilizer Sales Projections to 1984-85
(thousands of long tons)

	<u>Urea</u>	<u>TSP</u>	<u>DAP</u>	<u>MP</u>	<u>TOTAL</u>
1979-80	536	206	42	46	830
1980-81	611	239	49	55	954
1981-82	670	210	124	66	1070
1982-83	763	244	143	79	1229
1983-84	869	283	166	95	1413
1984-85	990	328	193	114	1625

* This estimate is based on BADC's commitment to the Rajshahi experiment (Rajshahi normally uses 30% of Bangladesh's phosphates) and the likelihood that DAP will constitute about 10% of the phosphates sold in the other three Division of the country.

Bangladesh will meet as much of this demand as possible through local production. The rest must be met through importation. The most significant unknown in the local production equation is the date on which the Ashuganj Urea Factory will come on stream. A series of construction setbacks has postponed the start of production for three years. USAID's latest estimate is that test production at Ashuganj will begin in September, 1981. The factory should operate at 60% of rated production capacity by November, 1981 and reach targeted levels within 2 years. Table 6 presents USAID's estimate of production at Bangladesh's four fertilizer factories through 1984. Past production is presented in Annex B.4.

TABLE 6

Estimated Local Fertilizer Production
(Thousands of Metric Tons)

	<u>Ashuganj</u>	<u>Ghorasal</u>	<u>Fenchuganj</u>	<u>Urea Subtotal</u>	<u>TSP Chittagong</u>	<u>Total</u>
1980-81	-	342	80	322	60	382
1981-82	250	270	75	595	80	675
1982-83	375	270	75	720	90	810
1983-84	475	270	75	820	90	910
1984-85	475	270	75	820	90	910

Based on these sales projections and production estimates, and given an in-country stock requirement (including factory stocks) of a three-month supply of urea and a five-month supply of phosphates and MP, one can calculate projected import needs as presented in table 7.

USAID funds appropriated under this project extension will help meet import requirements during Bangladesh fiscal years 1981-82 and 1982-83.

The greatest need will be for phosphates, and USAID will continue its leading role in encouraging the adoption of DAP by importing 75,000 tons of DAP. This quantity amounts to 26% of DAP requirements but only 8 percent of total import needs over the two-year period. This level of support will be lower than past AID practice, reflecting current AID budget constraints. (Since Liberation, USAID has provided 28% of Bangladesh's imported fertilizer.) USAID will also import small quantities of zinc, sulphur, and other secondary and micro-nutrients as needed.

TABLE 7

Fertilizer Import Requirements
(Thousands of Tons)

	<u>Urea</u>	<u>TSP</u>	<u>DAP</u>	<u>MP</u>	<u>Total</u>
<u>1981-82</u>					
Expected Opening Stock*	150	140	45	55	390
Local Production	595	80	0	0	675
Sales	670	210	124	66	1070
Import Requirements	116	92	139	44	391
<u>1982-83</u>					
Required Opening Stock	191	102	60	33	386
Local Production	720	90	0	0	810
Sales	763	244	143	79	1229
Import Requirements	69	170	152	86	477
<u>1983-84</u>					
Required Opening Stock	217	118	69	40	444
Local Production	820	90	0	0	910
Sales	869	283	166	95	1413
Import Requirements	80	212	177	103	572
<u>1984-85</u>					
Required Opening Stock	248	137	80	48	513
Local Production	820	90	0	0	910
Sales	990	328	193	114	1625
Import Requirements	195	252	201	118	766

* These July 1981 opening stock figures are not required stock levels. They are USAID estimates of the unbalanced stock situation which is likely to exist at the end of this fiscal year. The opening stock of urea is particularly uncertain. The 150,000 ton figure assumes a BDG self-financed import of 40,000 tons, which USAID is encouraging and without which FY 81-82 imports would have to be increased.

B. Economic Analysis

1. Farm Level Financial Analysis Update

Farm level cost of production surveys conducted during the last three-year period of project implementation validate the original project paper's calculations of the profitability of chemical fertilizer use to owner and tenant cultivators of foodgrains.^{1/} Even at actual -- lower than recommended -- average fertilizer use levels, these surveys show that farmers have an incentive to adopt fertilizer and that further income gains would be realized from increasing fertilizer applications to recommended levels under proper management conditions. These findings are supported by annually increasing fertilizer sales; farmers, in increasing numbers, are finding fertilizer a profitable investment.

Conditions under which farmers used fertilizer at the outset of the project in 1977-78 are not the same as the conditions prevailing today, nearly three years later. The most notable change has been in the relative official prices of fertilizers and foodgrains. Table 8 shows that between July 1976 and November 1980, official fertilizer price increases totaled 80 percent,^{2/} while official procurement prices increased only 49 percent for paddy and 53 percent for wheat. Moreover, the wage bill which accounts for over half of production costs has risen at least as much as the procurement price. Irrigation and pesticide costs, while of lesser importance in the production equation, have also increased at least in step with fertilizer price changes.

Assuming no change in the structure of production (the proportions in which inputs are used) and no increases in yields or acreage cropped, these input price increases would have resulted in a deterioration in farmers' incomes during the period covered. In fact, fertilizer sales have continued to grow despite the increases in fertilizer prices, the deterioration in relative fertilizer/grain prices, and adverse climatic conditions during parts of the period. Thus the benefits of fertilizer use appear to exceed its increasing cost.

^{1/} USAID and MOA Farm Level Cost and Returns Surveys for 1978/79 and 1979/80.

^{2/} For ease in calculations a composite fertilizer price is employed, based on prices of the main fertilizers weighted by their relative use in cultivation.

TABLE 8
Relative Fertilizer and Foodgrain Prices and Price Changes

<u>Fertilizer Sales Prices</u>			<u>Foodgrain Procurement Prices</u>				
<u>Effective Dates</u>	<u>Price in Taka/maund*</u>	<u>Percent Change</u>	<u>Effective Dates</u>	<u>Price in Taka/maund</u>		<u>Percent Change</u>	
				<u>Paddy</u>	<u>Wheat</u>	<u>Paddy</u>	<u>Wheat</u>
-	-	-	April 1, 1976	77	75	-	-
July 1, 1976	56	-	-	-	-	-	-
-	-	-	Nov. 15, 1977	84	84	9%	12%
July 1, 1978	65	16%	-	-	-	-	-
-	-	-	April 5, 1979	84	90	0%	7%
Aug. 27, 1979	83	28%	-	-	-	-	-
-	-	-	Nov. 15, 1979	110	110	31%	22%
Nov. 2, 1980	101	22%	Nov. 15, 1980	115	115	4.5%	4.5%
Total change (July 1, 76 to present)	-	80%	Total change (April 1, 76 to present)	-	-	49%	53%

Sources: Fertilizer: BADC. Foodgrains: World Bank report.
*weighted average price

While we do not yet know the extent to which crop yields on individual farmers' fields have improved over the project period and the degree to which increased fertilizer use can be credited with any yield increases, it is possible, using available figures, to assess the extent to which higher yields might ameliorate the deterioration in fertilizer/foodgrain price relationships.

Consider, for example, the case of a wheat farmer (original Project Paper Annex B.13, Table 2) who in 1977 applied two maunds of fertilizer and obtained yields of 20 maunds of grain per acre. (At 56 taka per maund, he paid 112 taka for fertilizer.) Assume that in late 1980 he applies 3 maunds of fertilizer at 101 taka per maund, for a total cost of Tk. 303. The added cost of fertilizer would be 191 taka. With grain selling at 115 taka per maund in 1980, the farmer requires only a 1.7 maund increase in yield ($191 \div 115$) to offset higher fertilizer costs.

As findings become available from the project-funded "Equity Study" survey and analysis, it will be possible to assess the extent to which chemical fertilizer use and the efficiency of that use are changing among cultivators of various farm sizes and tenancy groups. Early "Equity Study" findings from the 1979/80 T. Aman and Boro crops indicate that farmers of all sizes and tenancy groups were using fertilizers at about the same levels and with about the same efficiency, though as mentioned above, the 1979/80 T. Aman season was not a typical Aman season.

It is expected that as farmers become more familiar with fertilizer use and complementary measures (e.g. timely weeding, water application, pest control) to maximize returns from its use, their crop yields will improve. Measures under the project to improve the timely distribution of fertilizer to farmers can be expected to have a similar positive effect.

Under such conditions, farmers could easily absorb increases in fertilizer prices out of the revenues generated from only modest improvements in yields, even in the absence of grain price increases. For example, a 25 percent increase in fertilizer prices would result in only a 5 percent increase in total production costs, given no change in cultivation inputs and practices. In the case of the wheat farmer in the above example, only a further 5 percent increase in yield, or one more maund of wheat per acre (5 percent of 21.7 = 1.08), would be required to pay for the added fertilizer cost in the absence of any increase in output prices. The added yield of 2.78 maunds to cover the increased costs of both greater fertilizer use (from 2 to 3 maunds per acre) and higher fertilizer prices, represents a "reasonable" output/fertilizer response ratio by the most basic agronomic standards. Further analysis, however, will be required to determine the extent to

which, under current and proposed agronomic practices, farmers can increase yields in response to greater fertilizer use and still absorb higher fertilizer costs. It should not be overlooked, of course, that grain prices along with fertilizer prices are expected to rise in the future. The need for maintaining income levels by extracting greater efficiency (higher output response ratios) from increased chemical fertilizer use, will be reduced to the extent farmers can count on rising grain as well as fertilizer prices.

In summary, there appears to be ample scope for continuing to improve the level and efficiency of fertilizer use, as well as to increase fertilizer sales prices to levels more in line with production costs, without jeopardizing the income and equity goals of the project for farmer beneficiaries. Continued monitoring of farmers' use of fertilizers will be required, however, for which the equity study activities under the project will be continued and institutionalized.

2. Macroeconomic Assessment (Summary)

Although many of the economic benefits expected to result from this project are difficult, if not impossible, to quantify, the benefit/cost analysis in Annex J does attempt to measure the economic returns to the two costliest AID-financed project elements - fertilizer imports and storage construction - and to assess them in terms of their costs.

(a) Fertilizer Imports

The proposed project amendment includes provision of 75,000 metric tons of diammonium phosphate and 4,000 metric tons of micronutrient fertilizers over a two year period. Full economic costs of the fertilizer include import costs (C.I.F.), distribution/marketing costs, and the farmers' labor costs for fertilizer application and for extra weeding, harvesting, and threshing. These total costs were calculated at \$480/ton in 1980/81 prices.

The benefits attributable to these fertilizer imports were measured in terms of increased agricultural production resulting from the use of that fertilizer. This production was valued at \$377 per ton - the cost of imported grain delivered up-country, adjusted downward for the difference in quality between imported grain and locally produced HYV grain. On the basis that application of a ton of fertilizer results in 3.5 tons of additional foodgrain (as developed in Annex B.6), gross benefits of a ton of imported fertilizer amount to \$1,320.

Using a real (net of inflation) discount rate of 10 percent, the present values of the streams of benefits and costs of the fertilizer import program were compared, yielding a benefit-cost ratio of 2.5 to 1. As a sensitivity analysis, we also calculated the benefits under the alternative assumptions that 2.5 and 1.5 tons of extra grain will result from application of a ton of fertilizer. These assumptions resulted in

benefit cost ratios of 1.78 to 1 and 1.07 to 1, respectively, indicating that even in the harshest of circumstances the fertilizer import program is economically sound for Bangladesh.

(b) Storage Construction

The benefits of increased and improved storage capacity were assessed in Annex J in terms of (i) increased production through increased fertilizer use due to improved availability, (ii) reduced distribution costs through efficient site location, and (iii) reduced losses of nutrient value in storage.

(i) Improved Availability. A portion of the warehouse capacity built under this project will expand local storage capability and thereby allow fertilizer sales to increase to levels beyond those that would be attained if storage facilities were inadequate. The benefits accruing to this portion of the storage construction are measured in terms of the value of the extra foodgrain resulting from these increased sales net of all costs of the extra fertilizer used (importation plus distribution plus farm labor). Using a fertilizer yield response rate of 3.5 to 1, these net benefits amount to \$890/ton of extra fertilizer sold. Using alternative response rates of 2.5 to 1 and 1.5 to 1, each extra ton of fertilizer sold produces \$512 and \$135 in net benefits, respectively. These benefits were calculated over an assumed thirty year life of the warehouses in Annex J.

(ii) Reduced Distribution Costs. Another portion of the new warehouse capacity will replace inefficiently located godowns which are currently rented by BADC. Efficient location of PDP's and transit godowns along rail and waterways will save BADC about \$3 per ton over current movement costs. In Annex J these savings were estimated at \$396,000 per year (at constant 1981 prices) over the life of the warehouses.

(iii) Nutrient Loss Avoided. The nutrient value of urea is diminished by up to 5 percent if urea is stored in conditions exposing it to excessive moisture. This loss will be avoided in that portion of the project-constructed storage (78,000 MT) which replaces substandard, rented godowns. Assuming that 50 percent of the urea stored in these substandard warehouses is exposed to moisture and 5 percent of the nutrient value of that exposed urea is lost due to moisture absorption, we can then calculate the tonnage of urea loss avoided through improved storage. The value of the extra foodgrain produced as a result of this nutrient saving is calculated based (as above) on a fertilizer yield response ratio of 3.5 to 1. This value was calculated in Annex J at \$5,146,050 per year. For a sensitivity analysis we varied the urea exposure rate (from 50 percent to 25 percent), the nutrient loss rate (from 5 percent to 3 percent), and the yield response ratio (from 3.5:1 to 2.5:1 and 1.5:1). Various combinations of these three factors resulted in the twelve possible values of the annual benefits of an avoided nutrient loss presented in table J.5.

Costs of the construction program and benefits under the various assumptions discussed above were discounted at a real (net of inflation)

discount rate of 10 percent over a thirty-three year period (three years of investment costs plus a 30 year life of the warehouses). When the present values of the combined streams of benefits of improved availability, reduced distribution costs, and avoided nutrient loss were compared with the present value of the warehouse costs, twelve benefit-cost ratios were generated, ranging from 44.8:1 to 7:1. Since benefits exceeded costs in every case, the storage construction program was judged economically sound.

3. Balance of Payments Update

Barring an unforeseen adjustment of the prevailing relationship between world fertilizer and grain prices, the importation of fertilizer will always make sense from a balance of payments viewpoint up to the point at which the agronomic demand for fertilizer or foodgrain self-sufficiency has been reached.

To illustrate this point:

- a ton of imported DAP costs Bangladesh \$345 (C.I.F.) in foreign exchange.
- a ton of imported rice costs Bangladesh \$375 (C.I.F.) in foreign exchange.
- one ton of fertilizer produces an average of 3.5 tons of additional rice.

Under these circumstances, the importation of a ton of fertilizer will produce a net foreign exchange savings of \$967 in place of the importation of 3.5 tons of rice.

While the foregoing is simple enough, it remains necessary to weigh the cost of the proposed project from an overall balance of payments perspective. Although the importation of fertilizer will lead to a net improvement in the balance of payments, it nevertheless requires an initial foreign exchange commitment in competition with alternative import needs. This commitment, therefore, must be considered in the context of the overall balance of payments situation.

Bangladesh's balance of payments has been characterized by a heavy and growing dependence on foreign aid. Export growth has been largely stymied by the sluggish world market for jute, which in both raw and finished form accounts for some 70 percent of export earnings. Thus, notwithstanding encouraging progress in most recent years with respect to minor exports - notably fish, leather and tea - overall export growth since Liberation (1972/73 to 1979/80) has amounted to only 11 percent per annum (in nominal terms). Imports, meanwhile, have grown at a rate of 15.6 percent, pushing the trade deficit to approximately \$1.6 billion in 1979/80. Remittances from Bangladeshi working abroad

have risen rapidly in recent years, reaching an estimated \$163 million in 1979/80, but the current account deficit nevertheless rose to a record \$1.5 billion that same year. With foreign aid inflows of only \$1.3 billion in 1979/80, the BDG had to draw heavily on its foreign exchange reserves. The reserve drain continued into 1980/81, with reserves falling to around \$200 million - barely one month's imports - by the end of CY 1980.

In November, 1980, Bangladesh completed negotiations for a 3-year \$800 million IMF credit. This assistance will provide much needed relief over the near-term. However, the effect of the IMF credit has been offset by the poor outlook for foreign aid given the recessionary environment in the industrial countries. Meanwhile, petroleum import costs will reach an estimated \$500 million in 1980/81 (up from \$166 million in 1978/79), and are certain to rise sharply over at least the next year or two.

In short, Bangladesh's balance of payments situation will be under severe strain for the foreseeable future. Table 9 below, which summarizes the situation through 1979/80, provides a breakdown of imports by major category. As can be seen, fertilizer imports amounted to \$124 million in 1979/80. They are projected to rise at a rate of 3.5 percent per annum (in volume) during the Second Five Year Plan Period (FY 80-85). By financing some eight percent of the country's fertilizer import requirements in 1981-82 and 1982-83, the project will provide sorely needed balance of payments relief.

