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AMENDED PROJECT PAPER  
  
MANAGEMENT SUPPORT  
for  
AFGHAN FERTILIZER COMPANY

110p.

USAID / Afghanistan  
April 1976

**AGENCY FOR INTERNATIONAL DEVELOPMENT**  
**PROJECT PAPER FACESHEET**  
 TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE ("X" appropriate box)  
 Original  Change  
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DOCUMENT CODE: 3

2. COUNTRY/ENTITY: **AFGHANISTAN**

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6. ESTIMATED FY OF PROJECT COMPLETION: **FY 79**

7. PROJECT TITLE - SHORT (stay within brackets):  **AFC MANAGEMENT SUPPORT**

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL **4 75** b. FINAL FY **7 77**

9. ESTIMATED TOTAL COST (2000 or equivalent, \$1 = 56 Afgh.)

a. FUNDING SOURCE	FIRST YEAR FY 75			ALL YEARS		
	b. FX	c. L/C	d. Total	e. FX	f. L/C	g. Total
AID APPROPRIATED TOTAL	373		373	1,250		1,250
(Grant)	( 373 )	( )	( 373 )	( 1,250 )	( )	( 1,250 )
(Loan)	( )	( )	( )	( )	( )	( )
Other 1.						
U.S. 2.						
HOST GOVERNMENT	195	1,162	1,297	1,224	6,935	8,159
OTHER DONOR(S)						
<b>TOTALS</b>	<b>568</b>	<b>1,102</b>	<b>1,670</b>	<b>2,474</b>	<b>6,935</b>	<b>9,409</b>

10. ESTIMATED COSTS/AID APPROPRIATED FUNDS (2000)

a. Approp. Division (AIDNS Code)	b. Primary Project Code	c. Primary Tech. Code	FY 75		FY 76		FY 77		ALL YEARS	
			d. Grant	e. Loan	f. Grant	g. Loan	h. Grant	i. Loan	j. Grant	k. Loan
FN	119	019	373		392		495			1,250
<b>TOTALS</b>			<b>373</b>		<b>392</b>		<b>485</b>			<b>1,250</b>

11. ESTIMATED EXPENDITURES: 92, 260, 300

12. PROJECT PURPOSE(S) (stay within brackets)  Check it different from previous 1st PP

To increase Afghan farmers' annual usage of fertilizer and to spread use of fertilizer among small farmers.

*perhaps, fert is not all at reach-up time.*

*What are revised amounts for FY 77?*

*Murphy approved (792) 25%*

13. WERE CHANGES MADE IN BLOCKS 12, 13, 14, or 15 OF THE PID FACESHEET? IF YES, ATTACH CHANGED PID FACESHEET.

Yes  No

14. ORIGINATING OFFICE CLEARANCE

Signature: **John Standish** *[Signature]*

Title: **Chief, Capital Development and Engineering (CDI)**

Date Signed: **April 04 76**

15. Date Received in AID/W, or for AID/W Documents, Date of Distribution

AID 1330-4 (7-76)

*meeting 11/2 should apply to later projects.*

*Role of women*

*Social Analysis*

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BEST AVAILABLE COPY,

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## PART 1. SUMMARY AND RECOMMENDATIONS

### A. REASON FOR AND PURPOSE OF AMENDED PROJECT PAPER

The Project Paper - Management Support for the Afghan Fertilizer Company (December 1974) - provided for two years' advisory assistance to AFC and specified that an intensive evaluation would be conducted prior to the end of the first year of the project. This evaluation was held on November 25, 1975 with the representatives in attendance: The Ministry of Agriculture, Ministry of Planning, Agricultural Development Bank, Afghan Fertilizer Company, Checchi and Company/Washington, D. C., Checchi and Company/Advisory Team, AID/W and USAID/Afghanistan. The evaluation concluded that progress has been made in improving AFC's management capabilities, but that advisory assistance was still needed in general management, financial management, marketing and distribution. (Refer to Annex 2 for the evaluation report.) **Therefore, a one-year extension of the current two-year project is proposed in order to further improve AFC capabilities in the above areas.**

The evaluation also identified the need to clearly define project inputs and outputs and to establish verifiable indicators. This amended Project Paper includes such revisions as well as revisions in the project goal and purpose. Experience with the original project design demonstrated that there was a lack of sufficient detail in the logical framework matrix to permit a thorough and meaningful evaluation of the performance of the technical assistance team as well as the degree to which progress was being made at the project purpose level. Accordingly, project outputs have been more carefully defined and companion output indicators established. In addition, the original project purpose has been discarded and a new one incorporating the prime function of AFC -- the distribution of fertilizer -- has been formulated. At both the purpose and sector goal levels the USAID has added small farmer objectives for fertilizer use and increased production and income, respectively, to acknowledge the fact that it is AID's intent to improve the welfare of small farmers.

In summary, the Mission is now satisfied that it will be possible to both monitor the implementation of the revised project and to conduct meaningful future evaluations with the aid of the improved project design.

**B. SUMMARY DESCRIPTION OF PROJECT DESIGN AND IMPLEMENTATION PLAN**

The Government of Afghanistan has placed strong emphasis on becoming self sufficient in agricultural production, especially in wheat production. The strategy used in moving towards increased production has consisted of encouraging the use of and making available fertilizer (DAP and urea). **Although the use of fertilizer has steadily increased, it is still modest, particularly so in the case of small farmers.**

The sector goal is to increase the agricultural output of Afghanistan and to increase small farmer income through increased agriculture output. This increased output will be realized through the use of additional fertilizer applied to the principal crops of wheat, cotton and sugar. The project purpose, therefore, is to increase Afghan farmers' annual usage of fertilizer and to spread the use of fertilizer among small farmers. The project proposes to achieve this purpose by providing additional assistance to the AFC in improving its management efficiency in procuring and distributing fertilizer and other agricultural inputs to farmers and in increasing efforts at converting the uninformed small farmers to the use of fertilizer.

In order to keep prices and terms at levels which the small, less wealthy farmer can afford, fertilizer must be distributed efficiently and economically by the AFC which is the sole distributor of fertilizer in Afghanistan. Although much progress has been made in the development of the management and operations of the AFC, further improvements and modernization are required to ensure that maximum services are given at minimum cost.

The amended project will provide the services of three advisors for 24 months each, the services of a number of short-term specialists, contractor home office support and participant training. These advisors will work with the President and two Vice Presidents of the AFC who constitute the AFC's Executive Committee and will assist in the further development of the business capability and efficiency of the Company.

The implementation of the project is expected to begin with the arrival of the three primary advisors not later than January 1977 and extend for a two-year period. (1) The Management and Training Advisor will also serve as the Chief of Party and as the Chief Training Advisor to the AFC. He will monitor the accounting functions of the Company and render assistance to the various units of AFC in his field of competence; (2) the Financial Advisor will assist in programs to improve the performance

of the accounting system, particularly at the regional level; (3) The Marketing and Supply Advisor will assist AFC counterparts in marketing, supply, distribution and in the purchase of fertilizer from the international market.

The team members will assist their counterparts in developing and receiving approval (by the GCA) of their 1977 budget. This will be accomplished prior to the beginning of the Afghan year which starts March 21, 1977. This same requirement will be accomplished for the 1978 budget, although the advisors should have a smaller input since their counterparts will presumably be more capable by that time.

Another area to which these advisors will give early attention is the **development of a system of delegations of authority** which will allow for continuous operational authority in each functional area of AFC activities. Experience has shown the lack of an effective system has caused a "bottleneck" problem which needs to be resolved.

In order to obtain sufficient fertilizer stocks, it is necessary for the AFC to purchase fertilizer from the international market. This task requires the supervision of a person experienced in this area. The advisor would give limited assistance and guidance in the Spring 1977 fertilizer purchase and during the following year would train the appropriate personnel so that AFC would be able to complete the Fall 1978 fertilizer purchase without advisory assistance. Other tasks with which the Marketing and Supply Advisor will be assisting are **the decentralization of marketing and warehousing down to the five regional locations** (the other advisors will also be assisting in their areas of expertise in setting up functioning regional level operations) and **in assisting in promotional campaigns directed at increasing small farmer use of fertilizer (such as increasing the number and quality of demonstration plots).**

Although all the advisors will be involved in training counterpart personnel, the Chief Training Advisor will concentrate on developing an AFC training staff which will be capable of designing training courses and carrying them out without outside assistance. It is expected that the services of a short-term training specialist will be utilized during the setting-up of this permanent AFC training facility.

Two other activities which will require the assistance of short-term consultants are: (1) the establishment and implementation of procedures for procurement, distribution and safe handling of agro-chemicals (pesticides, herbicides, fungicides, etc.) down to the retailer level and (2) the establishment of reliable optimum ratios, by region and provinces, for application of DAP/urea to the important crops of wheat, sugar and cotton.

C. DETAILED FINANCIAL DATA

	<u>FY 1975</u>	<u>FY 1976</u>	<u>FY 1977</u>	<u>TOTAL</u>
	(MM) \$	(MM) \$	(MM) \$	\$
1. <u>PERSONNEL</u>	(49) 331	(52) 350	(54) 443	1,124
<u>Contract Advisors</u>				
Management & Training	(12)	(12)	(12)	
Financial	(12)	(12)	(12)	
Marketing and Supply	(12)	(12)	(12)	
Supply & Distribution	(12)	-	-	
<u>Short-Term Consultants</u>				
Agre-Chemicals		( 6)	( 6)	
Agricultural Economist		( 4)	( 4)	
Training Specialist		( 2)	( 2)	
Other	( 1)	( 4)	( 6)	
2. <u>PARTICIPANTS</u>	42	42	42	126
U.S. 2 x 4 MM				
Third countries				
13 x 4 MM				
TOTAL	<u>\$373</u>	<u>\$392</u>	<u>\$485</u>	<u>\$1,250</u>

D. SUMMARY FINDINGS OF NEW ECONOMIC ANALYSIS

The alternative to not using increasing amounts of commercial fertilizer in Afghanistan is the importation of wheat. Even if the positive developmental dynamics associated with increased fertilizer use are ignored, the economics are clearly in favor of increased fertilizer use over wheat imports, yielding a benefit-cost ratio in the neighborhood of 3:1.

Under present and projected cost-price relationships, ~~the average~~ ~~benefit-cost ratio of fertilizer use is, on the average, at least 3:1 -~~ ~~amounting to a net yield of 55-60 percent of the fertilizer investment.~~ However, based upon results of fertilizer trials, the risks of using fertilizer, at least on wheat, are substantial. The trial results show a rather high variation in yield response to fertilizer application from place to place and time to time. Thus, while average returns are favorable, the returns are by no means certain.

Most Afghan farmers are living at the margin of subsistence. Prudence simply does not permit them to assume the risks associated with the purchase of fertilizer under existing cost-price relations. This statement is especially applicable to small farmers. ~~Unless the odds are increased -- the incentives improved -- it is difficult to see anything except a slow expansion in the number of farmers using fertilizer;~~ a continuation of the performance over the past three years.

In the past, considerable emphasis has been placed upon making the AFC a financially viable institution. Financial autonomy would, of course, be highly desirable unless social costs were incurred in its attainment which more than offset the benefits. If, for example, such emphasis results in the ~~importation of wheat, the economic cost of which is three times that of producing wheat domestically through increased use of fertilizer,~~ then the emphasis on financial autonomy is misplaced. (For Afghanistan, the importation of wheat does not take land out of wheat production, unless the importation unduly depresses prices, thereby making land available to produce other crops.) The AFC seems to be precariously close to this position and given the three years of experience that the AFC now has, ~~it is time that AFC's fertilizer pricing policy be reviewed in the context of Government wheat price policy.~~

Fertilizer trial data contain enough apparent ambiguities that we are uncomfortable regarding the nutrient mix and application rate to recommend to farmers. The problem has important implications for national economic efficiency, for growth in food supply and for the welfare of farmers generally. The implications have special significance for this project which aims to expand the use of fertilizer by small farmers who have an extremely limited capacity to assume risks. The project will address the problem through a study to be conducted by AFC with the assistance of a TDY expert. The expert will review and analyze fertilizer trial results in some detail to determine the extent to which the data can be used as the basis for recommending to farmers, with a fairly high degree of confidence, the nutrient mix and the application rate that will yield to farmers the least-cost fertilizer application per unit of product output. The study will indicate what the variation in net returns is likely to be under the recommendation, how area specific the recommendation has to be, how the recommendation can best be implemented, whether additional fertilizer trials are needed, and if so how the trials are to be implemented and administered.

The number of ~~small farmers -- farmers that plant 10 jeribs (1.8 acres) or less to wheat -- is predicted to increase from 38,658 in the base year of 1974/75 to 65,000 in 1982. Their net farm income is predicted to increase by 101 million due to the increased use of fertilizer.~~

## E. PROJECT ISSUES

### 1. AFC's Capability of Using Advisory Services

The original provision of management services to the AFC was based on a precondition of AID's further assistance in loan financing of fertilizer supplies to the Government of Afghanistan. As discussed in the original Project Paper, the previous inefficiencies of fertilizer distribution under the Ministry of Agriculture with losses approaching 40 percent, nepotism and corruption, prompted the Government to organize the AFC. As a condition precedent to financing any importation of AID-financed fertilizer, it was agreed that a contract for management services would be entered into by the AFC.

This management contract was signed on December 6, 1972 with the Checchi and Company of Washington, D. C. and provided, in addition to other services, the following:

- a. Organization of the personnel and introduction of all management systems and policies of AFC.
- b. Management of all operations of AFC toward the achievement of a viable corporate enterprise in accordance with its charter, to the extent possible within the two-year contract period.
- c. Training of Afghans to perform competently at all levels of AFC operations.

The most significant aspect of this contract was that it provided for the direct operational control by nine (9) expatriate professionals of the organization and administration of the AFC, with Afghan counterparts as trainees. As a result of this direct approach, the organizational/functional structure of AFC was quickly established so that by September 1974, at the request of the Government and based on USAID assessment of progress achieved, the contractor's services were restructured from an operational role to that of an advisory role. Furthermore, by January 1975, the number of positions furnished by the contractor were reduced from nine to four expatriate personnel. These advisory services in the disciplines of general management, planning, financial management including accounting, procurement, transportation, warehousing and marketing, continued until March 28, 1976, the completion date for the services of the advisory staff. Certain residual procurement services are still being furnished the AFC under this phase of the contract, until December 31, 1976.

## 2. The Problem of DAP/Urea Application Ratios

The proper ratio and application of nitrogenous and phosphatic fertilizer has been a slow educational process with the farmers of Afghanistan. The introduction of fertilizer to increase food production is, comparatively speaking, a recent innovation. Although the Ministry of Agriculture through its Department of Research and Soil Survey, and Kabul University through its School of Agriculture, had conducted research and tests by crops and soil conditions, this was beyond the comprehension of the average farmer, who in early 1970/71 was instructed by extension agents of the Ministry of Agriculture that a 1 to 2 ratio of DAP/urea (one bag of black fertilizer and two bags of white fertilizer), is what should be applied to his crop. This ratio was the result of general plot tests which indicated that the new variety of imported wheat seed best responded to a 1 to 2 DAP/urea ratio.

A covenant was included in the AID loan agreements in recognition of the fact that the indiscriminate application of more phosphatic fertilizers than was optimally required constituted a foreign exchange drain on the financial resources of the Government of Afghanistan. This covenant stated that the Government would initiate research to determine the optimum ratio and amounts of phosphatic to nitrogenous fertilizer by crops and soil conditions.

At the November 25, 1975 Joint Evaluation of the project, representatives asked about the plans of the Government to study the proper application rate of phosphatic fertilizers. A.I.D. pointed out that the question was of great importance for the farmer, who might now be spending more money for DAP than necessary, and for the Government, which might be spending more foreign exchange than necessary for the import of phosphatic fertilizer. **The evaluation revealed that little actual research was conducted by the Government,** although the Ministry of Agriculture and Kabul University recognized the need for such research. **The lack of operational funds and budget support** for consumable laboratory supplies precluded any coordinated program by either agency. The physical facilities and personnel for such research are available in the Ministry of Agriculture and Kabul University.

As an interim measure, prior to a more systemized approach of research on the proper application of phosphatic/nitrogenous fertilizers, the AFC Supreme Council approved on March 9, 1976, the elimination of DAP/urea ratios in all future fertilizer sales, whether cash or credit. This established an open market with farmer choice to apply fertilizer by crop, method and time of application. This action was coordinated with

the Research and Soil Survey Department, Ministry of Agriculture, which prepared printed guidance for all AFC sales outlets to be used in farmer education. (See Annex 5.)

As already noted, previous fertilizer trial results raise a number of questions with important implications for national economic efficiency, for growth in agricultural output and for the welfare of farmers generally. The implications have special significance for this project which aims to expand the use of fertilizer by small farmers who have next to no capacity to assume risks. **The questions raised stem from what appear to be inconsistencies and rather high variances in the trial results.** There seems to have been no detailed assessment of the quality of the experiments to determine whether they were conducted in a manner to produce credible results. Do the results in fact reflect the empirical experience that farmers would incur? If so, there is a relatively high risk element associated with fertilizer application and the present cost-price relationships are not favorable enough to induce an increasing number of farmers to assume this risk except at a slow rate.

The trial data should be reviewed and analyzed in some detail in order to determine the extent to which the experimental data (along with other data, e.g., soil analyses) can be used as the basis for recommending to farmers, with a fairly high degree of confidence, the nutrient mix and application rate that will provide farmers the least-cost<sup>1/</sup> fertilizer application per unit of product output. What is the costs-returns variation likely to be under the recommendation? How area specific does the recommendation have to be? How could the recommendation be best implemented? Are additional fertilizer trials needed? If so, how implemented and administered? It is clear that a study to address these questions is badly needed. This project provides for a TDY expert to address the questions.

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1/ This is not necessarily (depending on the behavior of cost curves) profit maximizing but is cost minimizing. An appropriate assumption about the behavior of small farmers.

3. Division of Responsibility between the Supreme Council and Executive Committee

The AFC is governed, directed and operated in accordance with the terms and conditions of its Charter (ANNEX 3.). The Charter was jointly agreed to and approved by AID and the Government and remains a condition of the AID loan agreements and will continue to be a condition of any future Project Agreement.

The AFC was established as a joint-stock company on July 23, 1974, with an authorized capital stock of Three Hundred Million Afghanis (Afs. 300,000,000). The Agricultural Development Bank of Afghanistan is the company stockholder, which institution is also the source of farmer credit for fertilizer and other agricultural inputs.

The Supreme Council is composed of:

- Minister of Agriculture, Chairman
- Minister of Finance, member
- Minister of Planning, member
- Minister of Mines and Industries, member
- Minister of Commerce, member
- President of the Agricultural Development Bank of Afghanistan, Member
- Managing President of Afghan Fertilizer Company, member

The Supreme Council constitutes the policy guidance body of the AFC.

The operation and administration of the AFC is in turn turned over to the Executive Board which consists of the Chairman of the Executive Board, as President, the Financial and Administrative Vice President, and the Commercial Vice President.

The above organizational and functional arrangements although specified in the Charter as to areas of responsibility, have at times resulted in misunderstanding and friction between the Supreme Council and the Executive Board. The Joint Evaluation and USAID's monitoring of the project revealed that on occasion operational matters were brought before the Supreme Council in certain instances as informational matters, but in other instances as a means of sharing responsibility for onerous managerial decisions. Conversely, new members of the Supreme Council, not familiar with the AFC and its Charter, imposed unilateral decisions regarding personnel, retailer assignments and internal administration of the AFC. This situation culminated in USAID's and Embassy's query in January 1976

to the Government as to the future role of the AFC - would the organization be continued as an independent entity or would it become an entity of the Ministry of Agriculture under its direct supervision and operation? This issue was resolved by the Government through the Supreme Council, which by letter of February 21, 1976 (ANNEX 4) reaffirmed the role of the AFC in accordance with its Charter and the Covenants of the loan agreements.

4. The Ability of AFC to Assume Responsibility for the Sale of other Agricultural Inputs

The Charter of the AFC provides that with the approval of the Supreme Council, the Company can undertake other agricultural activities which would promote the Company's goals and interests, and which would bring additional agricultural inputs and facilities to the farmers. In recognition of the Company's ability to efficiently distribute fertilizers to farmers, the Supreme Council requested that the Company include distribution of pesticides through its existing network of retailers. The Plant Protection Department of the Ministry of Agriculture, in coordination with the Research Department, identifies and recommends the procurement of the pesticides to the Agricultural Development Bank, which in turn makes the line of credit available to the AFC to procure, store, and distribute the pesticides to the farmer. Concurrent with this activity, the AFC in coordination with the Extension Department of the Ministry of Agriculture attempts to educate farmers on the proper application of pesticides.

In addition to the above, the Supreme Council has also requested that improved seed varieties be distributed by the AFC. The seeds are furnished directly from the Ministry of Agriculture seed farmers to the AFC for distribution through its retailers.

The AFC, working in conjunction with its management advisory staff, recognized the importance of expanding the distribution of related agricultural inputs through its dealers and building up a network of not only fertilizer outlets (pesticides and seeds), but all related commodities, such as veterinary supplies, feed supplements, herbicides, insecticides, fungicides, sprayers and simple agricultural implements and tools. ~~The end result of this program would be a consolidated farmers store~~ similar to that found in the rural areas of the United States, where a farmer can make one stop for all his agricultural farming needs, receive advice, instructions and guidance on proper and appropriate technology in the application of agricultural inputs.

At the time of the Joint Evaluation, the question was raised by the AID representative whether the AFC is not diverging ~~itself by taking on the distribution of additional agricultural inputs.~~ In response, management of AFC stated that any new undertaking would first be studied and would have to be a separate profit-making activity or division of AFC.

The goals and ambitions of the AFC in expanding its operation to related agricultural inputs is commendable. There is a need for a "farmers' store" where the farmer could receive products as well as guidance. ~~The potential danger for the AFC is the too rapid expansion of its product line, overtaxing its managerial span, and more important, not being able to competently serve the farmer.~~ The AFC request for the advisory services of an Agro-chemical expert is a recognition for the need of outside advice and managerial guidance especially in view of potential dangers to farmers and consumers alike in the use of pesticides. A properly developed program, supplemented by managerial guidance, will help to assure the capability of AFC to expand into related agricultural inputs.