TABLE 9
Bangladesh: Balance of Payments, 1978/79-1980/81
 (Millions of U.S.\$)

	<u>1978/79</u>	<u>1979/80</u>	<u>1980/81 (proj.)</u>
Exports, f.o.b.	603	719	744
Imports, c.i.f.	-1,603	2,352	2,450
(Foodgrains)	(197)	(630)	(220)
(POL)	(166)	(390)	(500)
(Fertilizer)	<u>(72)</u>	<u>(124)</u>	<u>(147)</u>
Trade Balance	-1,000	-1,633	-1,706
Private Transfers ^{a/}	140	163	219
Services (net)	<u>60</u>	<u>-7</u>	<u>-39</u>
<u>Current Account Balance</u>	-800	-1,477	-1,526
<u>External Assistance</u>	1,016	1,286	1,212
(Food)	(187)	(377)	(157)
(Commodity)	(472)	(422)	(450)
(Project)	(357)	(487)	(605)
Debt Repayment ^{b/}	-120	-109	-109
IMF (net)	60	118	250
Other, errors & omissions	- 32	42	120
<u>Change in Reserves (-inc.)</u>	-124	140	53
<u>Reserves, end-period</u>	393	253	200

Note: a/ Mainly worker remittances; no precise breakdown available

b/ Includes interest.

C. Social Soundness Assessment

1. Introduction

Bangladesh combines a large, densely clustered population with an agrarian economy and extremes of social and economic inequality and extreme poverty. In the 3 years since the Fertilizer Distribution Improvement Project Paper was written, Bangladesh's population has grown from 83.5 million to over 90 million, making it the 8th largest country in the world. Over 90% of her people live in rural areas, with average population densities of over 1600 per square mile. Nearly half the population is under age 15; approximately three-quarters are women and children; only one person in five is literate. Land control is unequally distributed: over half the households in rural Bangladesh are functionally landless with less than one acre of land, while less than 3% of the population controls over 25% of the land. (Land Occupancy Study, 1978).

2. Social Organization and Agriculture

Society in rural Bangladesh rests on a subsistence base of wet-rice agriculture in a highly uncertain monsoon environment. The basic units for production and consumption are households formed around a man, his wife and sons, or a set of brothers. Women join their husbands' households at marriage and usually relinquish their inheritance rights to their fathers' lands to their brothers. With rapid population growth and Islamic inheritance practices specifying equal shares to sons and half shares to daughters, land fragmentation has accelerated in the past few decades.

Family labor on the land is supplemented at peak periods by outside help arranged either on mutual aid or wage labor bases. Because of land fragmentation, small plot sizes, and a farming strategy emphasizing risk spreading, patterns for access to land are complex. A farmer may self-cultivate part of his own land, lease out other parts too distant or undesirable for self-cultivation, lease in other plots which are convenient or desirable, and manage still other plots through hired labor. The conventional categories of owner, owner-tenant, and tenant are virtually meaningless in such circumstances. Generally, as the amount of land over which control is exercised increases, the amount of direct involvement with cultivation -- and manual labor -- decreases.

The ongoing study of Equity Effects of Fertilizer Use, sponsored by USAID and executed by the Bangladesh Agricultural Research Council and the International Fertilizer Development Center, offers useful insights into the pattern of farming in Bangladesh. Nearly three-quarters of the farmers studied own less than 2.5 acres of land.

However, holdings of 2.5 acres or less, while accounting for only 44% of the total land cultivated, include 82% of land rented-in on a share-cropping basis. Twenty-seven percent of the farmers, with more than 2.5 acres, control 56% of the owned land and, presumably, benefit from additional land which they rent out to others.

Under the usual terms for sharecropping, the tenant supplies all farming inputs and receives half the crop. Since access to the share-cropped land is part of a social relationship, not a strictly economic one, the sharecropper often is liable for a variety of other "contributions", of goods and services, to his patron as well. Often, tenants are not maintained on a plot of land for more than a few seasons, in order to avoid the possibility of their laying claim to ownership of the land. In consequence, the sharecropper's interest in improving the land or in adding inputs to increase yield is limited. During the 1979-80 boro season, 65% of all farmers used fertilizer on owned land, but only 61% used fertilizer on land rented in on shares.

3. Socio-cultural Compatibility

The Fertilizer Distribution Improvement Project was begun in 1978. Its purpose was to establish the means by which fertilizer use could be increased on a more equitable basis, through increased fertilizer stocks, expanded storage facilities, improved handling, and the institutionalization of a new marketing system making greater use of private fertilizer dealers. Since its inception, project reports and surveys have accumulated evidence concerning the impact of the project in the social and economic context of rural Bangladesh and its compatibility with its social/cultural setting.

An important element in the project has been the institution of a new marketing system, replacing government controls over movement and sales of fertilizer with significant private sector involvement. In the last two years, this new system has been extended nationwide. It includes unrestricted private transport of fertilizer, except in border areas, freedom for individuals, companies, and cooperatives to register and fertilizer from BADC sales points, establishment of distribution points in every district for wholesale fertilizer purchase; closing government warehouses in areas where private suppliers have become active; and increasing discount rates for purchases from district wholesale centers. The effect of these changes has been to improve the transport, distribution, and accessibility of fertilizers to farmers even in remote districts, while encouraging small entrepreneurs and shopkeepers to stock and sell fertilizer. Over the next few years, it is expected that private dealers will move increasing amounts of fertilizers to farmers.

Consolidation of storage facilities at primary distribution points (PDP) by the Government will allow for safe storage, improved stock control, and timely distribution during the agricultural year. Thus, significant changes are being made in the management of fertilizer distribution, helping to meet the clear and growing demand for fertilizer as farmers shift increasingly to high fertilizer response varieties of rice and other crops.

The Fertilizer Equity Study's preliminary findings indicate that fertilizer is familiar to most farmers, even those with tiny holdings. In the 1980 Boro Season, over half the owner farmers in the under-2 acres category were using chemical fertilizer; levels of use are lower than optimal for most tenure and size classes, but smaller farmers use relatively higher levels per acre than larger farmers. With increasing availability both of fertilizer and knowledge concerning its use, it may be expected that use levels will increase, with beneficial effects upon crop production in the country.

In the FES survey of fertilizer use during the Aman season of 1979, it was found that a large percentage of farmers in smaller size classes were using fertilizer than those with larger farms (59% to 61%). These smaller farmers amount to 72% of the total sample. However, on rented-in land (24% of the total land cultivated) significantly less fertilizer is used than on owned land -- reflecting the fact that sharecropped or rented-in land yields are divided half for the owner, half for the tenant, with the tenant bearing all input costs. Therefore, there is less incentive for the sharecropping cultivator to invest cash in inputs.

The FES estimates that net benefits from use of fertilizer are greater on smaller farms. Farms from 1 to 2.5 acres using fertilizer show adjusted net benefits per acre of Tk.20.35, while farms between 2.5 and 5 acres show only Tk.5.63 net adjusted benefits. From these early findings, it is possible to generalize on a preliminary basis that, where fertilizer is available, it will be used especially on owned land, and the results will disproportionately benefit smaller farmers in all tenure categories. As study results become available on more crop seasons, it will be possible to draw more definite conclusions.

The FES also provides further evidence verifying what has come to be commonly accepted: that Bangladeshi farmers are shrewd strategists, making good use of limited resources in a complex agricultural system. As the advantages of the new agricultural technology become clear to them, they will adopt it.

4. Equity Issues: the social impact of the project

The purpose of this project is to increase fertilizer use on an equitable basis.

Although the Fertilizer Equity Study is not yet complete, preliminary data analysis from the 1979 Aman and 1980 Boro seasons provides information on fertilizer use by small as well as large farmers, and for tenants as well as owner-cultivators. Land ownership and access to productive resources are highly skewed in Bangladesh. According to the FES 73% of the sample own 2.5 acres or less, covering only 44% of the total land cultivated and 82% of the total of land rented-in. The 27% who own more than 2.5 acres control 67% of the owner "operated" holdings -- using hired as well as family labor. No data are given concerning those self-cultivating versus those who are simply managers or absentee owners.

In spite of inequities apparent in control of the major productive resource in rural areas -- land -- the FES seems to indicate that there is significant fertilizer use by smaller farmers. About 67% of farmers with 2.5 acres or less used some fertilizer during 1979 Aman, compared to 60% of farmers with over 2.5 acres. Both on owner-operated, and rented-in land, relatively smaller farmers tend to use more urea per acre than larger farmers. As might be expected where sharecrop tenancies require the tenant to provide for all inputs in return for half the crop, use levels on rented-in land are significantly lower than on owner land.

The relatively high frequency of farmers of all size classes reporting fertilizer use indicates that access to fertilizer is relatively open and equal. As fertilizer has become more readily available in recent years, and at affordable prices, levels of use have risen. As supply, transport, storage and distribution continue to improve, and as farmers improve their knowledge of fertilizer techniques, incorporation of fertilizer technology as an integral part of Bangladeshi farming will accelerate.

However, since the use levels for all fertilizers are lowest on farms over 7.5 acres -- that is, large farmers are not yet using fertilizers intensively -- it is possible that increased fertilizer availability and knowledge of its advantages may become a factor in a shift to "modern farming" by those with influence and capital. Better seeds, more fertilizer, and improved cultivation practices mean higher yields which require more labor. Existing inequities in land control may become exacerbated as "medium" (with 2.5 to 6 acres) and "surplus" (over 6 acres) farmers buy up land from smaller farmers and convert share tenancies to self-cultivation with hired labor. This is the pattern noted in South India with the coming of the "Green Revolution" in the early 1970s, in a similar situation of socio-economic stratification. Growth in agrarian tensions under such circumstances is likely, at least until the benefits of increased food supplies and employment are developed adequately.

Women and children are an important part of the farm labor force, performing much of the processing work necessary for foodstuff preparation in the homestead. They do not directly participate in fertilizer procurement, or in its application, to any significant extent, since this work is usually performed by men. Increased yields due to fertilizer will increase the workload for family labor to an unknown degree. The same increased yields, however, will improve nutrition as well as family income, perhaps offsetting the increased work required and allowing for enhancement of overall family quality of life.

5. Spread Effects. The Diffusion of Innovations

Evidence of the spread of effects from this project, as so far implemented, is indirect. Some of the elements which are involved include: the overall general increase in fertilizer use in the past few years, as a function of improved supplies, storage, and distribution -- and the proven benefits to farmers of increased fertilizer use, the increasing

sophistication of farmers in managing fertilizer-soil-crops relations, seen in the growing demand for fertilizers in addition to urea; and the development of a broader range of fertilizer middlemen, as rural merchants increasingly stock and sell fertilizer. There is an overall feeling that, with the opening up of the system of fertilizer distribution directly as a consequence of this project, the Bangladeshi farmer can now begin to obtain adequate amounts of the right types of fertilizer in a timely fashion at affordable prices. The consequences of this important change will ramify throughout the agrarian economy in many, complex ways. Some of these may be noted briefly here.

One possible indirect effect with important consequences, is improved management and planning capability within the government. During the course of the project to date, technical assistance has resulted in reforms in regulations and procedures which have opened much of the fertilizer marketing function to the private traders. Analyses of supply, transport, storage, and distribution problems have led to a broadened awareness of the roles that the various divisions of BADG can play in increasing the operating efficiency of the corporation. It is hoped that the management training program planned for the project extension period will further improve efficiency by developing middle level management and decentralizing decision making. The success of such programs may offer a model to other BDG entities.

Fertilizer plus responsive seed varieties plus water control equals increased yields. In a country whose population overall suffers from serious nutritional deficiencies, the consequence of more food supplies is better health and greater productivity. The linkages from fertilizer to health are complicated and perhaps tenuous, and are hard to trace conclusively. But increased overall prosperity in rural areas seems to follow from effective implementation of programs shifting from older seed varieties to those which respond more effectively to fertilizer.

With increased reliance on fertilizer and other "outside" inputs, farmers are drawn increasingly into the cash economy. As well, rural entrepreneurship is encouraged as markets for inputs and for produce expand. In Bangladesh, marketing is constrained by inadequate local demand as well as by poor transportation in a difficult environment -- as may be seen by the proliferation of cyclical markets -- hat -- in rural areas. With establishment of fertilizer storage and marketing centers, and with the expansion of the agrarian economy, the small weekly hat will give way increasingly to the growth of bazaars -- that is, the establishment of permanent, multifunctional market centers, which can further stimulate local economic growth.

An immediate effect of increasing prosperity stemming from improved production, employment, and nutrition may be some acceleration in population growth rates as mortality declines while fertility remains high. Increased attention to population control and family planning activities will be required if the advantages of greater productivity are not to be lost through population growth.

D. Administrative Feasibility

1. Overall Implementation Responsibility

The Bangladesh agency responsible for implementing this project is the Bangladesh Agricultural Development Corporation, a publicly held corporation responsible to the Ministry of Agriculture and Forests. BADC has official responsibility for each of the major areas in which this project impacts: fertilizer importation and handling, fertilizer storage, and fertilizer distribution and marketing. The USAID Project Officer and project funded consultants have daily contact with the organization and regularly work with the officers shown in figure 2.

2. Fertilizer Imports

Calculations of fertilizer import requirements are made within the Supply (MSS) Division of BADC, based upon projections of sales, domestic production, and stock levels, as presented in the Monthly Fertilizer Newsletter. A request to import fertilizer with USAID project funds is made to the USAID Project Officer by the BADC Chairman. USAID, in turn, cables to AID/W BADC's proposal for fertilizer purchase, specifying IFB number, date of issuance, bid closing date, types and quantities of fertilizer desired and shipping periods. Once AID and BADC are in agreement as to the terms of the procurement, BADC's Purchase Division cables the specifications to the Bangladesh Embassy in Washington, which, in turn, issues the Invitation for Bids in accordance with AID procurement regulations. BADC sends one officer (usually the Member-Director, Finance) to participate in the bid opening and award. Awards (C&F) are approved by SER/COM in AID/W. Marine Insurance is provided by Sadharan Bima Corporation (the BDG insurer) under an "open cover" policy covering all BADC fertilizer imports.

BADC is the consignee for fertilizer imports. Bagged product is received by the BADC Shipping Office in Chittagong and/or at Chalna Port and unloading is monitored by USAID/Dacca's Logistics Management Office.

3. Bulk Handling

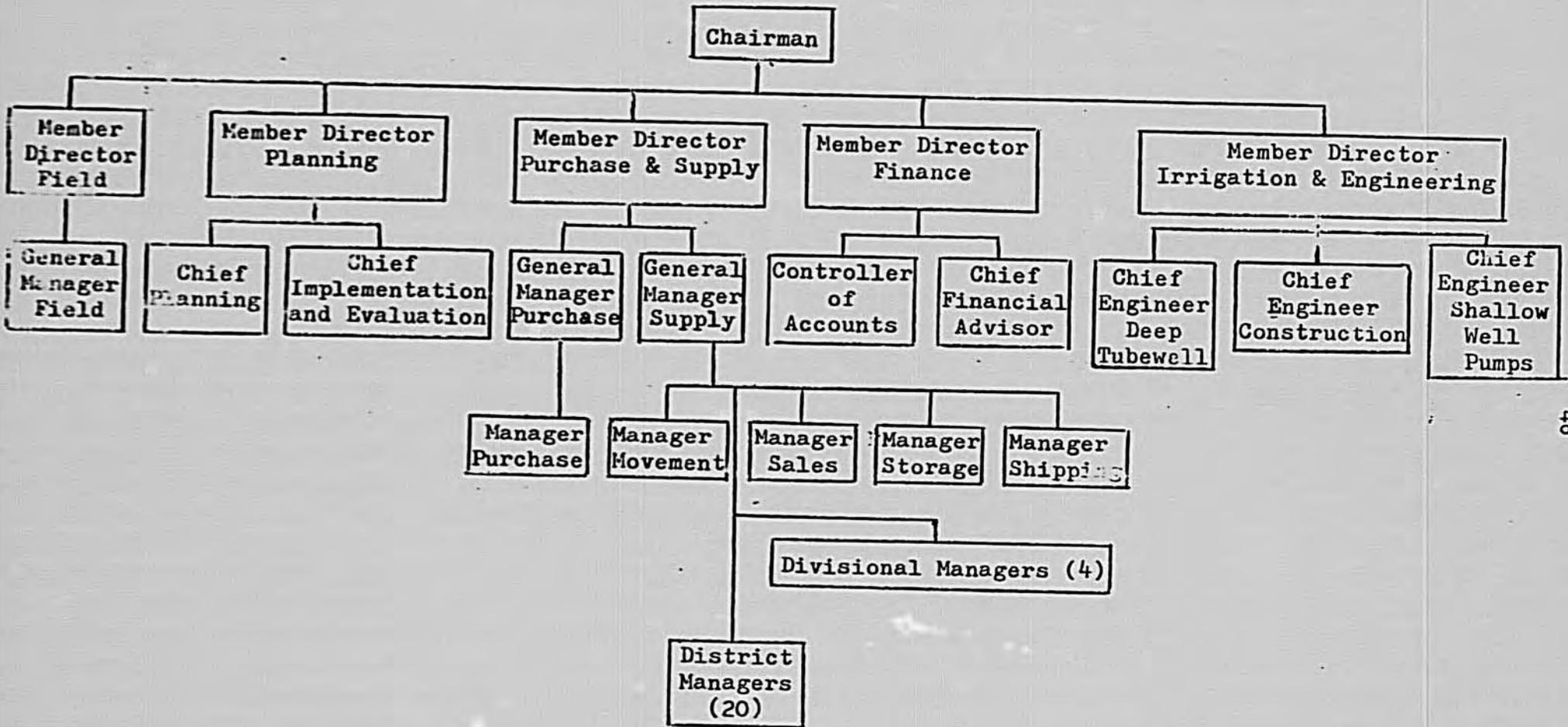
Bulk handling activities funded under the original project agreement will be implemented under the period of this project extension. BADC's General Manager for Supply is responsible for evaluation of the technical and cost proposals for the bagging equipment and handling services submitted by prequalified joint venture firms and described in Annex 3.16. He will negotiate a one-year, renewable contract with a local services contractor, subject to USAID approval.