PART 2. PROJECT BACKGROUND AND DETAILED DESCRIPTION

A. AFC HISTORY AND RECENT CHRONOLOGY OF EVENTS LEADING TO AMENDMENTS

As a result of poor agricultural production and the two drought years of 1970/71 with the resulting food shortages lasting up to June 1972, the Government of Afghanistan after consultation and advice of AID, established in 1972 the Afghan Fertilizer Company (AFC). This action was considered essential in order to replace an inefficient governmental system of fertilizer distribution and to concentrate those other agricultural inputs of insecticides, pesticides, improved seed in an AFC distribution system now including more than 350 retail dealers located in every significant farming/market area in Afghanistan.

In addition to the development loans (\$27.5 million) for the importation of fertilizer to insure that the AFC had the product resources to distribute to the farmer, the management structure of AFC was established and augmented by first loan financing the contract with Checchi and Company from December 1971 to March 1975 and then grant financing the advisory services after loan funds were no longer available for this purpose, from April 1975 to March 1976.

To ensure that the AFC carried out its functions in an efficient manner, and not be bound by restrictive governmental regulations and procedures, the integrity of its management function, and its operational role was guaranteed by its Charter, which was approved both by the GOA and USAID. The Charter is also a precondition of the loan agreement, which along with the "Special Covenants" of the loan agreement was the basis of agreement reached by the two Governments for AID financing of fertilizer.

Under the terms of the AID grant funded (\$350,000) Project Agreement No. 306-11-199-143, AFC Management Support and the terms of the Checchi and Company contract with the AFC, provisions were made for an evaluation of the project to determine if objectives have or are being met. In addition, under Section 5: Covenants of the \$19.5 million Loan Agreement (306-II-017), Amendatory Agreement between the Government of the Republic of Afghanistan and the United States of America, dated June 19, 1974 and under Article II, Special Covenants of the \$8.0 million Loan Agreement (306-T-019) Agricultural Input Loan among the Republic of Afghanistan, Afghan Fertilizer Company and the United States of America, dated August 13, 1975, provisions are contained which provide for the periodic exchange of information on matters related to the operation and management of the AFC.

As perviously stated, a joint evaluation of AFC operations and the performance of the Checchi and Company advisory management team was held November 23, 1975. The following are highlights and observations in the Evaluation Report.

- The AFC, as of the time of the evaluation, continued to maintain its independent integrity as a business entity in managing its own activities. Operational matters were handled by the Executive Board of the AFC, whereas the Supreme Council guidance had been in general restricted to policy matters.

- AFC policies with respect to personnel were on a sound business basis. Personnel were competitively selected, trained and properly utilized.

- The Retailer Dealer System, inaugurated by the AFC after the Amendatory Loan Agreement, appeared to be based on the sound principal of limiting the number of retailers to that commensurate with good managerial control, and at the same time ensuring that retailer competition continued to exist. Furthermore, there was a recognition on the part of AFC for the need to select or retain those retailers who expand sales, are knowledgeable in the use of fertilizer and agricultural inputs, and participate in demonstration plots and other promotional means of educating the farmer.

- It was noted that the AFC had expanded its operations from solely fertilizer distribution into the fields of pesticides, insecticides, and seeds. Discussion centered around the managerial ability of AFC to expand into other products beyond its primary responsibility for fertilizer distribution. In this respect, the environmental aspects associated with the distribution and handling of pesticides was discussed as a potential problem area for AFC. This was identified as an area of activity which requires further study.

- The discussion of research to determine the optimum ratio and amounts of phosphatic to nitrogenous fertilizer by crops and soils highlighted the related question of Government subsidies to AFC and the potential reduction of and savings of foreign exchange by the Government.

- At the conclusion of the evaluation, it was mutually agreed that additional management advisory services appeared to be required.

An official GOA/AFC letter has been received requesting AID continued assistance to the AFC for two additional years (one year beyond the initial two year project), at which time the AFC should be able to carry out its basic functions and expand at a moderate pace without additional foreign assistance.

B. PROJECT DESIGN

1. The Logical Framework

(See following pages entitled "Log Frame")

2. Narrative Discussion

The inputs necessary to the achievement of outputs and purposes are summarized as follows:

- Management and Training Advisor (24 mm): This advisor will provide assistance and guidance to the AFC Executive Committee on financial management, strategic planning, evaluation and general management. He will also serve as the team Chief of Party and as Chief Training Advisor to AFC.

- Financial Advisor (24 mm): The functions of this advisor will include assisting in improving AFC's accounting system in ways such as computerization, further regionalization and simplification of existing systems. He will make periodic visits to the regions for purposes of providing advanced financial training and guidance on the application of approved procedures to specific regional circumstances.

- Marketing and Supply Advisor (24 mm): This advisor will provide services to two principal departments: The Marketing Department and the Supply and Distribution Department. In addition to assisting in upgrading AFC marketing, supply and distribution capabilities, this advisor will assist AFC in international procurement and other agricultural inputs.

- Short-Term Agro-Chemical Advisor (12 mm): AFC has been designated by the GOA to distribute pesticides and other agricultural inputs for plant and animal protection. This new activity must be developed very carefully because of potential dangers to human life and the environment. This advisor will assist in training AFC's agro-chemical staff in the use of agro-chemicals and the requirements of agro-chemical distribution programs.

- Agricultural Economist (8 mm): Results of past fertilizer trials on wheat reveal inconsistencies and high variances. This project will provide a consultant to assist the AFC in reviewing and analyzing in some detail past trial data for making recommendations to farmers, with a fair degree of confidence. If additional fertilizer trials are needed, recommendations will be presented on how such trials should be implemented.

LOG FRAME

Goal	Indicators					
To increase the agricultural output of Afghanistan and to increase small farmer income	- Annual increases in agricultural production as follows:					
	<table border="0"> <tr> <td>Wheat:</td> <td>at least 3 percent</td> </tr> <tr> <td>Cotton:</td> <td>at least 10 percent</td> </tr> <tr> <td>Other:</td> <td>at least 5 percent</td> </tr> </table>	Wheat:	at least 3 percent	Cotton:	at least 10 percent	Other:
Wheat:	at least 3 percent					
Cotton:	at least 10 percent					
Other:	at least 5 percent					
	- Increased income to participating small farmers by Afs 101 million in 1978-79 over the base year of 1974-75.*					

\* Farmers producing 10 or less jeribs (4.8 acres) of wheat.

MANAGEMENT SUPPORT FOR AFC

Verification	Assumptions
- Ministry of Agriculture reports	- GOA price support programs being carried out (wheat, cotton, sugar)
- Food Procurement Department reports	
- AFC reports	- Agricultural Development Bank will continue to improve its credit program, including credit to small farmers.
- Agricultural Development Bank (ADB) reports	

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## LOG FRAME

## MANAGEMENT SUPPORT FOR AFC

Purposes	End of Project Status (EOPS)	Means of Verification	Assumptions
To increase Afghan farmers' annual usage of fertilizer and to spread use of fertilizer among small farmers.	<ul style="list-style-type: none"> <li>- One or more retailers in each agricultural producing Minor Civil Division.</li> <li>- Increased use of fertilizer: from 1974-75 <u>62,147 MT</u> to 1978-79 <u>130,000 MT</u></li> <li>- Increased number of small wheat farmers using fertilizer; from 1974-75 <u>33,658</u> to 1978-79 <u>65,000</u> *</li> <li>- Increased fertilizer sales to sm. wheat farmers: from 1974-75 <u>13,424 MT</u> to 1978-79 <u>25,543 MT</u></li> </ul>	<ul style="list-style-type: none"> <li>- AFC records and reports</li> <li>- USAID monitoring of AFC operations</li> <li>- Agricultural Development Bank reports</li> </ul>	<ul style="list-style-type: none"> <li>- No natural disasters or insect infestations.</li> <li>- Other donor and GOA agricultural sector activities which impinge upon the project purpose are maintained at current levels of effort and efficiency.</li> </ul>
	<p>* Farmers producing 10 or less jeribs (4.8 acres) of wheat.</p>		

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## LOG FRAME

## MANAGEMENT SUPPORT FOR AFC

Outputs	Indicators	Means of Verification	Assumptions
1. AFC producing timely, comprehensive and realistic plans.	1.a. Plans for 1977 and 1978 prepared and approved before beginning of respective years. b. AFC/Advisors prepare quarterly progress targets.	- AFC records and reports - USAID monitoring of AFC operations	- AFC remains an independent business entity in accordance with terms of its charter.
2. AFC operates without advisory assistance.	2.a. Top management is conducting international business transactions including international fertilizer procurement.	- Agricultural Development Bank reports	
3. Distribution network decision-making patterns established.	3.a. Written delegations of authority operating effectively.	- Site visits by AFC/USAID personnel	
4. AFC conducts own staff development.	4.a. Training needs and opportunities assessed and specific individuals assigned for training. b. Afghan trainers conducting courses without assistance of advisors.		
5. AFC has established a pattern of sound financial management.	5.a. Operating expenses not more than 3 percent of value of sales. b. AFC's accounting system is maintaining timely and proper financial management reports. c. AFC's accounting system applied to regional offices.		
6. AFC has developed adequate marketing, supply and distribution capability.	6.a. Warehouse inventory records system functioning and orderly warehouse operational procedures being used.		

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## LOG FRAME

## MANAGEMENT SUPPORT FOR AFC

Outputs	Indicators	Means of Verification	Assumptions
	<p>6.b. Procurement of products at least six months ahead of demand.</p> <p>c. Inventory losses are less than <math>\frac{1}{2}</math> of 1% of sales.</p>		
<p>7. AFC markets other agricultural inputs.</p>	<p>7.a. 1977 sales include pesticides, veterinary supplies, seeds, etc.</p> <p>b. Sales of other agricultural inputs as follows: 1977 - 30 million afs; 1978 - 35 million afs.</p>		
<p>8. AFC decentralizes specified warehousing, marketing, distribution and accounting functions to regional offices.</p>	<p>8.a. Adequate facilities and procedures established to support Fall, 1977 sales in all five regional locations.</p>		
<p>9. AFC establishes procedures for procurement, distribution and safe handling of agro-chemicals at the retail level.</p>	<p>9.a. AFC agro-chemicals staff trained by contractor agro-chemicals specialist.</p>		
<p>10. AFC establishes optimum ratios by region and/or province for application of DAP/Urea to important crops (wheat, cotton, sugar).</p>	<p>10.a. AID-provided agricultural economist provides recommendations to AFC regarding optimum ratios.</p>		

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## LOG FRAME

## MANAGEMENT SUPPORT FOR AFC

Inputs	Indicators		Means of Verification	Assumptions
<u>U.S.</u>	<u>1976</u>	<u>1977</u>		
1. Advisory Services				
a. Management and Training	1. a. 12 mm	12 mm	- ProAg signed	- Contract advisors arrive
b. Financial	b. 12 mm	12 mm	- P/O/T issued	NLT Jan 1977
c. Marketing and Supply (to include international fertilizer procurement)	c. 12 mm	12 mm	- Presence of Advisors	- AFC budget approved
2. Short-Term Consultants			- USAID monitoring of the project	
a. Agro-chemicals	2. a. 6 mm	6 mm		
b. Agricultural Economist	b. 4 mm	4 mm		
c. Training Specialist	c. 2 mm	2 mm		
d. Other	d. 4 mm	6 mm		
3. Home Office Backstopping Support for Offshore Fertilizer Procurement:	3.	2 mm		
4. USAID Direct Participant Training	4. a. U.S.:	2 x 4 mm		
a. Executive Level Management Training	b. Third Country:	13 x 4 mm		
b. Courses in fiscal, agro-chemical, inventory control, marketing, etc.		13 x 4 mm		
<u>GOA:</u>				
1. Offices and Transportation	1.	Adequate facilities, offices and transportation made available.		
2. Fertilizer	2.	Fertilizer supplies on hand adequate to meet existing need plus 6 months inventory stocks.		
3. Personnel	3.	Counterpart staff in-place and functioning.		
4. Storage	4.	AFC Repos		

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- Other Short-Term Specialists (20 mm): A need for a variety of short-term specialists is anticipated in such fields as agricultural economics, training, veterinary medicines and program assessment. These consultants will be provided as needed and as agreed upon by USAID and AFC/GCA. Short-term consultants will be required to assist the AFC and the advisors in identifying and structuring programs in agro-economics (fertilizer ratio and application to production), computer record-keeping and control and other operational and functional areas which may be identified as needing short-term assistance. In addition, it is anticipated that a short-term training specialist will be required to assist the Chief of Party in organizing and setting up an on-the-job training program, short-term foreign training and a non-degree business/management school training program for selected AFC staff members. The functional areas requiring the above training include, among others, accounting, inventory and stock control, warehousing and storage, personnel procedures, farmer education techniques, office procedures, commercial documentation, agro-chemicals, and English as a second language.

- Contractor Home-Office Backstopping Support (4 mm): There will be a requirement for contractor home-office backstopping support in connection with assisting AFC in procurement and import of fertilizer.

- Participant Training (120 mm): Participant training will be offered to some of the best qualified management staff for training in the U.S. and third countries in business administration and other disciplines such as fiscal, agro-chemical, inventory control, marketing, etc. However, emphasis will continue to be given to on-the-job training.

### 3. Other Donor and GCA Activity

A large number of other donors have provided agricultural assistance to Afghanistan during the past twenty years. The U.S.S.R. has assisted with livestock and irrigation projects and other activities associated with increasing agricultural production. The Germans have worked on area development in Paktia Province, the project encompassing practically all activities usually associated with rural development. The French have done substantial work on improving cotton while the Indians have worked on rice and potatoes. The PRC has concentrated its assistance in developing irrigation. The British and others have been generally associated with the implementation of agro-industrial projects such as cotton mills, but have done some irrigation and water resources work as well. In-so-far as fertilizer is concerned, the UNDP, the German, Japanese, Russians and several Arab States have all made varying amounts of fertilizer available under a wide variety of concessionary, including grant, terms. Some such assistance will likely continue. However,

The FAO, WFP, IERD, ADB and the UNDP each have projects underway to assist agriculture. These projects promoting agricultural credit, cooperative development, rural public works, water management and irrigation, and rural roads are most important to the success of the fertilizer project. However, no other donor has shown any interest in fertilizer distribution and is not likely to do so.

The World Bank, the Asian Development Bank, the U.N. Agencies, the Germans and the British have all spoken of their interest in this project but none are interested in financing the technical assistance required. The interest of these donors varies from that of the **World Bank, which is helping finance 55,000 tons of fertilizer storage capacity,** to that of the Germans who have expressed some interest in financing a grain storage program operated by the AFC, but only if some arrangement is made for technical assistance to be supplied to assist in its management.

Afghanistan has taken many steps to increase the availability and consumption of fertilizer. There have been sporadic campaigns as well as long-time programs conducted by the Extension Service; fertilizer trials have been conducted; fertilizer has been subsidized; a urea plant was constructed and a fertilizer credit program was developed, with emphasis on ways to finance small producers.

In the area of manpower, Kabul University is training a large number of agriculturists and considerable numbers of people are being sent abroad for advanced or specialized training in agricultural and related fields. A number of countries and international organizations are coming forth with offers of money for manpower training, some of which will be used to further promote agricultural development.

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### PART 3. IMPLEMENTATION ARRANGEMENTS

#### A. PPT NETWORK AND NARRATIVE DISCUSSION (See following two pages for PPT chart and list of CPIs.)

The Project Performance Tracking (PPT) network for this project will utilize three tracks: Documentation Track - CPIs show the date of the signing of two ProAgs required by project; two evaluation CPIs are shown. The first evaluation appears on the chart as being scheduled one year after the ProAg has been signed. However, the advisors will have been on the job for only about six months. This relatively short time of project activity will require an evaluation in order to coincide with the AID budgeting cycles. AFC Management Track - The first CPI shows the arrival of the three principal contract advisors to be January 1977. This would appear to be sufficient time (ProAg signed six months earlier) to allow for recruiting, processing and travel so that the advisors would arrive on schedule. Other CPIs on this track relate to AFC counterpart training and management improvement activities to which the advisors will be providing expert guidance, although advisors do not have responsibility for implementation of these systems per se. AFC Operations Track - These CPIs center around the operational objectives of AFC. Key to successful completion of CPIs will be the degree to which the advisors can detect problem areas, work out well-conceived solutions, and instigate timely acceptance and implementation of solutions and procedures by their AFC counterparts. It is anticipated that the PPT network may need to be revised, primarily changing target dates, after the advisors arrive and develop their target work plans.

#### B. EVALUATION AND BASELINE DATA COLLECTION

##### 1. Project Design

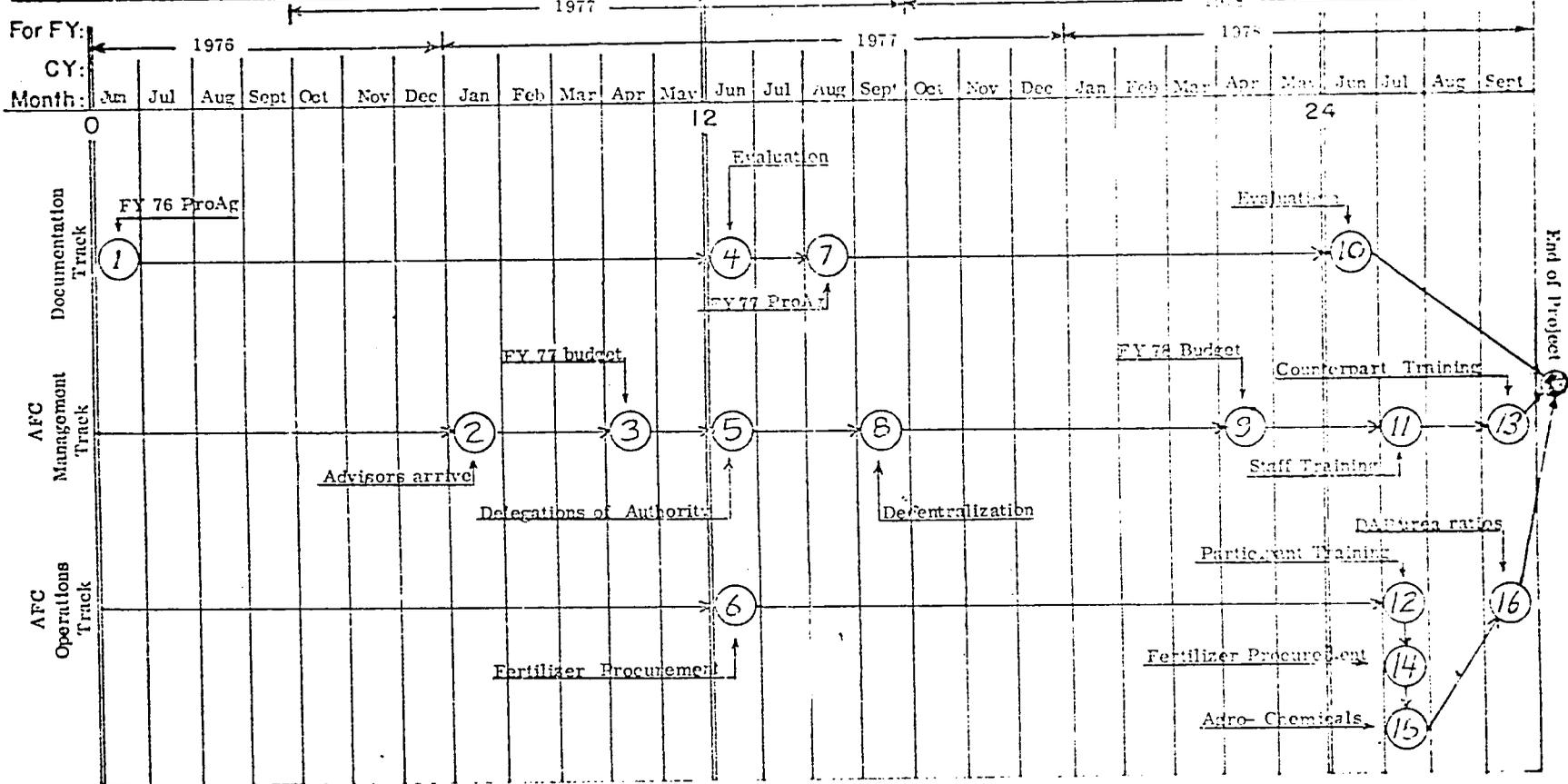
Given the importance of fertilizer in food grain production in Afghanistan, there is a need to pay particular attention to the means of expanding fertilizer use. For Afghanistan it is a matter of either using fertilizer or importing wheat. The revised project purpose addresses this need, i.e., "To increase Afghan farmers annual usage of fertilizer and to spread use of fertilizer among small farmers." Achieving the project purpose, however, requires that the problem be looked at from several points of view: (a) the development of complimentary inputs such as improved irrigation (see Central Helmand Drainage Project

Country: Afghanistan	Project No: 306-11-199-143	Project Title: Amendment to Management Support for AFC	Date: Apr. 1976	/X/ Original / / Revision #	Approved: April 4, 1976
CPI DESCRIPTION Date		Respon- sibility	Date	Respon- sibility	
1. Jun 76	FY 76 ProAg signed.	USAID/GOA	12. Jul 78	All AFC participant training completed and participants assigned to responsible, appropriate positions.	Contractor/ AFC
2. Jan 77	Three advisors arrive (Management & Training Advisor; Financial Advisor; Marketing and Supply Advisor).	AID/W	13. Sep 78	Management counterpart training completed.	Contractor/ AFC
3. Apr 77	AFC FY 1977 budget approved (Aghan year 1356: Mar. 21, 1977 through Mar. 20, 1978).	GOA	14. Sep 78	AFC completes international fertilizer procurement without advisory assistance.	AFC
4. Jun 77	AID project evaluation.	USAID	15. Sep 78	AFC has established and implemented procedures for procurement, distribution and safe handling of agro-chemicals down to the retail level.	AFC/ Contractor
5. Jun 77	Written delegations of authority operating effectively.	GOA	16. Sep 78	AFC/GOA has established (and is able to educate farmers regarding) optimum ratios (by region and /or provinces) for application of DAP/ Urea to important crops (wheat, cotton, sugar, etc.)	AFC
6. Jun 77	AFC completes international fertilizer procurement with limited advisory assistance.	AFC/ Contractor			
7. Aug 77	FY 77 ProAg signed.	USAID/GOA			
8. Sep 77	AFC completes decentralization of specified warehousing, marketing distribution and accounting functions in five regional offices.	AFC			
9. Apr 78	AFC FY 1978 budget approved (Aghan year 1357: Mar. 21, 1978 through Mar. 20, 1979).	GOA			
10. Jun 78	AID/ GOA joint project evaluation.	USAID/GOA			
11. Jul 78	AFC conducts staff training courses without advisory assistance.	AFC			