4. Storage Construction

BADC's Storage Manager and Chief Construction Engineer are the two BDG Officers chiefly responsible for implementation of the project's warehouse construction component.

Figure 2

BADC Organizational Chart



The consulting engineer for USAID's Phase II Storage Construction program has assisted the Manager (Storage) in developing the National Fertilizer Storage Plan, which includes identification of sites, required capacities, and site drawings for all EDG planned fertilizer warehouses. Phase II sites (funded under the original authorization for this project) have been chosen from the NFSP, and Phase III sites (funded under this amendment) will also be selected from the plan.

Just as it was done for the Phase II program, Phase III construction design, site engineering plans, construction IFB's and bills of quantities will be completed by the consulting engineer and submitted for approval to BADC's Chief Engineer (Construction) and the USAID Project Officer, who will rely for technical expertise on the USAID Office of Engineering and Rural Development. The consulting engineer will also evaluate bids and recommend that BADC negotiate a contract with the lowest responsive bidder among construction contractors bidding on the construction programs.

BADC will sign agreements with the Bangladesh Inland Water Transport Authority for the right to construct and use pontoon barge loading wharfs on riverside warehouse sites and with Bangladesh Rail Corporation for construction of rail sidings at railway warehouse sites. In the latter case, the construction contractor will perform the earthwork preparatory to construction of rail sidings. Bangladesh Rail will install the track.

5. Marketing System Improvements

BADC's Member Director (Supply) is responsible for development and implementation of the New Marketing System for fertilizer. To assist him and to recommend improvements in the systems of fertilizer sales and distribution, the project has funded a marketing and distribution consultant with offices in the Movement, Storage, and Sales Division. During the period of the project extension, new technical assistance contracts will be awarded for a consultant to assist the Member Director (Supply) in designing and implementing the Dealer Development Program (dealer training, dealer credit, fostering of dealer associations) and for a planning consultant to assist the MSS Division in instituting reforms into the pro formas which govern BADC operations. The Bangladesh Krishi Bank will be responsible for administering loans under the Fertilizer Dealer Credit Program to dealers prequalified under criteria established by BADC's Manager (Sales).

6. Management Training

The BADC management training consultants will be responsible to the Chairman, BADC and will be located in the Implementation Section of the Planning Division while studying management problems and recommending management reforms. Design of the training curriculum and implementation of the training program will be the responsibility of the Principal, BADC Staff Training Institute with the assistance of the consultant.

PART IV
FINANCIAL PLAN

A. Summary Cost Estimate* and Financial Plan (Millions of U.S. \$)

	<u>USAID</u>		<u>BDG</u>		<u>Others</u>		<u>Total</u>
	<u>FX</u>	<u>LC</u>	<u>FX</u>	<u>LC</u>	<u>FX</u>	<u>LC</u>	
<u>1. Original Project Funding</u>							
Fertilizer purchase	78.5	0	3.5	150.0	362.6	0	604.6
Storage Construction	56.3	0	0	3.5	0	0	59.8
Bulk Handling	2.0	0	0	0	1.2	0	3.2
Marketing System	2.1	0.1	0	0	0	0	2.2
Seed Purchase	10.6	0	9.0	3.6	4.0	0	27.2
Contingency	0.4	0	0	0.0	0	0	0.4
Subtotal (1978-80)	<u>149.9</u>	<u>0.1</u>	<u>12.5</u>	<u>167.1</u>	<u>367.8</u>	<u>0</u>	<u>697.4</u>
<u>2. Amendment Funding</u>							
Fertilizer Purchase	32.6	0	0	310.0	268.6	0	611.2
Storage Construction	45.4	0	0	2.0	80.0	0	127.4
Bulk Handling	0	0	0	25.0	0	0	25.0
Marketing System and Dealer Development	1.5	0.5	0	40.5	0	0	42.5
Management Training	1	0	0	0.5	0	0	1.5
Contingency (5%)	4.0	0	0	0	0	0	4.0
Subtotal (1981-82)	<u>84.5</u>	<u>0.5</u>	<u>0</u>	<u>378.0</u>	<u>348.6</u>	<u>0</u>	<u>811.6</u>
<u>3. Total Project Funding</u>							
Fertilizer Purchase	111.1	0	3.5	470.0	631.2	0	1,215.8
Storage Construction	101.7	0	0	5.5	80.0	0	187.2
Bulk Handling	2.0	0	0	25.0	1.2	0	28.2
Marketing System and Dealer Development	3.6	0.6	0	40.5	0	0	44.7
Seed Purchase	10.6	0	9.0	3.6	4.0	0	27.2
Management Training	1.0	0	0	0.5	0	0	1.5
Contingency	4.4	0	0	0	0	0	4.4
Total LOP	<u>234.4</u>	<u>0.6</u>	<u>12.5</u>	<u>545.1</u>	<u>716.4</u>	<u>0</u>	<u>1,509.0</u>

* includes 15% annual inflation

B. Costing* of Project Outputs/Inputs Funded Under Project Amendment
(Thousands of U.S. \$)

Project Inputs	Project Outputs					TOTAL
	#1	#2	#3	#4	#5	
<u>AID Funded</u>						
20,000 MT bagged DAP	8,000					8,000
30,000 MT bulk DAP	11,770					11,770
25,000 MT bulk DAP	10,490					10,490
4,000 MT micronutrients	2,340					2,340
Phase II engineering Consultant		4,000				4,000
Phase III Construction contracts		41,400				41,400
T.A. for dealer development				1,000		1,000
Local costs and equipment for dealer training				500		500
T.A. for planning/ implementation				250		250
Short-term consultants in marketing/distribution				75		75
Sales promotion				50		50
Fertilizer Use studies				125		125
T.A. for management training					750	750
Local costs & equipment for management training					250	250
Contingency (5%)	2,000	1,800		200		4,000
Subtotal (AID)						85,000

Project Inputs	Project Outputs					TOTAL
	#1	#2	#3	#4	#5	
<u>BDG Funded</u>						
620,000 MT urea (1981/82)	111,000					111,000
80,000 MT TSP (1981/82)	25,000					25,000
720,000 MT urea (1982/83)	144,000					144,000
90,000 MT TSP (1982/83)	30,000					30,000
"Hardcore" Construction		2,000				2,000
Bagging imported fertilizer			25,000			25,000
Dealer Training				500		500
Dealer Credit				40,000		40,000
Management Training				500		500
Subtotal (BDG)						<u>378,000</u>
<u>Other Donors</u>						
790,000 MT fertilizer imports	268,600					268,600
233,700 MT storage		80,000				<u>80,000</u>
Subtotal (others)						<u>348,600</u>
TOTAL	613,200	129,200	25,000	43,200	1,000	811,600

Project Outputs are:

- #1 - Fertilizer supplies
- #2 - Increased fertilizer storage capacity
- #3 - Bulk Handling
- #4 - Marketing system improvements
- #5 - Management training

C. Projection of AID Expenditures by Fiscal Year

(thousands of \$ U.S.)

<u>Fiscal Year</u>	<u>Grant Funds</u>	<u>Loan Funds</u>	<u>Total</u>	<u>Cumulative Total</u>
1978	13	0	13	13
1979	42,505	0	42,505	42,518
1980	27,237	0	27,237	69,755
1981	36,245	0	36,245	106,000
1982	51,000	7,000	58,000	164,000
1983	18,000	25,000	43,000	207,000
1984	16,000	0	16,000	223,000
1985	12,000	0	12,000	235,000

PART VPROJECT EXTENSION IMPLEMENTATION PLANA. Implementation Schedule Update1. Project Documentation

<u>Date</u>	<u>Action</u>
June, 1981	Grant Authorized by AID/W
July, 1981	Project Agreement Amendment signed and 1981 funds obligated
August, 1981	Conditions precedent to disbursement of amendment funds satisfied
January, 1982	FY 1982 funds obligated
July, 1985	Project Assistance Completion Date

2. Distribution and Marketing Systems Improvements

<u>Date</u>	<u>Action</u>
April - June 1981	Third evaluation of New Marketing System
April, 1981	National Fertilizer Policy Study draft consensus report.
June, 1981	Least Cost Movement System for fertilizer completed.
June, 1981	Expressions of interest requested from consultants for dealer development program and implementation planning.
August, 1981	National Fertilizer Policy adopted by BDG
August, 1981	"Equity Effects of Fertilizer Use" Study Completed.
August, 1981	New Consultants selected.
September, 1981	Consultancy contracts signed
December, 1981	Final design of dealer credit program
January, 1982	First credit extended to fertilizer dealers.
December, 1981	Dealer training program designed.

<u>Date</u>	<u>Action</u>
January, 1982	First BADC project proforma revised
February, 1982	Training of Bangladeshi dealer trainers begins
March, 1982	First field training of dealers
April, 1982	Second BADC project proforma revised
May, 1982	BADC recognition of first Fertilizer Dealer Associations
August, 1982	Third BADC project proforma revised
January, 1983	First evaluation of dealer credit program
January, 1983	Fourth BADC project proforma revised
February, 1983	Fourth evaluation of NMS
March, 1983	Elimination (or conversion to PDP) of last Thana sales centers.
March, 1983	First evaluation of dealer training program
January, 1984	Evaluation of Dealer Development Program (dealer training, dealer credit, and dealer associations)

3. Bulk Handling Option

<u>Date</u>	<u>Action</u>
August, 1981	Contract awarded for procurement of equipment and local bagging services
January, 1981	Bagging machines arrive Bangladesh
February, 1981	Services begin

4. Storage Construction

<u>Date</u>	<u>Action</u>
May, 1981	Contract signed for Phase II construction
June, 1981	Engineering consultant selected for Phase II A&E services
July, 1981	Phase III Consultant contract signed.

<u>Date</u>	<u>Action</u>
October, 1981	Prequalification of Phase III Construction firms.
February, 1982	First Phase III IFB issued
June, 1982	First Phase III construction contract awarded
December, 1982	Final Phase III IFB issued
March, 1983	Final Phase III construction contract awarded
August, 1983	Phase II construction completed
March, 1985	Phase III construction completed

5. Fertilizer Imports

IFB's for fertilizer tenders will be issued four months before expected arrival of the fertilizer in Chittagong or Chalna. It is anticipated that 20,000 MT of DAP will be purchased early (July or August) in BDG FY 1981/82 and another 30,000 MT at midyear for arrival around April, 1982. Another 25,000 MT would be purchased early in BDG FY 1982/83. BADC's ongoing program of supply forecasting will determine exactly when these imports will be needed. Timing of the micronutrient fertilizer imports will depend on sales of the recently purchased zinc and on BDG progress in identifying soil deficiencies.

6. Management Training

<u>Date</u>	<u>Action</u>
July, 1981	Scope of work agreed to by USAID and BADC
August, 1981	Technical Proposals requested from Consultants
October, 1981	Consultant selected
November, 1981	Consultant contract signed
February, 1982	Performance incentive system designed
March, 1982	Management problems identified
May, 1982	Training curricula developed
June, 1982	Management short courses begun
July, 1982	Performance incentive system implemented
December, 1982	First assessment of management short courses
January, 1983	Management training program instituted in BADC Staff Training Institute or Bangladesh Management Development Center
July, 1983	Evaluation of management training program.

B. Evaluation Plan

1. Regular Evaluations (Monitoring)

Regular evaluations to aid BADC and USAID in monitoring progress of the project will continue throughout the period of the project extension and will be conducted by USAID, BADC, and consultant personnel. These will include:

- (a) April-June, 1981: third evaluation of the performance of the New Marketing System. Review and assessment of second year of NMS operations in Chittagong Division and first year in Khulna and Dacca Divisions.
- (b) February 1982: fourth evaluation of the New Marketing System. Review and assessment of the impact of three years of the NMS in Chittagong Division, two years in Khulna and Dacca Divisions, and the first year and a half in Rajshahi Division.
- (c) January 1983: Assessment of the first year of the dealer credit program.
- (d) March, 1983: Assessment of the dealer training program after one year of training.
- (e) January, 1984: Evaluation of the Dealer Development Program, to include the dealer credit scheme, dealer training program, effect of dealer associations, and the integration of all these aspects into a mature New Marketing System.

2. External Evaluations

- (a) A major external evaluation focusing on achievement of project outputs and purpose is scheduled for September, 1982. This timing will allow review of evaluation findings prior to any decision to approve a follow-on project. A preliminary scope of work for this evaluation is attached as Appendix N.
- (b) It may be desirable to schedule another overall evaluation for 1985. This final evaluation could include certain project elements that will not be adequately covered in the September 1982 evaluation, such as the dealer development program and the utilization of warehouses built under the Phase II construction program.

C. Conditions Precedent to Disbursement and Covenants

1. Conditions Precedent to Disbursement of Funds Authorized Under Project Amendment

- (a) An opinion of counsel acceptable to AID that this Agreement has been duly authorized and/or ratified by and executed on behalf of the Grantee and that it constitutes a valid and legally binding obligation of the Grantee in accordance with all of its terms.
- (b) A statement of the names of the persons holding or acting in the office of the Grantee and a specimen signature of each person specified in such a statement.
- (c) Assurance that BDG budgetary allocations will be established for FY 1981-82 through 1984-85 for BADC sufficient to carry out the project each year, including an understanding to increase such allocations as required to achieve the outputs of the project.
- (d) Closing of all Thana Sales Centers (TSC's), sales at which have fallen by 50% or more since the establishment of the New Marketing System and closing of all TSC's within 15 miles by road from a PDP.
- (e) Establishment of BADC sales targets, stock requirements, and import programming for DAP, just as these are presently established for urea, TSP, and MP. Programming of DAP in the BADC Monthly Fertilizer Newsletter.

2. Conditions Precedent to Disbursement of Fiscal Year 1982 Funds

- (a) Reservation in the Bangladesh banking system of the amount of Taka for the fertilizer dealer credit program as is agreed upon as appropriate in the course of the design of the dealer credit program.
- (b) Establishment of a retail fertilizer pricing structure that subsidizes DAP to the same extent as its nutrient equivalent of imported urea and TSP.
- (c) Realignment of PDP and TSC discounted dealer prices to the same ratio that existed at the introduction of the New Marketing System in 1979.
- (d) Adoption of a comprehensive fertilizer stock control and accounting system.
- (e) Implementation of a least cost movement system for BADC fertilizer movement.

Fertilizer Offtakes from BADC
(Thousands of Long Tons)

<u>Year</u>	<u>Urea</u>	<u>TSP</u>	<u>DAP</u>	<u>MP</u>	<u>AS*</u>	<u>SP</u>	<u>PS</u>	<u>HP</u>	<u>NPK</u>	<u>TP</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	60	-	14	-	-	-	-	-	-	244
1972-73	277	89	-	18	-	-	-	-	-	-	384
1973-74	268	94	-	18	-	-	-	-	-	-	380
1974-75	176	76	-	18	-	-	-	11	1	-	282
1975-76	312	111	-	22	-	2	-	4	7	-	458
1976-77	349	124	-	22	-	2	-	4	6	-	507
1977-78	477	191	-	41	-	1	1	3	1	-	715
1978-79	469	174	38	44	-	0.4	0.3	4	4	0.7	734
1979-80	536	206	42	46	-	0.1	0.1	3	8	0.3	842
July-Dec '80	256	131	24	26	-	-	-	2	8	0.1	447

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

Source: B.A.D.C.