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### PROJECT PERFORMANCE TRACKING (PPT) SYSTEM

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CRITICAL PERFORMANCE INDICATOR (CPI) NETWORK

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Paper) and seeds, of fertilizer responsive plant varieties; (b) research to develop and test appropriate fertilizer and related packages together with demonstration and extension inputs to promote farmer understanding of necessary input and management practices; (c) appropriate delivery mechanisms in terms of marketing fertilizers and providing credit to distributors as well as farmers; (d) the question of subsidies to promote small farmers adoption of new practices also merits critical examination. However, this project design addresses the project purpose only from the fertilizer delivery mechanism standpoint (c. above) and a simple management approach is used. The development hypothesis at the output to purpose level states that if carefully delineated management improvements and systems can be made fully operative, at the output level, then progress can be made toward the project purpose as measured in modest, quantifiable end-of-project status indicators. **No doubt, if the entire range of synergistic production factors were being addressed through a unified and coordinated sector approach then greater purpose level gains could be expected.** Unfortunately, this is not the case. At present, nearly all GOA and donor agricultural efforts do profess to address, in some form or another, this project's agricultural sector goal, i. e., "To increase the agricultural output of Afghanistan and to increase small farmer income." However, the present reality is that projects are frequently poorly designed and poorly implemented by nearly all parties. Lack of sector coordination is the rule and fragmentation of effort resulting in slow, if any measurable progress, is the inevitable outcome. Thus, this project design, while having a goal, does not make any pretentious claim to being instrumental in greatly affecting the goal level statement. Nor for that matter does the remaining project design claim to be solely instrumental in bringing about change at the purpose level. This project is but one element of a range of development needs which must be addressed before the full potential of the project purpose can be realized. It will be noted in the logical framework that one of the key assumptions at the purpose level is that "Other donor and GOA agricultural sector activities which impinge upon the project purpose are maintained at current levels of effort and efficiency." Surely, without this stipulation, there can be little hope that this modest project can assist in affecting the needed changes at the purpose level.

## 2. Evaluation

One of the reasons for this amendment stems from the fact that a number of evaluation difficulties were encountered in the November 25, 1975 evaluation, which difficulties necessitated project redesign. These difficulties included:

a. Inconsistencies in and lack of clear relationship between two versions of the logical framework. ( See the Capital Assistance Paper Afghanistan - Agricultural Inputs, AID-DLC/P-2118 dated June 28, 1975 and the Project Paper Management Support for the Afghan Fertilizer Company, TOAID A-173, dated December 8, 1974.)

b. Lack of sufficient detail and explanation of the matrices presented in these papers.

c. Difficulties encountered in applying these matrices in project evaluation.

d. Criticisms that insufficient criteria exist by which to judge the performance of the contract management team; and

e. Lack of AFC and contracting team involvement in the development of these matrices.

In an effort to overcome these difficulties one of the tasks undertaken was to greatly expand and hopefully to better define the output indicators. It will be remembered that the development hypothesis by which outputs are linked to the purpose is a management process by which staff training, improved systems and new programs will be molded together to produce a self-sustaining organization capable of affecting the project purpose. Given this hypothesis and the past evaluation difficulties listed above, careful attention was given to developing a list of outputs and indicators which would allow verifiable measurement. It is on this list of indicators that evaluation will be focused. In addition, the PPT network relates Critical Performance Indicators (CPIs), which are primarily output related, to each other and to time and as such will provide a further basis for which the regularly scheduled evaluations of actual versus planned performance can occur. The following evaluations have been scheduled:

- June 1977. This will be approximately six months after the advisors' arrival. (CPI No. 4) However, it must be noted that this early evaluation is necessary if the results are to be in hand in sufficient time to provide guidance for negotiating a FY 1977 ProAg, the last year for which obligations can be made. Since it will be early in project implementation, the first evaluation will primarily be a USAID effort, and will seek to measure performance primarily at the input to output level.

- June 1978. At this time, a joint USAID/GOA evaluation will be held to measure performance principally at the output to purpose level and also to look at performance against the end-of-project status indicators. (See Baseline Collection below.) For this evaluation, AID/W participation is invited.

### 3. Baseline Collection

Measurement of the project purpose requires that baseline data be collected. It needs to be noted that this is no mean task in Afghanistan. Often, proxy data must be used in place of original baseline data gathering, and such is the case with this project. Agricultural Development Bank (ADB) data have been analyzed to provide 1974-75 baseline against which 1978-79 end of project status will be measured, again using proxy ADB data (See PART 4 Economic Analysis of Beneficiaries.) ADB data provides the only continuing and reliable source of proxy data gathering now providing information useful for measurement at the purpose level.

The following quotation appears to be tailor-made for Afghanistan. It is excerpted from a paper entitled "Fertilizer Issues in the 1970s and Beyond," written by Graham F. Donaldson, Agriculture and Rural Development Department, World Bank:

"The attainment of an effective fertilizer policy is seriously inhibited for many countries by the shortage of relevant data. In addition to uncertainty about changes on the international scene, there is frequently inadequate information on existing stocks at retail and wholesale levels and usually none on what stocks might be held beyond the farm gate. Similarly, it is often difficult to determine what proportion of orders placed in a given year are delivered by a particular date. More fundamental is a paucity of information

about the farm uses of fertilizer, including imperfect knowledge on where fertilizer is used, on which crops and at what rates, what proportion of farmers use fertilizers, whether these fertilizers are purchased on credit or on a cash basis, and in particular, what the response is to the use of fertilizer in terms of units of output per unit of input. Such information is, of course, essential if there is to be any realistic demand forecasting in the short run; and for longer range planning, more data are needed for any sensible interpretation of what implications or change in availability or price of fertilizer might have in terms of crop output, and therefore of appropriate policies. Very often, this price relationship is of primary importance, particularly when fertilizer is used primarily on foodgrains,..."

AFC falls far short of nearly every necessity required above for effective fertilizer policy management, which management this project will attempt in part and imperfectly to address.

#### PART 4. FINANCIAL AND ECONOMIC ANALYSIS

Afghanistan contains 63 million hectares of land, most of which is either mountainous or arid waste. Estimates place arable land at 8 million hectares with less than 4 million hectares under crops. While the area of cropped dryland amounts to 40-45 percent of cropped irrigated land, production from the former is only a fraction of production from the latter.

The country's soils are mostly structureless, typically alkaline and characteristically have a very low level of fertility. The soils are high in calcium; low in organic matter, available nitrogen and phosphorous; and medium to high in available potassium. Lack of organic matter has resulted in an unfavorable physical condition of the soil for high crop production.

Wheat is by far the country's most important crop and is the staple of the Afghan diet. Other major crops, but decidedly secondary to wheat, are corn, barley, rice, cotton, sugar beets, fruits and vegetables. The yields of field crops are low. There are a number of reasons for this, the most important being the low innate nutrient level of the soil.

Crops generally respond well to commercial fertilizer, although fertilizer trials show substantial variation in response from time to time and place to place. More experimental work has been done on wheat than any other crop. The trial results have not been as consistent as we would like.<sup>1/</sup> In some cases there was also a high degree of variability for a given treatment. It would nonetheless appear that we can make the following generalizations from the fertilizer trial data:

- ~~Wheat does not respond to the application of potassium fertilizer.~~
- ~~Wheat does respond to phosphatic fertilizer alone. The response is weak,~~ however, and as shown later, costly.
- ~~Wheat also responds to nitrogen alone~~ more so than to phosphatic fertilizers. And if only one of the three nutrients (N, P, K) is

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<sup>1/</sup> See Tables 8-1 through 8-4, ANNEX 8, for summaries of trial results

applied, nitrogen is the most important. The trial results were rather variable when N was applied alone, however.

~~The incremental product of phosphatic fertilizer is quite high once some minimum level of N is applied.~~

A. GOA CONTRIBUTION

The AFC's draft Seven-Year Plan projects the following costs<sup>1/</sup> for the first three years of the plan period. 1355-1357 (1976/77 - 1978/79).

	\$ 1000's		
	<u>1976/77</u>	<u>1977/78</u>	1978/79
Cost of Goods Sold	18,263	24,891	31,085
Operating Expenses	1,555	2,071	2,611
Depreciation	153	222	273
Interest	119	119	119
Capital Eudget	160	956	1,224

No subsidy is needed, according to the Plan, to maintain a minimum cash balance of afs 700 million. While we consider the projection high, we will nevertheless use it, adjusted for non-allowable costs, as the AFC contribution to the project. For it is clear that the Afghan contribution will be substantially greater than the 25 percent required. The U.S. fertilizer loans have been obligated. Depreciation and interest will be struck from the list. ~~The projection assumes that the unit cost of goods sold will remain constant.~~ Projected operating expenses and capital costs include an allowance for ~~inflation of about three percent annually.~~ ~~No provision is made for contingencies.~~ On the basis of the foregoing, the Afghan contribution to the project would be:

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<sup>1/</sup> A conversion rate of afs 57/\$ was used in the draft Plan

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	<u>GCA Contribution (\$1000s)</u>		
	<u>1977/78</u>	<u>1978/79</u>	<u>TOTAL</u>
Cost of Goods Sold	24,891	31,085	55,976
Operating Expenses	2,071	2,611	4,682
Capital Outlay	<u>956</u>	<u>1,224</u>	<u>2,180</u>
TOTAL	27,918	34,920	62,838

B. U.S. CONTRIBUTION

The two-Year U.S. contribution to the amended project, all for personnel and participants, will total \$377,000. (Total three-year project cost is \$1,250,000.)

	<u>AID Contribution, Expenditure Basis (\$1000s)</u>		
	<u>1977/78</u>	<u>1978/79</u>	<u>TOTAL</u>
Personnel	350	443	793
Contract	(350)	(443)	(793)
Participants	<u>42</u>	<u>42</u>	<u>84</u>
TOTAL	392	485	877

C. OTHER DONOR CONTRIBUTIONS

While it is very unlikely that some commodity assistance will be forthcoming from other donors, the draft Seven-Year Plan shows no such assistance and we are aware of no commitments. We accordingly show no assistance to the project from other donors.

D. SUMMARY TABLE, SOURCES AND USES OF FUNDS.

The following table summarizes the sources and uses of project funds. The AID contribution is a small fraction of total project costs. While the host country contribution is very likely overstated, the GCA will in any case be providing most of the project funds.

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TABLE 1 -- Summary, Sources and Uses of Funds  
(\$1000s)

USE	AID		GCA		TOTAL
	FX	LC	FX	LC	
Personnel	793	-	10	2,191	2,984
Participants	84	-	-	-	-
Commodities	-	-	28,747	28,563	58,310
Other	-	-	117	2,210	2,327
TOTAL	877	-	29,874	32,964	63,715
Percent of Total		1.4		98.6	100.0

E. DELIVERED COST OF FERTILIZER:

The following table shows estimates of the delivered cost of fertilizer to AFC warehouses under present and projected short-run prices.

TABLE 2 -- Fertilizer Costs; Delivered to AFC Warehouses\*

Product	Nutrients N - P - K	Price, FCB (\$/MT)	Ocean <sup>1/</sup> (\$/MT)	Overland <sup>2/</sup> (\$/MT)	Total (\$/MT)
DAP	18 - 46 - 0	160, U.S.	40	40	240
Urea	46 - 0 - 0	115, U.S.	40	40	195
Urea	46 - 0 - 0	115, Mazar	0	21	136
TSP	0 - 46 - 0	120, U.S.	40	40	200
TSP	0 - 43 - 0	155, USSR <sup>3/</sup>	0	23	178
FS <sup>4/</sup>	0 - 0 - 60	140, NW Eur	40	40	220

\* Source: AFC

<sup>1/</sup> To Karachi, includes insurance;

<sup>2/</sup> \$26 in Pakistan for rail freight and unloading; \$14 average truck freight in Afghanistan

<sup>3/</sup> Delivered to border port;

<sup>4/</sup> Potassium Sulfate. Throughout this paper, P is used as an abbreviation for P<sub>2</sub>O<sub>5</sub> and K for K<sub>2</sub>O.

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Assume, as is projected in the draft Seven-Year Plan, that AFC's operating costs will amount to 8 percent and other costs to slightly over 1 percent of sales. Assume also that retailers will obtain, as they currently do, a mark-up of rfs 20 per 50-kg bag of fertilizer.<sup>1/</sup> On these assumptions, the financial cost of delivering fertilizer to farmers at retail outlet is shown in the following table.

TABLE 3 -- Financial Cost of Delivering Fertilizer to Farmers

<u>Product and Source</u>	<u>Cost at Retail Outlet (\$/MT)</u>	<u>\$/kg Nutrient at Retail</u>		
		<u>N</u>	<u>P</u>	<u>K</u>
DAP (U.S.)	269	0.339*	0.452	-
Urea (U.S.)	220	0.478	-	-
Urea (Mazar)	156	0.339	-	-
TSP (U.S.)	226	-	0.491	-
TSP (USSR)	202	-	0.470	-
PS (NW Europe)	247	-	-	0.412

\* Same price assumed as for product of Mazar plant.

<sup>1/</sup> Based upon AFC projections, sales run about 102 percent of cost of sales for fertilizer. Operating costs plus other costs would amount to 9.3 percent of cost of sales.

On the above costs, the following tables show the financial costs of delivering the nutrients of the fertilizer treatments used in fertilizer treatments used in-fertilizer trials in 1968-69, 1969, 1970 and 1971. In each case, the lowest-cost source of the nutrient is used -- Mazar urea for nitrogen and U.S. DAP for phosphorus except for these treatments where phosphatic fertilizer only is applied, in which case USSR triple-super phosphate is used.

TABLE 4 -- Irrigated Wheat Response to Various Fertilizer Treatments, Treatment Cost (at Retail) and Retail Cost of Fertilizer Needed to Produce One Metric Ton of Wheat, 1968-69 Trials

Treatment No.	N-P (Kgs/ha)	Mean Yield of wheat (Kgs/ha)	Mean	Treat- ment Cost (\$/ha)	Retail
			Increase in Wheat Yield over Treatment #1 (MT/ha)		Cost of Fertilizer Needed to Produce 1 MT Wheat (\$/MT)
1	0 - 0	2190	-	-	-
2	0 - 40	2190	0.0	18.80	-
3	0 - 60	2519	0.329	26.20	85.71
4	0 - 80	2628	0.438	37.60	85.84
5	0 - 100	2409	0.219	47.00	214.61
6	67 - 0	2884	0.694	22.71	32.73
7	67 - 40	3212	1.022	40.79	39.91
8	67 - 60	3395	1.205	49.83	41.36
9	67 - 80	3285	1.095	58.87	53.77
10	67 - 100	3395	1.205	67.91	56.36
11	133 - 0	3176	0.966	45.09	45.73
12	133 - 40	3723	1.533	63.17	41.40
13	133 - 60	3650	1.460	72.21	49.46
14	133 - 80	3869	1.679	81.25	48.39
15	133 - 100	4125	1.935	90.29	46.66
16	200 - 0	3103	0.913	67.80	74.26
17	200 - 40	3796	1.606	85.88	53.47
18	200 - 60	4088	1.898	94.92	50.01
19	200 - 80	4344	2.154	103.96	48.26
20	200 - 100	4380	2.190	113.00	51.60

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TABLE 5 - Treatment Cost, at Retail, and Retail Cost of Fertilizer Needed to Produce One Metric Ton of Wheat, 1969 and 1970 Trials

Treatment NO.	N-P-K (Kgs/ha)	Treatment Cost (\$/ha)	Mean Increase In Wheat Yield Over Treatment # 1		Retail Cost of Fertilizer Needed to Produce 1 MT Wheat	
			1969 (MT/ha)	1970 (MT/ha)	1969 (\$/MT)	1970 (\$/MT)
1	0-0-0	-	-	-	-	-
2	75-0-0	25.43	0.251	0.585	101.31	13.47
3	150-0-0	50.85	0.462	0.877	110.06	57.98
4	0-75-0	35.25	0.270	0.308	130.56	114.45
5	0-150-0	70.50	0.365	0.579	193.15	121.76
6	75-75-0	59.33	1.303	1.833	45.53	32.37
7	75-150-0	93.23	0.950	1.194	98.14	78.08
8	150-75-0	84.75	1.080	1.272	78.47	66.63
9	150-150-0	118.65	3.016	2.460	39.34	48.23
10	0-75-100	76.45	0.434	0.346	176.15	220.95
11	75-75-100	100.53	1.324	1.892	75.93	53.13
12	150-150-100	159.85	2.977	2.580	53.69	61.96

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TABLE 6 - Treatment Cost, at Retail, and Retail Cost of Fertilizer Needed to Produce One Metric Ton of Wheat, 1974 Trials

<u>NC.</u>	<u>Treatment</u> N-P-K (Kgs/ha)	<u>Treatment</u> Cost (\$/ha)	<u>Mean Increase in</u> Wheat Yield Over Treatment #1 (MT/ha)	<u>Retail Cost of</u> Fertilizer Needed to Produce 1 MT Wheat (\$/MT)
1	0- 0-0	-	-	-
2	95-40-0	50.29	0.632	79.56
3	134-40-0	63.51	1.130	56.20
4	174-40-0	77.07	0.908	84.87
5	102-60-0	61.70	0.893	69.09
6	142-60-0	75.26	1.568	48.00
7	181-60-0	88.48	1.259	70.28
8	110-80-0	73.45	1.023	71.80
9	150-80-0	87.01	1.500	58.01
10	190-80-0	100.57	1.867	53.87

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TABLE 7 - Treatments Ranked According to (Present)-Fertilizer Costs at Retail, of Producing a Ton of Wheat, for 1968-69, 1970 and 1974 Trials, Lowest-Cost Four Treatments

<u>N-P-K</u> <u>Kg/ha.</u>	<u>Additional</u> <u>Wheat Due</u> <u>to treatment</u> <u>Kg/ha</u>	<u>Fertilizer Cost (Retail)</u> <u>Required to Produce A</u> <u>Metric Ton of Wheat</u> <u>\$/MT</u>
<u>1968-69 Trials</u>		
67-0-0	694	32.73
67-40-0	1022	39.91
67-60-0	1205	41.36
133-40-0	1533	41.40
<u>1969 Trials</u>		
150-150-0	3016	39.34
75-75-0	1303	45.53
150-150-100	2977	53.69
75-75-100	1324	45.93
<u>1970 Trials</u>		
75-75-0	1833	32.37
75-0-0	585	43.47
150-150-0	2460	48.23
75-75-100	1892	53.13
<u>1974 Trials</u>		
142-60-0	1568	48.00
190-80-0	1867	53.87
134-40-0	1130	56.20
150-80-0	1500	58.01

The trial data are not as unambiguous as we would wish. It does seem safe to say, however, that:

- Nitrogen applied alone at a low rate ( $\frac{1}{2}$  to  $\frac{2}{3}$  bags, or 25 - 33 kgs. of urea per jerib) is a low cost method of increasing wheat output. The results of the 1969 trials make us uncomfortable with such a recommendation, however.

- When going from low to higher application rates, the evidence is fairly consistent that wheat can be produced more cheaply when phosphorous is applied with nitrogen fertilizer. There is not much agreement, however, on the N-P ratio or the amount of application.

The presentation of the following figures is an attempt to illustrate the two preceding statements.

	Application Rate N-P (Kgs/ha)	Fertilizer Cost per Ton of Wheat Produced (\$/MT)
<u>1968-69</u>	67 - 0	32.73
	133 - 0	45.73
	67 - 40	39.91
	133 - 40	41.40
<u>1969</u>	75 - 0	101.31
	150 - 0	110.06
	75 - 75	45.53
	150 - 150	39.34
<u>1970</u>	75 - 0	43.47
	150 - 0	57.38
	75 - 75	32.37
	150 - 150	48.23

1974                      These trials did not include any plots on which straight nitrogen was applied.

However:

<u>Application Rate N - P (kgs/ ha)</u>	<u>Fertilizer Cost per Ton of Wheat Produced (\$/MT)</u>
95 - 40	79.56
134 - 40	56.20
174 - 40	34.87
102 - 60	60.09
142 - 60	48.00
181 - 60	70.28
110 - 80	71.80
150 - 80	58.01
190 - 80	53.87

Thus far we have concentrated upon wheat and will continue to do so. There are a number of reasons for this. In the first place, this cereal is by far the nation's most important crop. It is produced by perhaps 70 percent of all farmers who have land under cultivation. If the project is to benefit a large number of small farmers, it will be done through wheat. Wheat is the main problem area and self sufficiency in wheat production has been declared a national goal. There are more experimental data for wheat than for any other crop.