Local Fertilizer Production
(thousands of Metric Tons)

<u>Year</u>	<u>Fenchuganj</u>		<u>Ghorasal</u> <u>Urea</u>	<u>Chittagong</u> <u>TSP</u>
	<u>Urea</u>	<u>A.S.</u>		
1962-63	73	-	-	-
1963-64	101	-	-	-
1964-65	77	-	-	-
1965-66	93	-	-	-
1966-67	95	-	-	-
1967-68	111	-	-	-
1968-69	88	-	-	-
1969-70	96	5	-	-
1970-71	56	6	44	-
1971-72	47	3	-	-
1972-73	39	6	175	-
1973-74	61	10	221	-
1974-75	58	5	11	32
1975-76	53	6	229	41
1976-77	77	9	208	28
1977-78	61	10	151	41
1978-79	55	5	236	62
1979-80	104	10	257	71
July-Dec.1980	48	4	90	35

Source: BCIC Report March 1981
(Fertilizer Production in Bangladesh)

Fertilizer Subsidy and Price Policy

One major concern of the Fertilizer Project Paper was the BDG's fertilizer and the increasingly heavy burden that on the development budget (See Project 78, the first year of the project, 752 million taka and consumed 6.6% of resources. Given the projected requirements for phosphates in during the project, it was recognized that an effective DAP promotion would have to rise or a growing budget would be required to fix

The urgency for raising the elimination of the use of hand-held by the still relatively low handling by BADC, BCIC, BIWTC, or BR the fact that 85 percent of rate movement and handling contractors of fertilizer. This situation and. the rising proportion of fertilizer ceiling prices at the retail level. Moreover, reduction of fertilizer price increases and encourage the development of principal means of meeting private fertilizer dealers. mobilization. According to have averaged nearly 26% three year period. Since pay the full cost of bagged fertilizer BDG also strengthened in Bangladesh after December 31, 1981. increases in foodgrain (1) be imported in bulk with empty bags or cost of fertilizer (1) be imported in bulk with empty bags or

The savings of the landed costs. prices have been the BDG by the will adopt and implement the recommendations of 1,073 million taka National Fertilizer Policy Study, developed levels that prevail in this project. annual fertilizer

Other covenants contained in Section 5.2 of the Grant Agreement will remain in force.

Fiscal Year
which new
prevailed
1978/79
1979/80
1980/81

1/ Cr
o

BEST AVAILABLE DOCUMENT

A further outcome of fertilizer price increases during project implementation, as shown in Table B.8.2, has been a stabilizing in annual development budget allotments to pay for fertilizer subsidies. After rising by 30 percent in FY 1978/79, these subsidies have leveled off with the consequence that as a share of the development budget they have begun to decline.

It is the Mission's policy to continue to encourage a reduction in development budget allocations for fertilizer subsidies, in both relative and absolute terms. Since domestic production costs and import prices will continue to rise, this will almost certainly require further increases in the prices farmer will pay for fertilizer. The BDG has made a fairly good start in getting fertilizer subsidies under control during the first years of the project and deserves encouragement for continuing to do so. Table B.8.3 shows that between 1977/78 and 1979/80 the subsidy on locally produced urea fertilizer declined from 34.1% to 6.9% of the cost to farmers. Similar, though less dramatic, declines in subsidies have been registered for the other fertilizers as well.

However, in absolute terms, only for urea and domestically produced TSP has the absolute value of per unit subsidies declined. Table B.8.3 shows that for the same period, imported TSP and MP still registered an absolute increase in the value of per unit subsidies despite the fact that domestic sales prices rose more rapidly than CIF import and domestic distribution costs. In fact, given the high -- 50 to 60 percent -- subsidy rates on these fertilizers, domestic prices must be increased at more than double the rate of import prices if per unit subsidies are to decline and their impact on overall subsidies is to be reduced.

The BDG, therefore, will require further encouragement and assistance in implementing a price and subsidy policy that will assure long-run financial viability for the fertilizer sub-sector. The BDG is aware of the need to adjust fertilizer prices further and appears to be holding the line against rising subsidies, for which it deserves support.

TABLE B.8.2
Fertilizer Subsidies and Annual Development Budget
(1976/77 to 1980/81 -- in Millions of Taka)

Item	1976/77 (Actual)	1977/78 (Actual)	1978/79 (Actual)	1979/80		1980/81 Budgeted
				Budgeted	Revised	
Development Budget	9,892	11,429	16,017	20,700	23,300	27,000
Agriculture Sector	1,850	1,541	2,344	2,623	2,938	3,580
Fertilizer Subsidy	713	752	1,180	1,095	1,179	1,167
Fertilizer Subsidy as % of						
Development Budget	7.2%	6.6%	7.4%	5.3%	5.1%	4.3%
Agriculture Budget	38.5%	48.8%	50.3%	41.7%	40.1%	32.6%

Source: Ministry of Finance and Planning Commission as presented in IMF Memorandum "Use of Fund Resources -- Extended Fund Facility", November 24, 1980 Table 5 p.38

TABLE B.8.3
Trends in Fertilizer Costs, Prices & Subsidies
(1976/77 and 1980/81 -- Taka per ton)

<u>Fertilizer Type</u>	<u>Cost To</u>		<u>Subsidy Level</u>	
	<u>BADC</u>	<u>Farmer</u>	<u>Amount</u>	<u>Percent</u>
<u>1977/78</u>				
Urea (Local)	2480	1635	845	34.1%
Urea (Imp)	3590	1635	1955	54.5%
TSP (Local)	5138	1308	3830	74.6%
TSP (Imp)	3578	1308	2270	63.5%
MP (Imp)	2450	1090	1360	55.5%
<u>1979/80</u>				
Urea (Local)	2630	2450	180	6.9%
Urea (Imp)	4237	2450	1787	42.2%
TSP (Local)	5120	1907	3213	62.8%
TSP (Imp)	4996	1907	3089	61.9%
MP (Imp)	3330	1497	1833	55.0%
<u>% Change 1977/78 to 1979/80</u>				
Urea (Local)	6.0%	49.8%		-
Urea (Imp)	18.0%	49.8%		-
TSP (Local)	0.0%	45.8%		-
TSP (Imp)	39.6%	45.8%		-
MP (Imp)	35.9%	37.3%		-

1/ Includes factory or CIF costs plus BADC distribution costs to point of sale.

TABLE B.8.4 1/
Trends in Official Chemical Fertilizer Sales Prices

Effective Date of Price Change	Urea		TSP(Granular)		TSP (Powdered)		Murate of Potash		Diamonium Phosphate	
	Amount	(%)	Amount	(%)	Amount	(%)	Amount	(%)	Amount	(%)
April 1, 1974	50	-	40	-	40	-	30	-	-	-
July 1, 1976	60	(20.0)	48	(20.0)	48	(20.0)	40	(33.3)	-	-
July 1, 1978	70	(16.6)	55	(14.6)	55	(14.6)	45	(12.5)	-	-
Oct. 16, 1978	-	-	-	-	-	-	-	-	70	-
August 27, 1979	90	(28.6)	70	(27.3)	60	(9.1)	55	(22.2)	90	(28.6)
November 2, 1980	110	(22.2)	90	(28.6)	80	(33.3)	70	(27.3)	110	(22.2)

Source: B.A.D.C.

1/ Amounts in Taka per maund; percents represent change from previous price level.

National Fertilizer Storage Plan:
Sites, Capacities, and Financing Sources

NFSP Ref.	Location of PDP and Transit Point	Storage Capacity Requirement			Existing Capacity	Additional Construction Required		Source of Financing	United to Programs
		PDP	Transit	Total		Capacity	Currently Programmed		
<u>Dacca District</u>									
A1	Dacca	3,500	7,500	11,000	-	11,000	-	-	11,000
A3	Joydebpur	4,500	-	4,500	500	4,000	-	-	4,000
A4	Ghorasal	2,000	-	2,000	-	2,000	-	-	2,000
A5	Narsinghdi	4,000	-	4,000	1,900	2,100	-	-	2,100
A6	Hanikganj	3,500	-	3,500	1,000	2,500	-	-	2,500
A7	Sirajdikhan	2,000	-	2,000	1,000	1,000	-	-	1,000
A8	Mirkadin	3,500	-	3,500	1,000	2,500	-	-	2,500
	District Total:	<u>23,000</u>	<u>7,500</u>	<u>30,500</u>	<u>5,400</u>	<u>25,100</u>	<u>-</u>	<u>-</u>	<u>25,100</u>
<u>Kishoreganj District</u>									
B1	Kishoreganj	11,000	-	11,000	2,000	9,000	4,000	FRG	5,000
B2	Netrokona	4,500	-	4,500	-	4,500	5,000	USAID Phase II	(500)
B3	Jaria	2,500	-	2,500	400	2,100	2,000	FRG	100
B4	Sararchar	3,500	-	3,500	2,000	1,500	-	-	1,500
B5	Kuliarchar	4,000	-	4,000	2,400	1,600	-	-	1,600
B6	Bhairab	6,000	-	6,000	4,400	1,600	-	-	1,600
	District Total:	<u>31,500</u>	<u>-</u>	<u>31,500</u>	<u>11,200</u>	<u>20,300</u>	<u>11,000</u>	<u>-</u>	<u>9,300</u>
<u>Mynensingh District</u>									
C1	Shambuganj	6,000	-	6,000	2,000	4,000	4,000	ADB	-
C2	Mynensingh	8,000	2,000	10,000	2,200	7,800	3,000	USAID Phase II	4,800
C3	Jamalpur	4,500	1,500	6,000	1,500	4,500	-	-	4,500
C4	Melendah	5,000	-	5,000	200	4,800	5,000	USAID Phase II	(200)
C5	Sherpur	5,500	-	5,500	200	5,300	6,000	ADB	(700)
C6	Gaffargoan	6,000	-	6,000	1,000	5,000	-	-	5,000
	District Total:	<u>35,000</u>	<u>3,500</u>	<u>38,500</u>	<u>7,100</u>	<u>31,400</u>	<u>18,000</u>	<u>-</u>	<u>13,400</u>

L.FSP Ref.	Location of PDP and Transic Point	Storage Capacity Requirement			Existing Capacity	Additional Required Capacity	Construction Currently Programmed	Source of Financing	United to Programs
		PDP	Transit	Total					
<u>Tangail District</u>									
D1	Madhupur	4,000	-	4,000	200	3,800	5,000	USAID Phase II	(1,200)
D3	Tangail	6,000	-	6,000	3,000	3,000	-		3,000
	District Total.	<u>10,000</u>	-	<u>10,000</u>	<u>3,200</u>	<u>6,800</u>	<u>5,000</u>		<u>1,800</u>
<u>Faridpur District</u>									
E1	Rajbari	2,000	-	2,000	500	1,500	1,000	IFAD	500
E2	Palong	2,500	-	2,500	-	2,500	1,000	IFAD	1,500
E3	Gopalganj	1,000	-	1,000	400	600	1,000	IFAD	(400)
E4	Tepakhola	5,500	-	5,500	2,000	3,500	4,000	IFAD	(500)
E5	Madaripur	1,000	-	1,000	1,000	-	-	-	-
E5A	Takerhat	2,500	-	2,500	-	2,500	2,000	IFAD	500
	District Total:	<u>14,500</u>	-	<u>14,500</u>	<u>3,900</u>	<u>10,600</u>	<u>9,000</u>		<u>1,600</u>
<u>Chittagong District</u>									
F1	Donazari	3,500	-	3,500	500	3,000	-	-	3,000
F2	Chakaria	2,500	-	2,500	200	2,300	-	-	2,300
F3	Cox's Bazar	2,500	-	2,500	400	2,100	-	-	2,100
F4	Sandwip	3,000	-	3,000	400	2,600	2,000	Dutch	600
F5	Chittagong	16,500	37,000	47,500	33,200	14,300	2,000	BDG	12,300
	District Total	<u>22,000</u>	<u>37,000</u>	<u>59,000</u>	<u>34,700</u>	<u>24,300</u>	<u>4,000</u>		<u>20,300</u>
<u>Noakhali District</u>									
H1	Feni	7,500	-	7,500	3,500	4,000	3,000	USAID Phase II	1,000
H2	Chowmuhani	5,500	-	5,500	500	5,000	-		5,000
H3	Laksmipur	3,500	-	3,500	1,400	2,100	-	-	2,100
H4	Hatiya	4,000	-	4,000	400	3,600	3,000	Dutch	600
	District Total:	<u>20,500</u>	-	<u>20,500</u>	<u>5,800</u>	<u>14,700</u>	<u>6,000</u>		<u>8,700</u>

NFSP Ref.	Location of PDP and Transit Point	Storage Capacity Requirement			Existing Capacity	Additional Construction		Source of Financing	United to Programs
		PDP	Transit	Total		Required Capacity	Currently Programmed		
<u>Comilla District</u>									
I1	Comilla	9,000	-	9,000	1,000	8,000	{ 8,000 1,000	USAID Phase II BDG	(1,000) -
I2	Brahmanbaria	8,000	-	8,000	1,000	7,000	{ 6,000 1,000	USAID Phase II BDG	- -
I3	Daukandi	3,000	-	3,000	400	2,600	4,000	USAID Phase II	(1,400)
I4	Chandpur	4,500	-	4,500	1,500	3,000	-	-	3,000
I5	Laksham	5,500	-	5,500	1,000	4,500	-	-	4,500
	District Total	<u>30,000</u>	-	<u>30,000</u>	<u>4,900</u>	<u>25,100</u>	<u>20,000</u>	<u>10,500</u>	<u>5,100</u>
<u>Sylhet District</u>									
J1	Shaistaganj	6,500	-	6,500	-	6,500	5,000	FRG	1,500
J2	Kulaura	1,500	-	1,500	400	1,100	2,000	FRG	(900)
J3	Azairiganj	5,500	-	5,500	200	5,300	3,000	FRG	2,300
J4	Jamalganj	1,500	-	1,500	-	1,500	2,000	FRG	(500)
J5	Sunanganj	2,500	-	2,500	-	2,500	2,000	FRG	500
J7	Sylhet	3,500	1,000	4,500	1,000	3,500	2,000	FRG	1,500
J8	Srinangal	2,500	-	2,500	1,000	1,500	-	-	1,500
	District Total:	<u>23,500</u>	<u>1,000</u>	<u>24,500</u>	<u>2,600</u>	<u>21,900</u>	<u>16,000</u>	-	<u>5,900</u>
<u>Rajshahi District</u>									
K1	Rajshahi	11,500	-	11,500	1,000	10,500	8,000	IBRD	2,500
K2	Annara	5,500	-	5,500	-	5,500	6,000	USAID Phase II	(500)
K3	Rohanpur	5,000	-	5,000	-	5,000	4,000	USAID Phase II	1,000
K4	Natore	9,500	-	9,500	200	9,300	8,000	IBRD	1,300
K5	Atraf	5,000	-	5,000	500	4,500	3,000	USAID Phase II	1,500
	District Total	<u>36,500</u>	-	<u>36,500</u>	<u>1,700</u>	<u>34,800</u>	<u>29,000</u>	-	<u>5,800</u>

NFSP Ref.	Location of PDP and Transit Point	Storage Capacity Requirement			Existing Capacity	Additional Required Capacity	Construction Currently Programmed	Source of Financing	United to Programs
		PDP	Transit	Total					
<u>Rangpur District</u>									
L1	Rangpur	14,000	-	14,000	3,700	10,300	5,000	USAID Phase II	5,300
L2	Lalmunirhat	-	-	-	500*	-	-	-	-
L3	Saidpur	9,500	-	9,500	400	9,100	2,000	BDG	7,100
L4	Doar	6,500	-	6,500	-	6,500	3,000	-	3,500
L5	Kurigram	-	-	-	2,200*	-	-	-	-
L6	Gaibandha	15,000	-	15,000	6,000	9,000	-	-	9,000
L7	Mahendranagar	16,000	-	16,000	-	13,300*	12,000	USAID Phase II	1,300
	District Total:	<u>61,000</u>	<u>-</u>	<u>61,000</u>	<u>12,800</u>	<u>48,200</u>	<u>22,000</u>		<u>26,200</u>
<u>Bogra District</u>									
M1	Santahar	20,000	9,500	29,500	3,000	26,500	22,000	USAID Phase II	4,500
M2	Joypurhat	9,000	-	9,000	400	8,600	2,000	BDG	6,600
M3	Bogra	22,500	-	22,500	2,500	20,000	12,000	USAID Phase II	8,000
	District Total:	<u>51,500</u>	<u>9,500</u>	<u>61,000</u>	<u>5,900</u>	<u>55,100</u>	<u>36,000</u>		<u>19,100</u>
<u>Pabna District</u>									
N1	Muladuli/Ishurdi	2,500	-	2,500	1,000	1,500	5,000	USAID Phase II	(3,500)
N2	Pabna	5,000	-	5,000	200	4,800	2,000	ADB	2,800
N3/N3A	Baghabari/Shahjadpur	7,000	7,000	14,000	2,000	12,000	4,000	IBRD	8,000
N3B	Kashinathpur	Not Yet Determined							
N4	Sirajganj	6,500	-	6,500	500	6,000	1,000	ADB	5,000
N5	Ullapara	8,000	-	8,000	-	8,000	2,000	ADB	6,000
	District Total:	<u>29,000</u>	<u>7,000</u>	<u>36,000</u>	<u>3,700</u>	<u>32,300</u>	<u>14,000</u>		<u>18,300</u>

* Existing capacity at Lalmunirhat and Kurigram is used to meet storage requirements at neighboring Mahendranagar.

NFSP Ref.	Location of PDP and Transit Point	Storage Capacity Requirement			Existing Capacity	Additional Required Capacity	Construction Currently Programmed	Source of Financing	United to Programs
		PDP	Transit	Total					
<u>Dinajpur District</u>									
01	Dinajpur	11,000	-	11,000	1,000	10,000	6,000	USAID Phase II	4,000
02	Shibganj	13,500	-	13,500	2,000	11,500	10,000	USAID Phase II	1,500
03	Panchagar	6,000	-	6,000	200	5,800	4,000	USAID Phase II	1,800
04	Charkhai	7,000	-	7,000	-	7,000	6,000	USAID Phase II	1,000
05T	Parbatipur	-	9,500	9,500	1,000	8,500	-	-	8,500
	District Total:	<u>37,500</u>	<u>9,500</u>	<u>47,000</u>	<u>4,200</u>	<u>42,800</u>	<u>26,000</u>	-	<u>16,800</u>
<u>Khulna District</u>									
P1	Satkhira	3,500	-	3,500	500	3,000	3,000	USAID Phase II	-
P2	Bagherhat	1,000	-	1,000	400	600	-	-	600
P3T	Chalna	-	48,000	48,000	-	48,000	22,500	-	25,500
P4T	Shiromoni	-	38,500	38,500	7,500	31,000	13,400	IBRD	17,600
P5	Roosevelt Jetty	1,000	-	1,000	3,000	(2,000)	-	-	(2,000)
P6	Rajapur	1,000	-	1,000	-	1,000	-	-	1,000
	District Total:	<u>6,500</u>	<u>86,500</u>	<u>93,000</u>	<u>11,400</u>	<u>83,600</u>	<u>38,900</u>	-	<u>42,700</u>
<u>Barisal District</u>									
Q1	Bhola	10,500	-	10,500	1,500	9,000	8,000	USAID Phase II	1,000
Q2	Kawkhali	3,500	-	3,500	-	3,500	4,000	ADB	(500)
Q3	Tushkhali	5,500	-	5,500	400	5,100	-	-	5,100
Q4	Barisal	5,000	-	5,000	500	4,500	4,000	BDG	(2,500)
	District Total:	<u>24,500</u>	<u>-</u>	<u>24,500</u>	<u>2,400</u>	<u>22,100</u>	<u>19,000</u>	USAID Phase II	<u>3,100</u>

NFSP Ref.	Location of PDP and Transit Point	Storage Capacity Requirement			Existing Capacity	Additional Required Capacity	Construction Currently Programmed	Source of Financing	United to Programs
		FDP	Transit	Total					
<u>Patuakhali District</u>									
R1	Patuakhali	5,500	-	5,500	500	5,000	{ 2,000 3,000	BDG	
B2	Barguna	4,500	-	4,500	200	4,300		ADB	-
	District Total:	<u>10,000</u>	-	<u>10,000</u>	<u>700</u>	<u>9,300</u>	<u>8,000</u>	ADB	<u>1,300</u>
<u>Jessore District</u>									
S1	Jessore	6,500	-	6,500	2,500	4,000	5,000	IFAD	(1,000)
S2	Kaliganj	6,000	-	6,000	1,500	4,500	4,000	USAID Phase II	500
S3	Magura	2,500	-	2,500	200	2,300	3,000	IFAD	(700)
S4	Narail	1,000	-	1,000	-	1,000	2,000	IFAD	(1,000)
	District Total:	<u>16,000</u>	-	<u>16,000</u>	<u>4,200</u>	<u>11,800</u>	<u>14,000</u>		<u>(2,200)</u>
<u>Kushtia District</u>									
T1	Chuadanga	7,000	-	7,000	-	7,000	7,000	USAID Phase II	-
T2	Kushtia	6,500	-	6,500	2,000	4,500	3,000	USAID Phase II	1,500
	District Sub-Total:	<u>13,500</u>	-	<u>13,500</u>	<u>2,000</u>	<u>11,500</u>	<u>10,000</u>		<u>1,500</u>
	Grand Total:	<u>496,000</u>	<u>161,500</u>	<u>657,500</u>	<u>127,800</u>	<u>529,700</u>	<u>305,900</u>		<u>223,800</u>

Fertilizer Imports
(thousands of tons)

<u>Donor Source</u>	<u>1972-73</u>					<u>Total</u>
	<u>Urea</u>	<u>TSP</u>	<u>DAP</u>	<u>MP</u>	<u>Other</u>	
USAID	84	30	-	-	-	114
BDG	-	44	-	-	-	44
U.K.	-	20	-	-	-	20
Canada	<u>10</u>	-	-	-	-	<u>10</u>
Total	<u>94</u>	<u>94</u>	-	-	-	<u>188</u>
	<u>1973-74</u>					
USAID	-	74	-	-	-	74
BDG	-	-	-	-	24	24
Canada	-	-	-	16	-	16
Sweden	-	14	-	-	-	14
Norway	-	10	-	-	-	10
FRG	-	-	-	5	-	5
Total	-	<u>98</u>	-	<u>21</u>	<u>24</u>	<u>143</u>
	<u>1974-75</u>					
USAID	36	33	-	-	-	69
FRG	32	10	-	7	5	54
Norway	20	10	-	-	12	42
BDG	12	-	-	-	24	36
Canada	-	19	-	11	-	30
EEC	24	-	-	-	-	24
U.K.	-	10	-	-	-	10
Denmark	2	7	-	-	-	9
FAO	8	-	-	-	-	8
Netherlands	<u>8</u>	-	-	-	-	<u>8</u>
Total	<u>142</u>	<u>89</u>	-	<u>18</u>	<u>41</u>	<u>290</u>
	<u>1975-76</u>					
USAID	58	93	-	-	-	151
Canada	10	7	-	27	-	44
U.K.	-	40	-	-	-	40
FAO	4	30	-	-	-	34
FRG	17	-	-	-	-	17
Rumania	-	12	-	-	-	12
Netherlands	8	-	-	-	-	8
Australia	-	4	-	-	-	4
Denmark	<u>1</u>	-	-	-	-	<u>1</u>
Total	<u>98</u>	<u>186</u>	-	<u>27</u>	-	<u>311</u>

Donor Source	1976-77					Total
	Urea	TSP	DAP	MP	Other	
Norway	-	15	-	-	-	15
Saudi	11	-	-	-	-	11
Canada	-	-	-	10	-	10
Total	<u>11</u>	<u>15</u>	<u>-</u>	<u>10</u>	<u>-</u>	<u>36</u>
	1977-78					
USAID	81	68	-	-	-	149
Saudi	126	-	-	-	-	126
Netherlands	61	41	-	-	-	102
Canada	-	-	-	31	-	31
BDG	28	-	-	-	-	28
Norway	-	-	-	-	-	10
Japan	-	10	-	-	-	10
Total	<u>296</u>	<u>129</u>	<u>-</u>	<u>31</u>	<u>-</u>	<u>456</u>
	1978-79					
USAID	92	-	84	-	-	176
Saudi	113	19	-	-	-	132
Netherlands	69	10	-	-	-	79
Canada	-	-	-	77	-	77
Norway	15	23	-	-	-	38
Japan	33	-	-	-	-	33
U.K.	-	27	-	-	-	27
BDG	20	-	-	-	-	20
Denmark	-	14	-	-	-	14
Belgium	-	10	-	-	-	10
Sweden	7	-	-	-	-	7
Australia	-	-	-	-	2	2
Total	<u>349</u>	<u>103</u>	<u>84</u>	<u>77</u>	<u>2</u>	<u>615</u>
	1979-80					
IDA	67	55	-	-	-	122
Saudi	-	-	-	-	-	88
Netherlands	21	46	-	-	-	67
EEC	52	11	-	-	-	63
Canada	-	-	-	60	-	60
USAID	-	-	42	-	-	42
FRG	17	16	-	-	-	33
Norway	-	13	-	-	11	24
Japan	5	16	-	-	-	21
OPEC	21	-	-	-	-	21
Bulgaria	16	-	-	-	-	16
Denmark	-	15	-	-	-	15
Belgium	-	1	-	-	-	1
Total	<u>287</u>	<u>173</u>	<u>42</u>	<u>60</u>	<u>11</u>	<u>573</u>

1980-81

<u>Donor Source</u>	<u>Urea</u>	<u>TSP</u>	<u>DAP</u>	<u>MP</u>	<u>Other</u>	<u>Total</u>
Netherlands	-	73	-	-	-	73
USAID	-	30	30	-	1	61
IDA	-	43	15	-	-	58
Saudi	45	-	-	-	-	45
Canada	-	-	-	42	-	42
IFAD	-	24	-	-	-	24
EEC	19	-	-	-	-	19
Japan	-	17	-	-	-	17
Denmark	-	15	-	-	-	15
Finnland	-	-	-	-	10	10
ADB	-	9	-	-	-	9
Norway	-	-	-	-	8	8
Total	<u>64</u>	<u>211</u>	<u>45</u>	<u>42</u>	<u>19</u>	<u>381</u>

Bulk Handling and Bagging Proposal

Bulk Handling and Bagging

(a) Rationale

Bulk handling and bagging facilities have been planned for the two major ports of Chittagong and Chalna to enable the Bangladesh Government to realize the considerable foreign exchange and cost savings inherent in the importation of bulk, rather than bagged, fertilizer. Bulk imports will save an estimated \$15 per ton of fertilizer and are thus likely to repay the cost of new handling equipment within the first several months of operation.

Cost savings resulting from a switch from bagged to bulk imports may be calculated roughly as follows:

Reduced cost of commodity	\$ 30/ton
Reduced cost of freight and discharge	<u>\$ 5/ton</u>
Gross savings	\$ 35/ton

Less:

Local bagging costs	<u>\$ 20/ton</u>
Net savings	\$ 15/ton *****

It is expected that the new facilities will handle 360,000 tons of imported bulk fertilizer in the first year of operations.

(b) System Description

If BADCO and USAID decide to proceed with the proposed bulk handling/bagging operation (see page 17 for current status of RFTP), BADCO will sign a local services contract with a joint venture firm to provide equipment and services to receive all bulk fertilizer shipments from seagoing bulk delivery vessels at Chittagong and Chalna ports, to bag the fertilizer in 50 kilo bags, and to load the bagged product onto transportation or into storage facilities.

Bulk fertilizers will be delivered to Bangladesh in geared bulkers in the range of 18,000 to 32,000 dead weight tons. The ship owner will be responsible for discharge of all vessels. Annual cargo volumes are expected to total 360,000 metric tons of urea, triple super phosphate, diammonium phosphate, and muriated potash. Monthly volumes will range between 20,000 and 40,000 metric tons, larger volumes being handled in the drier season, between mid-October and mid-May, and smaller volumes during the period of the southwest monsoon. Each delivery vessel will

call first at the Chittagong outer anchorage, where it will discharge approximately half of its cargo into a lightering vessel provided by the local service contractor (L.S.C.). The lightened delivery vessel will then proceed to Chalna Port where it will discharge the remainder of its cargo into the receiving hoppers of portable bagging machines located on Jetty No.9.

To unload mother vessels calling at the Chittagong Outer Anchorage, the local service contractor will provide lightering craft capable of receiving up to 2400 metric tons of bulk fertilizer per day. Lightering will be done using the unloading equipment of the mother vessel. After loading, the lightering craft will proceed to a Chittagong Port Authority jetty on the Karnaphuli River and discharge, using their own gear, into the receiving hoppers of portable bagging machines.

In each port, bulk fertilizer shall be unloaded into four 15-ton capacity surge hoppers, each feeding a portable bagging machine capable of bagging 60 tons per hour in 50 kilo bags. Each port shall have a substitute fifth bagging machine to serve during periods of maintenance or repair. Bags will be purchased by BADC as part of the bulk cargo, and each shall consist of a waterproof inner liner bag securely closed by a loop knot and an outer bag which is machine-stitched closed. As circumstances require, the bagging operation may take place on the dock, the mother vessel, or lightering vessels.

At Chittagong, the contractor will load the bagged product into local transit warehouses or onto trains, barges, or trucks provided by BADC for transport up country.

At Chalna, the LSC will headload the bagged fertilizer directly into barges furnished by the Bangladesh Inland Water Transport Corporation, to the extent that barge facilities are already fully utilized, into storage facilities.

(c) Major Equipment

- 1) 8 portable surge hoppers of structural steel, each with a surge capacity of 15 tons of fertilizer.
- 11) 10 portable bagging modules, each capable of bagging 60 tons per hour and each equipped with a gravimetric net weight apportioner, filling spout suited to 50 kg. bags, integral air compressor, bag closing conveyor to carry bags from filling spout through sewing head, heavy duty sewing machine pedestal, two (one is a spare) heavy duty Fischbin sewing machines, and electrical power distribution panels.

- iii) 8 portable truck loading conveyors, each with a 24 inch x 18 foot rough top or patterned PVC belt powered by a minimum 3 HP electric motor.
- iv) 8 portable feeder hopper/lump-breaker units to feed bagging modules and to grind hard lumps. Feeder unit must apply product at 60 tons/hour. Lump-breaker must be powered separately from feeder unit and at least at 10 HP.
- v) 48 bulk product unloading slings of nylon webbing and lined with nylon fabric: 24 five ton slings (4 hatches x 3 ships x 2 ports) and 24 special shaped 3-ton slings for shipdock loading into feeder hopper/lump-breaker modules.
- vi) 4 tow-trucks.
- vii) 2 fork lift/shovel loaders.
- viii) 50 kg capacity polyethylene liner bags; outer bags of jute or woven polypropylene.
- ix) temporary storage for up to 20,000 tons of bagged product at Chalna consisting of dunnage over a firm base, tarpaulins to cover, and rope ties to secure tarpaulins.
- x) temporary pontoon barge loading wharf at Chalna equipped with four 6-foot-wide access ramps.

ENVIRONMENTAL ASSESSMENT

Since no new project elements are introduced with this amendment, no environmental assessment is required. State 112161 (1978) stated that "No IEE's or EA's (are) necessary" for this project.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORKANNEX D
Page 1 of 1Life of Project:
From FY 1978 to FY 1982
Total U.S. Funding \$235,000,000
Date Prepared: May 1981

Project Title & Number: Fertilizer Distribution Improvement Grant (388-0024)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>Increased foodgrain production, especially by small farmers.</p>	<p>Measures of Goal Achievement:</p> <p>Minimum 4 percent annual increases in foodgrain production on all land.</p> <p>Minimum 6 percent annual increases in foodgrain production on land holdings of 2 acres or less.</p>	<p>Ministry of Agriculture production figures.</p> <p>Bangladesh Bureau of Statistics.</p> <p>Sample surveys.</p>	<p>Assumptions for achieving goal targets:</p> <ul style="list-style-type: none"> - HYV seed available for moderate expansion. - Plant disease and pest infestation within normal bounds. - Weather and flood conditions temperate. - Irrigation facilities available for moderate expansion.
<p>Project Purpose:</p> <p>Increased use of fertilizer on an equitable basis</p>	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>15% annual increase in overall fertilizer sales</p> <p>22% annual increase in fertilizer sales to cultivators of two or fewer acres.</p>	<ul style="list-style-type: none"> - BADC offtake data - Sample surveys by consultant 	<p>Assumptions for achieving purpose:</p> <ul style="list-style-type: none"> - Crop/fertilizer price ratio encourages fertilizer use among tenant farmers. - Credit for fertilizer purchases becomes available to a significant proportion of tenant farmers. - BDC and donors fully realize fertilizer's vital role and provide determined support.
<p>Outputs:</p> <ol style="list-style-type: none"> 1. Adequate fertilizer stocks in country 2. Increased fertilizer storage capacity 3. Fertilizer Bulk Handling and Bagging Capacity. 4. New Marketing System and Dealer Training and Credit Programs adopted. 5. BADC Management Training Program in place. 	<p>Magnitude of Outputs:</p> <ol style="list-style-type: none"> 1. Five months inventory of phosphates 2. 300,000 tons capacity constructed under AID financing 3. 360,000 tons bagged annually in ports. 4. MHS implemented nationwide; 8,000 dealers trained and 8,000 purchasing fertilizer on credit. 5. 400 middle and upper level managers trained. 	<p>BADC, AID, dealers' records.</p>	<p>Assumptions for achieving outputs:</p> <ul style="list-style-type: none"> - Adequate financing by BDC and other donors for storage construction and fertilizer imports. - Domestic fertilizer production at projected levels. - Government counter-smuggling efforts continue to be effective.
<p>Inputs:</p> <p>BDC:</p> <ul style="list-style-type: none"> - Budgetary allocation to cover fertilizer imports, BADC operating costs, and dealer credit program. - Issuance of necessary implementing instruction. <p>AID: - Financing for marketing system improvements, storage construction, fertilizer imports, bulk handling facilities, and management training</p> <p>Other Donors: - Storage Construction and fertilizer imports.</p>	<p>Implementation Target (Type and Quantity)</p> <p>BDC - \$568 million</p> <p>AID - \$203 million grant financing \$32 million loan financing</p> <p>Other Donors - \$756 million</p>	<ul style="list-style-type: none"> - BADC reports and instructions - AID procurement and disbursement records. - BDC budget materials - Sample surveys 	<p>Assumptions for providing inputs:</p> <ul style="list-style-type: none"> - Government budget support to BADC - AID appropriations as planned. - Other donor support continues.