#### F. FINANCIAL RETURNS TO FARMERS

Farmers will be paying approximately afs 10,500 (\$185) per ton for fertilizer.<sup>1/</sup> On the basis of fertilizer trials it is realistic to assume that a ton of fertilizer applied by farmers would produce an average of four tons of wheat. It also seems realistic to assume that the Government will continue to pursue and improve upon its

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<sup>1/</sup> For an application ratio of either 2 to 1 or 3 to 1 urea to DAP. The Seven-Year Plan assumes a wholesale price of afs 480 per 50-kg bag of urea and afs 550 for DAP. Adding afs 20 per bag gives the retail price.

domestic wheat procurement program whereby the Food Procurement Department purchases at an announced price all wheat offered at collection centers. Furthermore, it seems reasonable to assume a purchase price of afs 15 - 50/seer (afs 6368 - 7074/MT). At these prices, the ~~farmgate price~~ should be close to afs 40/seer (afs 5660 or \$100 per MT). In addition to the fertilizer costs, there are increases in other production costs which are estimated at afs 1/kg of additional wheat produced.<sup>2/</sup> On the average, then, the increased production attributable to applying a ton of fertilizer would amount to 4 MT of wheat with a farmgate value of afs 5660/MT, for a total of afs 22,640. The costs incurred in producing the 4 MT of wheat total to afs 14,500 (fertilizer costs of afs 10,500 and other production costs, afs 4,000). The total returns are 156 percent of the total costs of using fertilizer.<sup>1/</sup>

A return of 56 percent annually on an investment is of course attractive, provided that the return in fact materializes. This is the mean return; but fertilizer trials indicate there is substantial dispersion about the mean. We will illustrate this with 1974 fertilizer trial data. The least-cost (per unit of output) fertilizer treatment was the application of 142-60-0 kgs per hectare.<sup>2/</sup> The average increase in wheat output was 1,568 kgs/ha, with a standard deviation of 920 kgs. Urea and DAP were the nutrient sources. The retail fertilizer cost to the farmer would be afs 4055/ha (afs 500/50 - kg bag of urea; afs 570 per bag of DAP). Other production costs would amount to one afghani per kg of additional wheat produced. Assume a farmgate price for wheat of afs 40/seer (afs 5,660/MT). On these data, the following table is constructed.

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<sup>1/</sup> See "The Feasibility of a National Wheat Management Program for Afghanistan," a USAID Staff paper, Kabul, Afghanistan, July 1974, p.37

<sup>2/</sup> One bag urea and one-half bag DAP per jerib.

TABLE 8 - Wheat Production Due to Fertilizer Treatment, Farmgate Value of the Production, Production Costs and Ratio of Total Returns to Total Costs Due to Treatment, 1974 Trial Data, Present Costs

	Mean	Mean* One Standard Deviation + 1 S.D.	- 1 S.D.
A. Wheat Production (Kgs/ha)	1538	2488	648
B. Value of Production (Afs/ha) <sup>2/</sup>	8875	14082	3668
C. Production Costs (Afs/ha)	5623	5543	4703
- Fertilizer <sup>3/</sup>	(4055)	(4055)	(4055)
- Other <sup>4/</sup>	(1568)	(2488)	(648)
D. $E \div C$ -- Total Returns $\div$ Total Costs	1.58	2.15	0.78

While the above table shows the average return on the investment in fertilizer as being 58 percent, there is a wide dispersion about the average with a number of users incurring losses on their fertilizer purchases. Thus, the use of fertilizer is by no means risk-free in a country where most farmers are living at the margin of subsistence and who very likely are strong risk-aversers rather than risk-takers. It is accordingly difficult to see a rapid growth, or in fact anything greater than slow growth, in fertilizer use under the projected cost-price relationship.

#### G. THE AFC AS A FINANCIALLY VIABLE ORGANIZATION

From the beginning, it has been stressed that the AFC should be a financially viable organization, generating sufficient revenues above its costs to become financially independent of the Government. Other things being equal, financial

<sup>1/</sup> Standard Deviation was 920 kgs wheat per hectare

<sup>2/</sup> A farm price of afs 40/seer (afs 5660/M.T) is assumed

<sup>3/</sup> One bag urea and  $\frac{1}{2}$  bag DAP/jerib; retail cost of urea; afs 500 per 50-kg bag; retail cost of DAP: Afs 570/50-kg bag. The treatment was 142-50-0 kgs/ha of N-P-K

<sup>4/</sup> One afghani for each additional kg of wheat produced because of treatment

autonomy is, of course, highly desirable. With such autonomy, the AFC would be a more efficient organization, for financial autonomy permits more autonomy to management. Thus, inventory management would be independent of the willingness of the Government to finance the inventory needed to assure delivery of fertilizer to farmers in appropriate quantities and kinds and at the appropriate time and place. However, financial viability at any cost is not an appropriate objective. If farmers are charged "too high" a price for fertilizer, the price of wheat will have to be quite high in order to induce farmers to use enough fertilizer to produce the "needed" wheat. **It seems there is a real possibility that at the present prices charged farmers for fertilizer, growth in sales of fertilizer will not be rapid enough to produce the extra wheat needed by the country unless the farm price of wheat is permitted to rise substantially.** The price required, however, would likely push consumer wheat prices up to a politically unacceptable level and domestic production would be supplemented by imports. Yet, as is shown later, the economic cost of importing wheat is three times the economic cost of producing wheat with fertilizer. Thus, the social cost of the present fertilizer pricing policy may be rather high and in any case should be re-examined. Domestic fertilizer/wheat policies should not be formulated without taking account of policies in neighboring countries (to the east and west). If Afghan wheat prices are higher than those of border countries, there will be some unofficial movement of wheat into Afghanistan. The opposite is also true. While obtaining imported wheat at a lower price than domestic prices may in some ways be desirable, the economics of producing wheat through the use of fertilizer suggest it would be better for Afghanistan to produce its own wheat. Furthermore, development requires that farm productivity increase and self-sufficiency in wheat production to insure food security is a declared national goal. It makes more economic sense to export wheat unofficially than import, although it appears that **Afghanistan is a fairly high cost producer of wheat.**

#### H. FERTILIZER SALES

Following the severe drought of 1970-71, an extraordinary effort was made by the Government to make fertilizer available to farmers in the fall of 1971 and spring of 1972. Prior to that time, the use of fertilizer had been insignificant. It is estimated that 45,000 MT of fertilizer were distributed to farmers in 1351 (1972/73), practically all of which was applied to wheat. The AFC became operational in 1973. **Sales (in MTs) since 1351 (1972/73) have grown at an average rate of 15 percent annually, reaching 69,000 MT in 1975/76. Almost all the growth occurred in 1973/74. Sales during the last three years have been almost flat.** Growth in fertilizer applied to wheat has been something over half the 15 percent with the amount applied to cotton growing rapidly from a very small base.

Earlier, we encountered substantial difficulty with the fertilizer trial data. Nonetheless, the average input-output ratio, fertilizer to wheat, was less than 1:4 for the two lowest-cost treatments for each of the four sets of trial data -- and a ratio of 1:4 will be used for projection purposes. We assume that the proportion of fertilizer used on wheat will continue to fall but at a decreasing rate. We take the Ministry of Agriculture's wheat production estimate of 2935 thousand metric tons for 1955 -- harvest of 1973 -- as our production estimate for 1976. The AFC's draft Seven-Year Plan calls for fertilizer sales to increase by 29.5, 34.3 and 34.8 percent respectively for 1973/77, 1977/78 and 1978/79. We would consider 20, 25 and 25 percent increases a good performance,  $\frac{1}{2}$  in fact an exceptional performance unless fertilizer prices are reduced to farmers. The following table is constructed on these assumptions as well as historical data.

TABLE 9 -- Fertilizer Distribution; Total, for Application to Wheat, Cotton and Other Crops -- 1972/73-1975/76 Estimates and 1976/77-1978/79 Projections

Year	Total * (MT)	Fertilizer Applied to:					
		Wheat		Cotton		Other	
		%	Am't (MT)	%	Am't (MT)	%	Am't (MT)
1972/73	45,000	96	43,200	2	900	2	900
1973/74	63,015	87	54,823	10	6,302	3	1,890
1974/75	62,147	85	52,825	11	6,836	4	2,486
1975/76	69,000	80	55,200	15	10,350	5	3,450
1976/77	83,000	76	63,080	18	14,940	6	4,980
1977/78	104,000	74	76,960	19	19,760	7	7,280
1978/79	130,000	72	93,600	20	16,000	8	10,400

\* Source: 1972/73-1975/76, AFC. All sales in 1972/73 and 18,400 MT of the 1973/74 sales were made by the Ministry of Agriculture

1/ The difference between the two projections amounts to 42,000 MT over the three years, 1976/77 - 1978/79.

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On these projections, and assuming that wheat production would rise by 1.5 percent annually without an increase in fertilizer application, wheat output would grow by 3, 3 and 1 percent respectively in years 1977/78-1978/79, keeping slightly ahead of population growth.<sup>1/</sup>

While cotton production has been growing rapidly in the recent past, if production would increase by an average of 10 percent annually from 155,000 MT in 1976/77 to 210,000 MT in 1978/79, one could not fault such a performance. The experimental work conducted on cotton indicates that an input-output ratio, fertilizer to seed cotton, of 1:5 or less is not uncommon. Under farm conditions, perhaps it would be more realistic to assume a ratio of 1:1. On this ratio, there is enough fertilizer projected to be applied to cotton to permit an annual growth in output of 10 percent without increasing the hectareage.

#### I. IMPORTANCE OF THE AGRICULTURAL DEVELOPMENT BANK TO PROJECT

According to AFC personnel, 85 percent of fertilizer sales to farmers is financed through the AgBank.<sup>2/</sup> An accommodative credit program -- with respect to general accessibility, terms and timeliness of loans to farmers, including small farmers -- is vital to the success of this project. Credit will have to be made available to farmers to purchase fertilizer if sales are to expand. Ex-patriate management has been provided to the Agricultural Development Bank (AgBank) since its reorganization in 1969. Management has attempted to make the AgBank a financially viable institution (collections are improving substantially) and at the same time to introduce changes and adopt practices accommodative to the provision of credit to the nation's farmers. This project assumes that the AgBank will continue its efforts to improve upon the timeliness of credit provided to farmers; upon making credit generally more accessible, especially to smaller farmers; and in other ways to continue to forge a credit program which fosters the development of the nation's agriculture.

<sup>1/</sup> But perhaps not population plus income growth. If per capital income should grow by 2 percent annually, with an income elasticity of demand for wheat of 0.3, then total demand would grow by 3.9 percent (2.3 percent due to population growth and 1.6 to income growth) annually.

<sup>2/</sup> Actually through the AgBank and the AFC, it is AgBank personnel who travel throughout most of the country and make the credit available to farmers.

## J. ECONOMIC BENEFITS

On purely efficiency criteria, little needs to be said about the economics of fertilizer use -- the economic benefits to the nation are large relative to the economic costs. For Afghanistan, it is a matter of either using fertilizer or importing wheat. <sup>1/</sup> And imported wheat would cost a minimum of \$200/MT delivered and distributed in country, or 5 times the cost of the fertilizer needed to produce a ton of wheat domestically. Besides the fertilizer cost, there are increased production costs at the farm level and increased distribution costs arising from marketing a larger output. The local currency cost of foreign exchange also has to be adjusted. Once these adjustments are made, a benefit cost ratio in the neighborhood of 3:1 is obtained. <sup>2/</sup>

1/ At least in the short to medium term, it is wholly unrealistic to expect improvements in cultural practices to increase output significantly, by more than say 1.5 percent annually. It has been noted that the natural fertility level of most of the country's soils is quite low. The area of irrigated land can be expanded by renovating and extending existing irrigation systems and by new major irrigation projects. Historically, the latter has been a high cost approach to increased food production and neither approach would have more than a marginal, if measurable, impact upon total food production in the short to medium term.