MISSING PAGE
NO. Annex E
1 of 12

6. FAA Sec.620(a), 620(f) 620D, App. Act.
 Is recipient country a Communist country?
 Will assistance be provided to Afghanistan, Angola, Cambodia, Cuba, Laos, The Socialist Republic of Vietnam or Syria? Will assistance be provided to Mozambique without a waiver?
 a) No
 b) No
 c) No
7. FAA Sec.620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?
 a) No
 b) No
8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?
 No
9. FAA Sec.620(l). If the country has failed to institute the investment guaranty 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?
 OPIC Bilateral Agreement was signed on January 15, 1975
10. FAA Sec.620(o). Fishermen's Protective Act of 1967, as amended. Sec.5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters.
 N/A
- a. has any deduction required by the Fishermen's Protective Act been made?
 N/A
- b. has complete denial of assistance been considered by AID Administrator?
 N/A
11. FAA Sec.620. App. Act
 (a) Is the government of the recipient country in default for more than six months on interest or principal of any AID loan to the country?
 No
- (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriated funds?
 No

12. FAA Sec. 520(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking into Consideration" memo. "Yes, taken into account by the Administrator at time of Agency OYB. This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.) U/A
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, App. Act; Sec. 607. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism? Has the country granted sanctuary from prosecution to any individual or group which has committed a War crime? No
16. FAA Sec. 666. Does the country object, on basis of race religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? No
17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977 although not a "nuclear-weapon state" under the non-proliferation treaty? No

5. Funding Criteria for Country Eligibility.

1. Development Assistance Country Criteria

a) FAA Sec.102(b)(4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development on such indexes as: (1) increase in agricultural productivity through small farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy.

(1) Yes
(2) Yes
(3) Yes
(4) Yes
(5) Yes
(6) Yes

b) FAA Sec.104(d). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, assistance to urban poor and through community-based development programs which give recognition to people motivated to limit the size of their families.

N/A

2. Economic Support Fund Country Criteria

a) FAA Sec. 502B. Has the country engaged in a consistent pattern of gross violations of internationally recognized human rights or made such significant improvements in its human rights record that furnishing such assistance is in the national interest?

N/A

b) FAA Sec.533(b). Will assistance under the Southern Africa program be provided to Mozambique, Angola, Tanzania, or Zambia? If so, has President waived the prohibition against the assistance by determining that such assistance will further U.S. foreign policy interests?

N/A

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?

N/A

d) App. Act. Will assistance be provided for the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights?

No

e) FAA Sec.620B, P.L. 94-329, Sec.406. Will ESF be furnished to Argentina or Chile?

No

5C(2) - PROJECT CHECK LIST

A. GENERAL CRITERIA FOR PROJECT

1. App. Act; FAA Sec.634A; Sec.653(b); (a) Describe how authorizing and appropriations Committees 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)?
 - a) Congressional Notification was included in Congressional Presentation for FY 81
 - b) Yes

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?

None required

4. FAA Sec.611(b); App.Act. If for water or water-related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources Dated October 25, 1973?

N/A

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 and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

Yes, certificate included herein.

6. FAA Sec.209. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

No

7. FAA Sec.601(a). 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.
 - a) The project does not address foreign trade
 - b) It fosters the private initiative of farmers and active competition among fertilizer dealers
 - c) It helps cooperatives by making more fertilizer available to them.

continued to next page

- d) It encourages active competition among fertilizer dealers.
- e) It will improve the technical efficiency of agriculture through increased fertilizer use.
- f) The project is not directed toward labor unions.
8. FAA Sec.601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise). N/A
9. FAA Sec.612(b); Sec.636(h). Describe steps taken to ensure 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 entire host country contribution is in local currency. The local costs of all contractor services will be paid with U.S. owned Taka.
10. FAA Sec.612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? No
11. FAA Sec.601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes
12. App. Acc. If assistance is for the production of any commodity for export, is the commodity for export likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity? N/A
- B. FUNDING CRITERIA FOR PROJECT
1. Development Assistance Project Criteria
- a) FAA Sec.102(a), 111; 113, and 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 and the use of appropriate technology, spreading investment out from cities to small towns
- a) The purpose of the project is to increase the use of fertilizer and to increase its use on an equitable basis.

and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (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; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

b) N/A

c) The project will increase the supply of fertilizer.

d) N/A

e) N/A

b) FAA Sec.103, 103A, 104, 105, 106, 107.

Is assistance being made available: (include only applicable paragraph 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 and extensive use of field testing to adapt basic research to local conditions shall be made (b) extent to which assistance is used in coordination with efforts carried out under Sec.104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of malnutrition of poor and vulnerable people, and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

An important purpose of the project is to increase the equitable use of fertilizer. The project is designed to increase fertilizer supplies at the local level. To accomplish that purpose the project provides a portion of phosphate import requirements, facilities for bagging bulk fertilizer imports, construction of warehouses for local stocks of fertilizer, and incentives to encourage expanded private sector participation in fertilizer marketing.

2. (104) for population planning under Sec.104(b) or health under Sec.104(c), if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.
3. (105) for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development; and (b) extent to which assistance provides advanced education and training of people in developing countries in such disciplines as are required for planning and implementation of public and private development activities.
4. (106) For technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:
 - (i) (a) concerned with data collection and analysis, the training of skilled personnel, research on and development of suitable energy sources, and pilot projects to test new methods of energy production; and (b) facilitative of geological and geophysical survey work to locate potential oil, natural gas, and coal reserves and to encourage exploration for potential oil, natural gas, and coal reserves.
 - (ii) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development organizations;
 - (iii) research into, and evaluation of, economic development processes and techniques;
 - (iv) reconstruction after natural or man-made disaster;
 - (v) for special development problems, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance

(vi) for programs of urban development, especially smaller labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

c) (107) is appropriate effort placed on use of appropriate technology? (relatively smaller, cost saving, labor using technologies that are generally most appropriate for the small farms, small business, and small incomes of the poor). N/A

d) FAA Sec.110(a). Will the recipient country 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)? Yes

e) 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, or is the recipient country "relatively least developed"? Yes. Bangladesh is "relatively least developed."

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 civil education and training in skills required for effective participation in governmental and political processes essential to self-government. The project is focused on the Agriculture Sector, the principal economic sector of the country.

g) FAA Sec.122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth? Yes

2. Development Assistance Project Criteria (Loans Only)

a) FAA Sec.122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest. N/A

b) FAA Sec.620(d). If assistance is for any productive enterprise which will compete with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. or more than 20% of the enterprise's annual production during the life of the loan? N/A

3. Project Criteria Solely for Economic Support Fund

- a) FAA Sec.531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of Section 102? N/A
- b) FAA Sec.533. Will assistance under this chapter be used for military, or paramilitary activities? N/A

5C(3) - STANDARD ITEM CHECK LIST

A. Procurement

1. FAA Sec.602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? Yes
2. FAA Sec.604(a). Will all procurement be from 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 commodities be insured in the United States against marine risk with a company or companies authorized to do a marine insurance business in the U.S.? Yes, Agreement so provides
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. N/A
5. FAA Sec.608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? Yes
6. FAA Sec.603. (a) Compliance with requirement in Section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum 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, goods and professional and other services from private enterprise, be furnished on a contract basis? Yes
- 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? N/A
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
9. App. Act. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States? N/A
- 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 left 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? N/A
- C. Other Restrictions
1. FAA Sec.122(e). If development loan, is interest rate at 2% per annum during grace period and at least 3% per annum thereafter? N/A
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? N/A

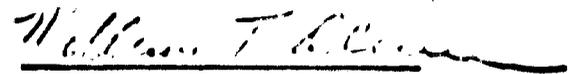
3. FAA Sec.620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-block countries, contrary to the best interests of the U.S.? Yes
4. FAA Sec.636(i). Is financing not permitted to be used, without waiver, for purchase, sale, long-term lease, exchange or guaranty of motor vehicles manufactured outside the U.S.? Such is not permitted
5. Will arrangements preclude use of financing:
- a) FAA Sec.104(f). To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions, to pay for performance of involuntary sterilization, as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization? Yes
- b) FAA Sec.620(g). To compensate owners for expropriated nationalized property? Yes
- c) FAA Sec.660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement assistance, except for narcotics programs? Yes
- d) FAA Sec.662. For CIA activities? Yes
- e) App. Act. To pay pensions, etc., for military personnel? Yes
- f) App. Act. To carry out provisions of FAA Section 209(d) (Transfer of FAA funds to multilateral organizations for lending). Yes
- h) App. Act. To be used for publicity or propaganda purposes within U.S. not authorized by Congress? Yes

BANGLADESH
FERTILIZER DISTRIBUTION IMPROVEMENT GRANT AMENDMENT

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

I, William T. Oliver, Acting Mission Director, the principal 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 judgement Bangladesh has the financial and human resources capability to utilize effectively the project to be financed by this grant.

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



William T. Oliver
Acting Director

May 29, 1981

Date

From: M.A. Matin Lasker,
Deputy Secretary,



Handwritten number: 4/285

Ministry of ~~Finance~~ Finance
External Resources Division
Government of the People's Republic of Bangladesh
Sher-E-Bangla Nagar
Dacca-15

~~SECRET~~ D.O. NO. ERD/USA(P)-31/78/130

April 13, 1981.

Subject: Additional \$ 85 million funding for the
Fertilizer Distribution Improvement Project.

Dear Mr. Kimball,

Handwritten notes and checkmarks in a vertical column on the left margin, including the number 4/29 and a signature.

We understand that the \$ 150 million provided under the Project Agreement for Fertilizer Distribution Improvement (AID Project Number 388-0024) is almost entirely expended or committed. These funds have been used to procure necessary fertilizer imports, to fund the first portion of construction under the National Fertilizer Storage Plan, to procure fertilizer bagging equipment and to develop our New Marketing System for fertilizer distribution, wholesaling, and retailing.

In view of the importance of the fertilizer sector to the development of Bangladesh's agriculture, the Government requests you to provide another \$85 million to continue and broaden these project activities. We ask that the funds be utilized for further construction of fertilizer warehouses, for importation of phosphate and micronutrient fertilizers, for continued development of the New Marketing System, with greater emphasis on developing the capabilities of private dealers, and for training and improvement of the management system within BADC.

With regards,

Yours sincerely,
(Signature)
13.4.81
(M. A. Matin Lasker)

Mr. Frank B. Kimball,
Director,
USAID Mission to Bangladesh,
Jiban Bima Bhavan,
10 Dilkusha C/A, Dacca.



PROJECT AUTHORIZATION AMENDMENT

On July 24, 1978 the authorization for the Fertilizer Distribution Improvement Project (388-0024) was approved. Now it is proposed to amend that authorization in order to approve additional funding of not to exceed \$85,000,000 (United States States dollars), in grant funds. If this amended authorization is approved, the life of project funding for the project will be \$235,000,000 (United States dollars).

The amended authorization follows:

1. Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Amendment to the Fertilizer Distribution Improvement Project. Pursuant to the Amendment, I authorize additional planned obligations of not to exceed Eighty-five Million United States Dollars (U.S.\$85,000,000) in grant funds over a two year period from date of authorization, subject to the A.I.D. OYB/Allotment process to help in financing foreign exchange and local currency costs for the Project.

2. The Amendment to the project is designed to provide continued substantial support to the fertilizer sector in Bangladesh and to address major constraints on the use of fertilizer.

3. I hereby authorize the initiation of negotiations in order to amend the Project Agreement, and I hereby authorize its execution by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and delegations of authority. The Amendment

to the Project Agreement that may be negotiated and executed shall be subject to the following essential terms and major conditions, as well as such other terms and conditions as A.I.D. may deem appropriate.

4. Source Origin. Except for ocean shipping, goods and services financed by A.I.D. under the grant shall have their source and origin in the Cooperating Country or in the countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

5. Terms and Conditions.

a. Prior to any disbursement, or the issuance of any commitment documents under the Amendment to the Project Agreement, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D., except as A.I.D. may otherwise agree in writing:

(1) Assurance that a budgetary allocation will be established for FY 1981-82 for the Bangladesh Agricultural Development Corporation (BADC), sufficient to carry out the Project during that year, including an understanding to increase such allocation as necessary to achieve project requirements.

(2) Documentation that BADC has established sales targets, stock requirements and import programming data for DAP.

b. Under the Amendment to the Project Agreement prior to any disbursement of fiscal year 1982 funds or to issuance of any commitment documents for such fiscal year 1982 funds, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D., except as A.I.D.

may otherwise agree in writing:

- (1) Documentation that an amount of funds will be reserved in the Cooperating Country banking system that is adequate for carrying out the fertilizer dealer credit program.
- (2) Documentation that a retail fertilizer pricing structure has been established whereby DAP is competitive with imported Urea and TSP.
- (3) Documentation that PDP and TSC discounted dealer prices have been established at the ratio in effect when the New Marketing System was instituted in 1978 or at a ratio that provides dealers with an incentive to increase purchases from PDP's.
- (4) Documentation that BADC has established a comprehensive fertilizer stock control and accounting system.
- (5) Assurance that a budgetary allocation will be established for FY 1982-1983 for BADC, sufficient to carry out the Project during that year, including an understanding to increase such allocation as necessary to achieve project requirements.

Benefit/Cost Analysis

This analysis attempts to account only for the benefits expected to accrue to the two major AID financed project inputs - fertilizer imports and storage construction. Returns to other elements of the project (the dealer development program, for example, or institutional development) are real, but much more difficult to quantify. Since fertilizer imports and storage construction account for over 90% of USAID project costs under this amendment, healthy economic returns to these project elements will be deemed sufficient to economically justify the amendment.

a. Fertilizer Imports

The proposed project extension includes provision of approximately 79,000 metric tons of fertilizer over a two year period. Full economic costs of the fertilizer (against which benefits are measured) include: import costs (C.I.F.), distribution and marketing costs to BADC and to private dealers, and the farmer's labor costs involved in using the fertilizer. DAP and micronutrient fertilizer imported both in bag and in bulk during the course of the project extension will average \$380 per ton. BADC distribution and dealer markup will average \$50/ton. And the farmer's incremental labor is estimated at \$50/ton for fertilizer application, extra weeding, and extra harvesting and threshing. For purpose of project appraisal, therefore, the total cost of the imported fertilizer is approximately \$480/ton.

As in the original project paper, the basis for the calculation of economic returns to these fertilizer imports lies in the fertilizer response ratio, which measures the additional foodgrain output resulting from the application of a unit of fertilizer. Although response ratios vary considerably according to crop, soil condition, and cultivation practice, for the purpose of this analysis we have used a response ratio of 3.5:1, which, as developed in Annex B.6 is assumed to be an attainable response under typical conditions.

Domestic foodgrain production resulting from use of the fertilizer imports is valued at \$377/ton, a figure representing the alternative cost of imported rice and wheat, delivered up-country. The cost of imported rice averages \$375 per ton and wheat \$225/ton (C.I.F.). In-country transportation for both averages \$50/ton. If we assume that 90% of the fertilizer imported under this project amendment will be used in rice production and 10% of wheat, the weighted average value of grain imports avoided through increased local production is \$410 per ton. However, since the coarse local varieties produced under HYV cultivation sell for about 92% of the cost of imported grain, the value of the increased production attributable to project supplied fertilizer has been adjusted downward by 8% to \$377 per ton.

Table J.1 presents the costs and benefits (all in constant 1981 prices) of the project-financed fertilizer imports. The benefits of each shipment are assumed to be realized one year after its costs are incurred. Using a real (net of inflation) discount rate of 10%, we calculate the stream of discounted benefits at a present value of \$82,235,000 and the discounted costs at \$33,314,000, for a benefit cost ratio of 2.5:1.

TABLE J.1
Benefits and Costs of Fertilizer Imports
(thousands of dollars)

<u>1</u> BDG FY	<u>2</u> Year	<u>3</u> Costs	<u>4</u> PVcosts	<u>5</u> Ben _{3.5}	<u>6</u> PV _{3.5}	<u>7</u> Ben _{2.5}	<u>8</u> PV _{2.5}	<u>9</u> Ben _{1.5}	<u>10</u> PV _{1.5}
1980/81	0								
1981/82	1	24,000	21,816						
1982/83	2	13,920	11,498	65,975	54,495	47,125	38,925	28,275	23,355
1983/84	3			38,265	28,737	27,332	20,526	16,400	12,316
Total:		37,920	33,314	104,230	83,232	74,457	59,451	44,675	35,671
B/C ratio					<u>2.50</u>		<u>1.76</u>		<u>1.07</u>

Since the fertilizer response ratio of 3.5:1 is still unproven as the average response in Bangladesh, we have also calculated the benefits under the alternative assumptions that 2.5 and 1.5 tons of extra grain will result from the application of each ton of the project's imported fertilizer. Valued again at \$377 per ton, these benefits appear in columns 8 and 10 of Table J.1 and yield benefit-cost ratios of 1.78:1 and 1.07:1, respectively. This sensitivity analysis indicates that, even under the worst of circumstances, fertilizer imports are economically justified at the macro-economic level. (Results of the Equity Study, due in September, 1981, will give us a better idea of what yield response can be expected under a variety of Bangladesh farm conditions.)

b. Storage Construction

Under this amendment, 120,000 MT of storage capacity will be constructed at approximately 20 NFSP sites at a cost to AID of \$40 million (at current prices, including consulting engineering costs). Average completion date for the buildings will be early in BDG FY 1984/85. This

analysis assumes that the areas to be served by this Phase III construction program will have a storage requirement of 149,000 MT warehouse capacity in 1986/87, 29,000 of which is already owned by BADC at PDP and transit sites and the rest of which will be constructed under this project. The assumptions underlying this calculation are as follows:

- 1) The NFSP calls for 657,000 MT of storage capacity at 88 sites.
- 2) 127,800 MT of this requirement are already in place.
- 3) 529,700 MT of the requirement remain to be built.
- 4) The 120,000 ton Phase III program represents 22.7% of planned NFSP construction at about 20 of the 88 sites.
- 5) Fertilizer demand is expected to increase by 15% per annum through 1984/85 and by 10% per annum thereafter.
- 6) Storage capacity requirements will be calculated at 1/3 of sales until 1986/87 (3 months PDP storage plus a one month transit warehouse stock). Beginning in 1989/90, storage requirements will be 1/4 of sales projections (2 months' PDP stock plus a one month transit stock). The increase from 4 to 6 stock turnovers per year at the PDP's will result from improvements in the national transportation system. Between 1986/87, the stock turnover rate will gradually increase, keeping storage requirements constant.
- 7) Until the completion of the Phase III construction program in 1984, all storage requirements beyond existing (1981) capacity in the service areas of the Phase III sites must be rented.
- 8) In 1983/84, just prior to completion of the Phase III construction program, all available warehouse space will be fully utilized by BADC.

Based on these assumptions and on the fertilizer sales projections presented in Table 7, we can construct a sales and storage profile for the service areas to be served by the Phase III construction sites (22.7% of the NFSP).

TABLE J.2
Phase III Sales and Storage Profile
(thousands of long tons)

<u>Year</u>	<u>Fertilizer Sales</u>	<u>Storage Requirement, of which</u>	<u>BADC Owned</u>	<u>Rented</u>
1981/82	243	81	29	52
1982/83	279	93	29	64
1983/84	321	107	29	78
1984/85	369	123	149	0
1985/86	406	135	149	0
1986/87	446	149	149	0
1987/88	491	149	149	0
1988/89	540	149	149	0
1989/90	549	149	149	0
1990/91	653	163	?	?
1991/92	719	180	?	?

Costs of the storage program consist basically of the costs of construction. Physical maintenance costs are negligible, and BADC's operating costs in terms of personnel will not increase as a result of this project, since consolidation of many Thana Sales Centers into fewer, larger PDP's will allow the same number of BADC Storekeepers, Thana Inspectors, night guards, etc. to manage more stored tons. Costs of the project's storage program are listed in Table J.3, column 2, in constant 1980/81 dollars.

TABLE J.3
Construction Costs (\$000)

	<u>1</u> <u>Year</u>	<u>2</u> <u>Costs</u>	<u>3</u> <u>Present Value</u>
0	1980/81	0	0
1	1981/82	800	727
2	1982/83	12200	10083
3	1983/84	19000	14275
4	1984/85	8000	5484
	Total:	<u>40000</u>	<u>30549</u>

The benefits of the storage construction program can be measured in terms of (i) increased production through increased fertilizer use due to improved availability of fertilizer, (ii) reduced distribution costs, and (iii) reduced losses in product value.

(i) Improved Availability. Without increased storage capacity, fertilizer sales will be unable to keep pace with growing demand. By the time the warehouses funded under this amendment are constructed in 1984, existing BADC owned and rented transit and PDP storage in the service areas of the proposed godowns will be utilized at full capacity and at planned stock turnover rates. Assuming that the fertilizer itself is available in country, any increase in sales will have to result from additional local storage and/or from rapid movement of small quantities into areas of supply shortage by private wholesalers. Although this project aims to strengthen and encourage fertilizer movement by private wholesalers, their ability to procure and move fertilizer to areas lacking warehousing will be limited to the extent that storage capacity in excess of local demand exists in neighbouring districts.

Given this assumption that any increased sales beyond the 1983/84 sales level cannot occur without increased storage capacity, we can attribute the rising sales figures from 1983/84 to 1989/90 to the Phase III construction program. Since capacity will be fully utilized in 1989/90, any increases in sales beyond 594,000 MT per year in the Phase III service areas (See Table J.2) must be the result of a subsequent storage construction program. The incremental sales resulting from increased storage capacity built under this construction program are presented in Table J.4, column 2.

The value of these increased sales is measured in terms of the additional foodgrain produced as a result of increased fertilizer use. As in section (a) above, this production is valued at \$377 per ton and each ton of fertilizer is assumed to produce 3.5 tons of additional grain. All costs of the fertilizer must be netted out to arrive at the net benefits attributable to the increased storage space. These costs (importation plus inland transport, plus farm labor) are valued at \$430 per ton. This figure is lower than the \$480 used above in section (a), due to a difference in product mix and the fact that all BADC fertilizer imports do not carry USAID source and shipping restrictions.

In constant dollars, then, the benefits accruing to each ton of increased fertilizer sales enabled by increased storage space are calculated at $3.5 \times \$377 - \$430 = \$890$. Multiplying this \$890 by the extra fertilizer tonnage sold provides the net benefits expected to result from the extra fertilizer availability enabled by the Phase III construction program over the 30 year life of the godowns (Table J.4, column 3).

As a sensitivity analysis, we have also calculated these benefits at fertilizer response ratios of 2.5:1 (each ton of fertilizer produces \$512 in net benefits) and 1.5:1 (\$135 in net benefits per ton of fertilizer).

TABLE J.4
Benefits of Improved Availability

Year	Incremental Fertilizer Sales (thousands of tons)	Benefits Calculated at Various Fertilizer Response Rates (\$000)					
		Ben _{3.5}	PV _{3.5}	Ben _{2.5}	PV _{2.5}	Ben _{1.5}	PV _{1.5}
0 1980/81							P
1 1981/82							
2 1982/83							
3 1983/84							
4 1984/85	48	42,720	29,178	24,576	16,786	6,480	4,426
5 1985/86	85	75,650	46,973	43,520	27,022	11,475	7,125
6 1986/87	125	111,250	62,798	64,000	36,126	16,875	9,525
7 1987/88	170	151,300	77,641	87,040	44,665	22,950	11,777
8 1988/89	219	194,910	82,661	112,128	52,309	29,765	13,792
9 1989/90	273	242,970	103,043	139,776	59,279	36,855	15,643
10 1990/91							
to to	273/yr.	242,970	923,286	139,776	531,149	36,855	140,163
33 2013/14		per yr.		per yr.		per yr.	
TOTAL:			<u>1,325,580</u>		<u>767,336</u>		<u>202,451</u>

(ii) Reduced Distribution Costs. Preliminary consultant estimates have indicated that efficient location of PDP's and transit godowns along rail and waterways will save BADC about \$3 per ton over current movement costs under the present distribution system. As Table J.2 indicates, the Phase III construction program is likely to replace 78,000 MT in inefficiently located rented godown capacity, handling 312,000 MT of fertilizer per year. Resultant savings will be \$936,000 per year over the life of the warehouses.

(iii) Nutrient Loss Avoided. The nutrient value of urea is diminished by up to 5% if urea is stored in conditions exposing it to moisture. As in subsection (ii) above, we assume that 78,000 tons of substandard, rented

storage capacity, handling 312,000 tons of fertilizer annually, is replaced by this project. If we assume further that:

- 50% of this fertilizer is urea,
- 50% of the urea is exposed to moisture, and
- 5% of the nutrient value of that exposed urea is lost due to moisture absorption, then we can calculate that a loss of 3,900 tons of urea can be avoided annually, due to the improved quality of the storage constructed under this project.

The value of the extra foodgrain produced as a result of avoiding this nutrient loss is calculated based (as above) on a fertilizer yield response ratio of 3.5:1 and a grain value of \$377 per ton.

The resultant product of all these factors is \$5,146,050 per year.

For a sensitivity analysis we can vary the urea exposure rate (from 50% to 25%), the nutrient loss rate (from 5% to 3%), and the yield response ratio (from 3.5:1 to 2.5:1 to 1.5:1). Various combinations of these three factors result in the twelve possible values of the annual benefits of an avoided nutrient loss presented in Table J.5.

TABLE J.5
Annual Benefits of Nutrient Loss Avoided

<u>Combination</u>	<u>Yield Response</u>	<u>Exposure Rate</u>	<u>Nutrient Loss</u>	<u>Annual Benefits (\$000)</u>	<u>PV 30 years (\$000)</u>
1	3.5	.50	.05	5146	36,382
2	3.5	.25	.05	2573	18,191
3	3.5	.50	.03	3088	21,832
4	3.5	.25	.03	1544	10,916
5	2.5	.50	.05	3676	25,989
6	2.5	.25	.05	1838	12,995
7	2.5	.50	.03	2205	15,589
8	2.5	.25	.03	1103	7,798
9	1.5	.50	.05	2205	15,589
10	1.5	.25	.05	1103	7,798
11	1.5	.50	.03	1323	9,354
12	1.5	.25	.03	662	4,680

(iv) Benefit/Cost Ratios. Costs and benefits under the various assumptions discussed above were discounted at a real (net of inflation)

discount rate of 10% over a thirty-three year period (3 years of investment costs plus a 30 year life of the warehouses). When the present values of the combined streams of benefits of improved availability, reduced distribution costs, and avoided nutrient loss were compared with the present value of the warehouse costs, twelve benefit-cost ratios were generated. The assumption numbers in Table J.6 correspond to the combinations of assumptions regarding yield response, exposure rate, and nutrient loss presented in Table J.5

Benefit-cost ratios range from a high of 44.8 to 1 (a 3.5 yield response in calculating benefits i and iii, a 50% urea exposure rate in calculating benefit iii, and a 5% nutrient loss rate in calculating benefit iii) to a low of 7 to 1 (1.5 yield responses, 25% urea exposure, and 3% nutrient loss).

Since the benefit-cost ratio exceeds 1 in every case, the storage construction program can be judged economically sound.

TABLE J.6
Benefit-cost Ratios Under Various Assumptions

<u>Assumption Number</u>	<u>P.V Costs</u>	<u>Present Value of Benefits</u>			<u>Total</u>	<u>B/C</u>
		<u>(i)</u>	<u>(ii)</u>	<u>(iii)</u>		
1	30,549	1,325,580	6,618	36,382	1,368,580	44.80
2	30,549	1,325,580	6,618	18,191	1,350,389	44.20
3	30,549	1,325,580	6,618	21,832	1,354,030	44.32
4	30,549	1,325,580	6,618	10,916	1,343,114	43.97
5	30,549	767,336	6,618	25,989	799,943	26.19
6	30,549	767,336	6,618	12,995	786,949	25.76
7	30,549	767,336	6,618	15,589	789,543	25.85
8	30,549	767,336	6,618	7,798	781,752	25.59
9	30,549	202,451	6,618	15,589	224,658	7.35
10	30,549	202,451	6,618	7,798	216,867	7.10
11	30,549	202,451	6,618	9,354	218,423	7.15
12	30,549	202,451	6,618	9,354	213,749	7.00

(i) = improved availability
(ii) = distribution savings
(iii) = nutrient savings

Summary of G.A.O. Audit and USAID Response

In July, 1980, Senator Frank Church, Chairman of the U.S. Senate Committee on Foreign Relations, requested the General Accounting Office to examine the planning and implementation activities of the Fertilizer Distribution Improvement Project so that the committee could better assess whether more AID resources should be committed to the project. The audit report was published on March 31, 1981.

Although USAID believes that the GAO audit report contains a few insupportable conclusions, the Mission finds it for the most part constructive and notes that the audit recommendations are supportive of continued and expanded project activity in each of the major areas of project concern. The conclusions and recommendations of the audit report, along with the Mission's comments, are as follows:

I. Fertilizer Imports

A. G.A.O. Conclusions and Recommendations

Our review suggests the need for a more systematic analysis and projection of fertilizer requirements, based on changing supply and demand factors. The BADC monthly fertilizer newsletter provides statistics on many of these factors and uses a projected annual sales target to plan imports. Actual monthly sales activity would tend to reduce or increase overall fertilizer requirements when measured against these sales targets; yet the annual sales targets are not revised to reflect this activity. Because most leased warehouse space is known to be overstated and of low quality, the availability of storage space should not be the major consideration for imports. Demand which reflects both actual and systematically projected sales activity should more appropriately gauge import needs.

Realizing the potential benefits of DAP will require a more effective marketing campaign and a better job of planning imports to consider such factors as farmer acceptance and the availability of storage. In the long run, we believe that optimal fertilizer benefits await the development of reliable data on the best types, quantities, and combinations of fertilizers which should be used in Bangladesh. Accordingly, we recommend that the AID Administrator assist and encourage the Government of Bangladesh to:

1. employ a more systematic approach in planning imports, one that gives proper weight to the factors of fertilizer supply and demand in a way that is responsive to changing conditions;
2. pursue a DAP marketing strategy to include more widespread and consistent informational promotion, on-farm experiments to demonstrate the advantages of using DAP, and consideration of price incentives to purchase and use DAP; and
3. develop reliable, nationwide data on the most effective types, proportions, and combinations of fertilizer to use on the main crops grown in Bangladesh.

B. USAID Comments

The Mission agrees with these recommendations and notes that it has been actively pursuing these objectives for years and will continue to do so under the upcoming period of the project amendment.

1. The problem of poor import planning is one that the Mission and the project's IFDC consultant have been grappling with for years. USAID files contain numerous IFDC and USAID projections, letters, memos, and records of conversation which have accurately predicted and warned against upcoming overstock or understock positions. Certainly these efforts were not always heeded by the BDG, but sometimes they were, and as a result the problem has been reduced. For instance, USAID's advice to the Bangladesh Government in October 1980 not to export urea appears to have contributed to a presidential decision not to export a planned 150,000 tons of urea but instead to hold exports to 40,000 tons already contracted for.

The excessive overstocking which occurs from time to time cannot be explained simply by the fact that sales targets are not regularly revised. It is the Mission's opinion that BADC has consciously overstocked. We have criticized this practice and have held up the use of AID funds when we have felt that AID-financed imports would contribute to an oversupply. However, we have been unable to end this tendency. In attempting to understand the tendency, we have noted that in all its economic sectors Bangladesh deals with shortage situations and has a shortage mentality, which leads to hoarding. Whenever a commodity becomes available, the BDG grabs it, regardless of rational planning, and stockpiles it for fear that it will be unavailable when needed later. Bangladesh is also almost entirely dependent on donors to fill these shortages, and donors do not reliably plan very far ahead. AID, for example, is a major supplier of phosphates; yet we don't know how much money we will have available for phosphate imports in FY 1982. It is not possible for BADC to plan properly if it cannot obtain firm donor commitments on a longer-term basis.

2. A more vigorous DAP promotion policy is clearly needed if the new product is to make rapid inroads into the potential phosphate and nitrogen markets. This project has funded DAP promotion materials and the new BADC Chairman has indicated that he will seek to use project funds to print posters and leaflets to advertise the merits of DAP and provide useful information as to its application. This project amendment includes a dealer training program which will give dealers the technical knowledge they need to advise farmers on the use of DAP and other fertilizers. This program will also help dealers to establish demonstration plots. The USAID-BDG Grant Agreement Amendment obligating the funds for this project extension will include a provision that the price of DAP will be set at a level where the subsidy on DAP equals the subsidy on the equivalent nutrient combination of TSP plus urea. Finally, BADC has agreed to make DAP the major source of phosphates in Rajshahi Division during 1981/82, so that a large number of farmers will be induced to try it.

3. Through the Agricultural Research III Project, USAID is assisting the Ministry of Agriculture and Forests to develop reliable, nationwide data on the most effective use of fertilizers under various soil and cropping conditions. With USAID support, Bangladesh's agricultural research institutions are conducting extensive field trials on DAP, micronutrients, and other fertilizers.

II. Marketing System

A. G.A.O. Conclusions and Recommendations

The extent to which the new marketing system objectives have been achieved has not been determined, including questions about whether fertilizer has been made more available to small farmers, as envisioned. The number of active wholesale and retail fertilizer dealers and their jurisdictions are basically unknown because the information about dealer activities is not systematically collected. Most registered dealers apparently are not engaged in wholesale fertilizer storage and distribution but are direct users or retailers themselves.

Whether discounts are adequate to cover all dealer expenses and broaden sales jurisdictions of dealers has not been determined. The single discount system affects the ability of dealers to market fertilizer at great distances from buying sources. Fertilizer is sold in remote locations at higher than Government-administered prices because of lack of competition and higher transportation costs which constitute the dealer's major expense.

The absence of economies of scale in the current primary distribution point discount structure may inhibit greater wholesale and retail sales. Because prevailing prices which farmers pay often exceed officially administered prices, current pricing policies should be revised to better reflect wholesale distribution costs.

Aside from dealer discounts, most other cost reductions anticipated under the new marketing system cannot be realized until (1) storage locations are consolidated, (2) some sales centers and all leased warehouses are no longer used, and (3) the BADC staff has been reduced. Because of current large fertilizer stocks and the slow construction of additional warehouses, however, cost savings in these areas are not likely for sometime.

We recommend that the Administrator, AID, encourage and assist the Government of Bangladesh to:

1. systematically collect information on dealer functions and coverage under the new marketing system and use this data to help make necessary changes to ensure that farmers have equal access to available fertilizer when needed;
2. determine how the dealer discount policy should be revised or modified to more accurately reflect actual product and overhead costs to dealers and to allow a reasonable profit; and
3. gradually remove officially administered retail sales prices, as long as doing so would not reduce the equal access of fertilizers to all farmers.

B. USAID Comments

1. The Third Evaluation of the New Marketing System is currently underway. A major objective of this evaluation is to further define the dealer function and develop a more detailed profile of dealer activities. Information is being collected on the frequency and size of dealer purchases, dealers' perceived needs, their costs, and retailing practices. A special questionnaire has even been designed for ex-dealers in the hope that by sharing their reasons for leaving the business they may provide information useful for fine-tuning the NMS.

2. The only way that retail prices can be made to reflect dealer costs is by eliminating officially administered retail pricing. Fixed prices overcompensate dealers in areas close to PDP's and provide a disincentive to dealers to transport fertilizer long distances to remote areas. As long as dealers can freely enter the business and are numerous enough to compete with each other, deregulation of pricing will provide a fair return to dealers and a fair price to farmers. Until that can be achieved,

USAID has encouraged BADC to increase the dealer discount at PDP's to the same percentage of sales price that existed at the introduction of the NMS.

3. Removal of officially administered retail prices will not allow all farmers equal access to equal availability of fertilizer at equal prices. Deregulation will result in higher prices but improved supply of fertilizer in remote areas and in greater efficiency of distribution. USAID will attempt to negotiate the elimination of price controls prior to signing the upcoming grant agreement amendment. But price control should be eliminated abruptly, not gradually.

III. Warehouse Construction

A. G.A.O. Conclusions and Recommendations

Active collaboration among AID, IECO, and BADC is urgently needed to assure successful implementation of phase II storage construction. The current inconsistent efforts have impeded the smooth implementation of the project which is already a year behind schedule. The three participants in phase II should act immediately to cooperate on project activities requiring three-party review and approval processes. They should also establish a mutually agreed-upon implementation plan and a mechanism to integrate new developments into project planning documents.

Lastly, phase II is apparently only one of several phases in the Bangladesh Government campaign to provide the systems to efficiently distribute agricultural supplies and technology. AID is already planning to participate in future phases of storage construction. Even though the need for storage is urgent, AID must assess the likely role of other donors in addressing these needs in deciding on future AID involvement in construction. Future AID presentations to the Congress should explain current Agency funding for storage construction and for AID construction plans over the foreseeable future.

To avoid further loss of time and money in the design, planning, and construction of storage facilities, we recommend that:

1. the Administrator, AID, act to establish procedures and requirements calling for collaborative project efforts among the contractor the host government, and the AID mission and providing a mechanism to speed the approval process, resolving differences as they occur.

B. USAID Comments

The Mission agrees that communication among BADC, IECO (the Phase II Consulting Engineer), and USAID is essential to the timely completion of the warehouse construction program. But there is no plan, however well

prepared, which can guarantee against the effects of unsatisfactory consultant performance, the cause of most of the delay to date. The project agreement, the project implementation letters, the consultant's contract, and the relevant AID regulations (which are incorporated by reference into the project agreement and the consultant's contract) contain overall methods for identification of storage locations and capacities and for resolution of disagreements. These provisions parallel closely those which proved so workable under the Phase I storage construction program. The Mission notes that the process of site selection and drawing, which proved so contentious, has been completed. We look forward to smoother sailing during the period of actual physical construction.

IV. Bulk Fertilizer Imports

A. G.A.O. Conclusions and Recommendations

Both AID and IFAD plan to purchase and install onshore bagging equipment which could be duplicate efforts. The AID mission is planning to place five temporary portable bagging machines at each of the two major ports; IFAD plans to install eight machines at the port of Chittagong. Very little effort has been made to coordinate the bagging machine installations planned by AID and IFAD. Furthermore, five other AID-financed machines scheduled for Chalna seem to be premature because storage facilities there will probably not be available for at least 2 more years.

The AID mission estimate of processing 360,000 tons of bulk fertilizer during the first year of operation for the portable machines is questionable because the estimate anticipates bulk fertilizer imports from other donors who have not committed to bulk. Moreover, the open-type dockside operations which AID envisions will be subject to extensive periods of monsoon weather which, combined with the additional capacity of the IFAD machines and the shortage of adequate storage facilities, may well lead to waste, congestion, and underutilization of expensive equipment.

Although several AID-financed studies have concluded that importing bulk fertilizer is cheaper than bagged, they differ on the best methods and facilities to handle bulk shipments. In the absence of actual cost data and shipping experience, we did not attempt to analyze the results or recommendations of these studies. Importing fertilizer in bulk and bagging it onboard ships has been tried with mixed results. Our limited analysis of tenders and actual shipments of bulk and bagged DAP fertilizer suggested that costs savings by bagging bulk aboard ships are, at best, uncertain. In our opinion, the efficiency and economy of various schemes tried or proposed to accommodate bulk imports still remain to be convincingly demonstrated.

Because AID considers the construction of permanent bulk handling facilities to be more suitable for other donor funding, the establishment of such facilities, as recommended by several consulting engineers is contingent upon the support of donors other than AID. We recognize the AID mission efforts to address the problems of bulk imports: through feasibility studies, bagging aboard ships experiments, and now, through the use of portable bagging machines. Recognizing AID's experimental and alternative efforts and its position on financing major construction, we are not making a formal recommendation concerning permanent bulk handling facilities. However, the planning and financing necessary to provide either temporary or long-term permanent handling facilities in Bangladesh will require active coordination among several major donors. In this regard, we encourage AID to remain active in helping to meet both short- and long-term needs.

1. The Administrator, AID, should act to coordinate and integrate current AID plans for providing temporary bagging machines with similar efforts of IFAD, including securing appropriate commitments from the host government and other donors for effective equipment use.

B. USAID Comments

The Mission agrees that coordination of donor efforts is important in this area but disagrees that coordination has been lacking. It is BADC, not IFAD and USAID, who would select and install bagging machines in the ports. A single BADC officer manages both projects and is completely aware of the need to avoid duplication of effort. The World Bank/IFAD Project Officer and the USAID Project Officer met with BADC several times to agree on how the two projects would mesh. It was decided that the BADC effort utilizing USAID funds would begin first, both in Chittagong and Chalna. The IFAD funds would be made available later to add conveyor belts, warehouse improvements, additional bagging machines, etc. at Chittagong. Just in case there were any problems with the USAID funded effort, the IFAD project budgeted for bagging machines at Chittagong, with the intention that any excess funds could be used for the project's major component: fertilizer imports. Since G.A.O. audit was conducted, interest in bulk handling/bagging has developed in the private sector. It is therefore possible that neither USAID nor IFAD funds will be needed to finance the purchase of bagging machines.

Realizing the significant savings that will result from bulk importation, all the major fertilizer donors have agreed to finance bulk imports.

Preliminary Scope of Work for External Evaluation

I. The Project: The purpose of this project is to increase the use of fertilizer in Bangladesh on an equitable basis. The goal is to increase food production, especially by small farmers. (follow with a brief description of project history-previous project, funding levels, etc.).

II. Purpose and Timing of the Evaluation

- A. Purpose: The purpose of this evaluation is to assess and analyze progress of the project toward achievement of outputs, to review and assess data relating to initial achievement of the project purpose, and to make a preliminary determination of the likelihood of the project achieving its longer term goal of increased food production.
- B. Timing: The timing of the evaluation will be early enough to permit review of its findings prior to any decision to further amend or approve a follow-on project and late enough so that the project's progress towards achievement of its purpose can be fairly assessed. Specific dates will be determined by BDG, USAID/Dacca and AID/W. Probable timing will be September, 1982.
- C. Audience: The principal audiences for this evaluation will be AID/W and the BDG for purposes of determining future programming for fertilizer in Bangladesh, gaining lessons from the Bangladesh experience relevant to other fertilizer programs, and providing information to the Administrator and Congress on the effectiveness of this involvement. Since the project implementors and USAID/Dacca have in place well developed monitoring systems, including continuing studies of fertilizer distribution and use, it is not expected that they will be the primary audience for this evaluation. However, the evaluation may yield useful recommendations for improvement, which should be considered by project management.

III. Questions the Evaluation will Answer

- A. General Questions: There are four major questions which the evaluation team must answer. These are:
1. Has the project increased the level and rate of increase in fertilizer use in Bangladesh?
 2. Are the level and rate of increase in fertilizer use by small farmers (less than 2.5 acres) consistent with equity objectives and design projections?
 3. Is fertilizer being effectively used to increase food production, especially by small farmers?
 4. Will improvements in supply, use, and effectiveness of the fertilizer system be sustained?

B. Specific Questions: OUTPUTS TO PURPOSE

1. Fertilizer stocks, storage capacity and handling improvements.

- a) Are physical output targets achieved on time, within expected costs, and integrated in such a way as to produce the physical infrastructure necessary for an effective fertilizer supply system?
- b) Is the management system for procurement, packaging, and distribution to PDP's adequate and responsive to supply and demand signals?
- c) Do the price structure and distribution and regulatory systems produce incentives for private entrepreneurs to expand the retail distribution network vertically and horizontally?
- d) Is there evidence to indicate that AID-supported inputs have made a significant contribution to improvements in physical and managerial aspects in the fertilizer distribution chain?

2. Retailing link to consumers

- a) Has the system of private retailing of fertilizer continued to expand (e.g. increase in numbers of wholesalers, dealers, and consumers, volume handled, share of total fertilizer distributed)?
- b) Has competition among private dealers emerged with expected effect on consumer price and availability of fertilizer (or have private monopolistic practices emerged, generally, in selected regions)?
- c) Is there evidence that the shift to private retailing has resulted in small farmers, renters and shareholder maintaining or improving their access to fertilizer at equitable costs?
- d) Have efforts to channel fertilizer credit through private dealers proved effective and equitable (e.g. credit is supplied to small farmers at competitive rates)?
- e) Have efforts to train retailers in fertilizer use proved an effective means for extending technical knowledge to consumers, especially to small farmers?
- f) How does the average dealer markup compare with former BADC costs for equivalent distribution?

3. Training

- a) Has the target of 300 middle and upper management trainees been achieved?
- b) Are trainees functioning as planned within acceptable limits?
- c) Is there evidence that training has resulted in improved performance of individuals and of management system? (evidence for direct link is difficult to come by, but secondary measures can be developed).
- d) Is/was the substance of training appropriate to improving the capacities of individuals to perform assigned tasks? (Review of training curriculum, interviews with trainees, etc.)

C. PURPOSE LEVEL ASSESSMENT AND ANALYSIS

1. Is there evidence that the increase in the national supply of fertilizer increases the supply of fertilizer to small farmers and to the more remote areas of the country?
2. Is there evidence that demand for fertilizer by farmer class and by region has continued to expand equitably?
3. Is there evidence that farmer demand has become increasingly sophisticated with respect to a shift from TSP to DAP and with respect to increasing demand for and use of micro-nutrients as appropriate to specific regions, especially among small farmers?
4. Is there evidence that fertilizer costs remain low enough to encourage farmers to produce quantities of foodgrain consistent with the production targets of the country? Are costs so low that the real (unsubsidized) costs of fertilizer exceed the marginal value of production attributable to fertilizer use (i.e. fertilizer is overused)?

D. GOAL LEVEL ASSESSMENT

1. Evidence for relationship between purpose (increased use by farm class) and expansion of food production.
2. Evidence that other constraints to increased production, especially by small farmers - such as lack of water, new varieties, labor, credit, marketing - do not cancel out the effects of increased fertilizer supplies.

E. CROSS-CUTTING AND LONG TERM ASSESSMENT AND ANALYSIS

1. Policy Context: Is the BDG continuing to liberalize input supply and price structure consistent with improving efficiency of resource allocation? How has this project influenced these policy changes?
2. Does BDG exercise regulatory authority effectively to prevent monopolistic and exploitative practices from emerging in the private marketing system, including transport?
3. Is there a reasonable probability that supply and management improvement introduced by this project will be sustained upon completion of the project?
4. What effect/impact, if any, have increased supply and use of fertilizer had on the role of women in rural Bangladesh, especially among small farm families?
5. What effect/impact have increased supply and use of fertilizer had on supply, cost and deployment of farm labor, either family or hired?
6. What effect/impact had increased supply and use of fertilizer had on quality of land and water resources, with special emphasis on effects on domestic water supply? (e.g. possible potential increase in health hazards?)

F. PROJECT EFFECTIVENESS ASSESSMENT AND ANALYSIS

1. Did USAID/Dacca and AID/W perform management functions in a timely and supportive manner?
2. Assess the adequacy and realism of project design and analysis in relation to the project as actually implemented.
3. Did technical assistance teams perform as expected, with appropriate personnel and in a timely manner?
4. Was the data collection and monitoring system installed so as to produce reliable, timely and appropriate information to project managers (including BDG and USAID/Dacca)?
5. Is there evidence that monitoring information and analysis were used to identify problems and issues and to make mid-course corrections as needed?
6. Describe and assess any innovative and effective management systems, practices or other interventions, either by AID or the BDG which were introduced in this project that might have application for development projects in Bangladesh or elsewhere.

IV. TEAM COMPOSITION

Participating in the evaluation will be both specialists external to the project and representatives from BDG and USAID/Dacca. External specialists will include:

1. AID/Washington Development Specialist (Senior AID officer with some evaluation or social science (including economics) background and familiarity with AID programs, procedural relationships, and requirements; should have no previous connection with project. This person will be Team Leader.)
2. Agricultural Economist, with background and experience in South Asia, especially Bangladesh.
3. Management specialist with experience working in public sector corporations in LDC's.
4. Fertilizer Distribution Specialist.

V. Methodology and Procedures

A. Data on which the Evaluation Report is to be Based.

This project has built in a number of data collection and analysis activities, including internal evaluations, a major study on Equity Effects of Fertilizer Use, and a wide variety of other data sources. It is not expected that the evaluation team will need to commission additional data collection and analysis efforts, but this possibility should not be ruled out. The team will assess the quality and relevance of existing data and augment it through interviews and field observations.

- B. The team will assess and document relevant evidence, analyze, interpret, draw its own conclusions based on the preponderance of available evidence, synthesize findings, and make recommendations pertinent to the purposes of the evaluation.