2/ As noted earlier, the results of the wheat fertilizer trials have been less than consistent. However, using the average retail cost of fertilizer under present prices for the two low-cost treatments for each of the four sets of trial data gives an average of \$41.42/MT (with interest and depreciation costs removed) as the retail cost of the fertilizer needed to produce a ton of wheat domestically. For the four lowest-cost treatments, the average is \$47.22/MT. There would be additional (over fertilizer) farm costs associated with increased yields. These costs have been estimated at one afghani for each extra kg of wheat produced. (See p. 37, "The Feasibility of a National Wheat Management Program for Afghanistan," a USAID Staff Paper, Kabul, Afghanistan, July 1974). This cost amounts to afs 1000 or roughly \$18, per MT. This overstates the economic costs, however, since it includes transfers and interest, which account for approximately 25 percent of the increase. In addition, there would be the cost of distributing wheat once produced. The retail price of wheat typically averages about afs 8/seer (afs 1135 or about \$20/MT) over the farmgate price. In the foregoing, the afghani cost of foreign exchange is understated from an economic point of view. Duties on imports are substantially higher and much more pervasive than taxes on domestically produced foods. There are no export subsidies. One accordingly needs to shadow price the exchange

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2/ (cont'd.)

rate in order to compute the economic costs/benefit of fertilizer use. Earlier work suggests that a rate of afs 75/dollar may be appropriate. The higher exchange rate would increase the cost of both fertilizer and imported wheat. The relative increase for the latter would be greater than that of the former since the latter is almost wholly a foreign exchange cost while the former includes a large element of domestic output and for which there is a much smaller transportation cost. Once these adjustments are made, we obtain a benefit/cost ratio in the neighborhood of 3:1. One could argue that the importation of wheat would make land available to produce other products. The argument does not hold, however. For wheat is imported because of the low productivity of land and the use of fertilizer is more likely to release land from wheat production than importing wheat. One could also assume that the foreign assistance providing wheat imports would be available for that purpose only. The opportunity cost would be zero at the time of the loan, the cost being incurred at the time that interest and principal repayments were being made. The present value of this cost discounted at 10-15 percent annually for loans of say 40 years with 10 years of grace and interest of 2-3 percent is very low compared to the nominal amount of the loan. If wheat imports were so treated, or treated as being grant financed specifically for the imports, and fertilizer imports counted as a cost at the time of importation, then on paper the economic advantage of fertilizer over wheat imports may disappear altogether. This ignores the dynamics of a growing farm productivity, however, and the adverse impact that food imports can have upon a country's development process.

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## K. THE BENEFITS, THEIR DISTRIBUTION AND THE RECIPIENTS

According to the AFC advisory team, ~~85 percent of fertilizer sales~~ <sup>is credit sales, financed by the Agricultural Development Bank (AgBank).</sup><sup>1/</sup> The AgBank makes fertilizer loans to cotton companies (which in turn distribute fertilizer to cotton farmers), to cooperatives, to groups of farmers and to individual farmers. With respect to the latter two credit recipients, an individual loan is made to a farmer if the farmer purchases fertilizer for application to more than 50 jeribs (9.68 ha).<sup>2/</sup> If a farmer wishes to purchase fertilizer on credit for application to 50 jeribs or less, he is formed into a (small) group and a group loan is made. ~~Through 7041 groups, loans were made to 47,285 farmers in 1353 (1974/75)~~<sup>3/</sup> to finance the purchase of 37,502 MT of fertilizer. All or almost all this fertilizer was applied to wheat.<sup>4/</sup>

For each farmer obtaining credit, the AgBank maintains a record of the number of jeribs on which the farmer indicates he will apply fertilizer. On the basis of these records, TABLE 10, following, is constructed. It shows that in 1353 (1974/75), 47,285 farmers purchased 37,502 MT of fertilizer on credit which fertilizer was to be applied on fields of 50 jeribs or less in size. Of the 47,285 farmers, 17,432 or 36.9 percent purchased 4,126 MT of fertilizer to apply on plots/fields of less than 6 jeribs in size. And 16,326 or 34.3 percent of the farmers purchased 9,298 MT to apply on fields of 6 - 10 jeribs in size. ~~These two groups of farmers comprised 71.2 percent of the total of 47,285 farmers and purchased 35.8 percent of the total of 37,502 MT of fertilizer sold.~~

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<sup>1/</sup> As noted earlier, actually by AgBank and AFC.

<sup>2/</sup> In the past, a farmer would indicate to a representative of the AgBank the number of jeribs he wished to fertilize and a standard conversion factor was applied -- one 50-kg bag of urea plus one-half bag DAP per jerib, or its equivalent, 387 kgs -- 142-60 -- per hectare. Since farmers presumably will now be allowed to purchase any mix they wish, we do not know whether there will even be a recommended application rate.

<sup>3/</sup> Latest available data. The data are not entirely consistent. Data show 73 farmers as being under group loans and buying fertilizer for more than 50 jeribs and 12 farmers buying fertilizer to apply to no land.

<sup>4/</sup> All or most fertilizer applied to cotton was distributed by the cotton companies. The number of farmers to whom fertilizer was distributed is not known. Neither is the number of farmers provided fertilizer through cooperatives known.

TABLE 10 - Number of Farmers per Size Class of Area Fertilized and Total Fertilizer Application per Size Class, 1353 (1974/75) \*

Area Fertilized (Jeribs) <sup>1/</sup>	Number of Farmers	% of All Farmers that Used Fertilizer		Amount of Fertilizer Used		
		(%)	Cumulative (%)	(MT)	(%)	Cumulative (%)
1-5	17,432	33.9	33.9	4,126	11.0	11.0
6-10	13,226	34.3	71.2	9,298	24.8	35.8
11-15	4,072	8.6	79.8	4,028	10.7	46.5
16-20	4,256	9.0	88.8	6,027	13.1	62.6
21-25	750	1.6	90.4	1,313	3.5	66.1
26-30	2,018	4.3	94.6	4,427	11.8	77.9
31-35	368	0.8	95.4	910	2.4	80.3
36-40	879	1.9	97.3	2,611	7.0	87.3
41-45	74	0.2	97.4	241	0.6	87.9
46-50	<u>1,210</u>	<u>2.6</u>	100.0	<u>452</u>	<u>12.1</u>	100.0
TOTAL	47,285	100.0		37,502	100.0	

\* Source: Computed from AgBank Data

<sup>1/</sup> 1 jerib = 0.1936 hectare = 0.478 acres

A project purpose is to increase absolutely and relatively the number of small farmers using fertilizer. This calls for special attention to growth in the first two classes of farmers of Table 10 -- those fertilizing less than 11 jeribs. Based upon the socioeconomic survey being conducted in the Valley, a safe generalization is that if a farmer fertilizes any of his wheat, he will fertilize all his wheat, not just a part. Studies and estimates of national aggregates indicate that slightly less than 50 percent of all cultivated irrigated land is planted to wheat. On these two generalizations, fertilizer purchased for 5 jeribs would indicate a farm size of 10 - 11 jeribs (2 hectares or 5 acres) and purchases for 10 jeribs would indicate a farm size of 21 jeribs (4 hectares or 10 acres). The project is to pay special attention to expanding fertilizer use by the smallest-farmer group.

In Table 9, year-to-year fertilizer sales for application to wheat are projected to increase by 14, 22 and 22 percent respectively in 1976/77, 1977/78 and 1978/79. It is the project intent for sales to the smallest-farmer group (1 - 5 jeribs of wheat fertilized) to grow 25 percent faster than the overall growth rates (of 14, 22 and 22 percent), 1976/77 - 1978/79, and the next to the smallest-farmer group (6 - 10 jeribs of wheat fertilized) to grow 10 percent faster. Given these growth rates, and assuming that growth in 1354 (1975/76) was proportional to growth in aggregate fertilizer sales for wheat, Table 11 following is obtained. The table is constructed on the assumption of a constant per hectare fertilizer application rate. The net returns (afs 8,403/MT of fertilizer applied) of Table 8 are used.

TABLE 11 -- Number of Farmers Applying Fertilizer, Total Fertilizer Applied and Total Net Farm Income Attributable to Fertilizer Use -- by Field-Size Class, 1 - 5 and 6 - 10 Jeribs

Year	Number of Farmers Applying Fertilizer to Field Size Class of:		Total Fertilizer Applied to Field-Size Class (MT)		Total Net Farm Income Due to Fertilizer Use (afs millions)	
	1-5 J.	6-10 J.	1-5 J.	6-10 J.	1-5 J.	6-10 J.
1974/75	17,432	16,226	4,126	9,298	35	78
1975/76	18,215	16,955	4,311	9,716	36	82
1976/77	21,400	19,660	5,065	11,231	43	94
1977/78	27,300	24,300	6,462	13,925	54	117
1978/79	34,800	30,200	8,237	17,306	69	145

On the assumption that those farmers using fertilizer in 1977/78 would also be using it in 1978/79, the project would, on the above projection, benefit 34,800 of the smallest-farmers and 30,200 of the next to the smallest in the two years 1977/78 - 1978/79. The net farm income of the smallest-farmer group would be afs 123 million greater (average of afs 3,534 per family) for the two years than if no fertilizer were used. The next to the smallest-farmer group's net farm income would be afs 262 million larger (an average of afs 15,740 per family) than if no fertilizer were used.

The geographic distribution of fertilizer use is rather concentrated. As is shown in TABLE 12 following, 28 percent of the credit sales to farmers (financed through the AgBank) was made in a single province; over one-half in three provinces; and two-thirds in five of the country's 26 provinces. ~~Of these sales were made in two of the nation's poorest provinces, Ghor and Nimroz.~~ A project purpose is to decrease the geographic concentration of fertilizer use by increasing sales in those provinces that now use relatively little fertilizer.

The Table also suggests that the average per farmer purchase of fertilizer varied considerably from province to province. Thus the table shows that 15 percent of all farmers who purchased fertilizer lived in Helmand province and this 15 percent purchased 28 percent of the fertilizer sold. The corresponding figures for Helmand and Nangarhar combined are 35 and 45. AgBank data show a range in average per farmer fertilizer use by province of from 22.82 jeribs (1.4 hectares) in Kandahar to 3.32 jeribs (0.64 hectares) in Fariyab.

TABLE 12 -- AgBank Financed Fertilizer Sales to Farmers,  
Distribution by Province, 1353 (1974/75)\*

<u>Province</u>	<u>Amount Purchased Cumulative (%)</u>	<u>Number of Farmers that Purchased as a Percent of All Farmers that Purchased, Cumulative (%)</u>
Helmand	28	15
Nangarhar	45	35
Parwan	55	52
Kunduz	63	59
Kabul	68	62
Kandahar	73	64
Urozgon	77	68
Herat	81	73
Faghman	85	79
Baghlan	89	83
Other 16	100	100

\* Source: AgBank. Includes credit sales to individual farmers but does not include cash sales or sales to cotton companies, the sugar mill or to cooperatives.

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On the assumptions made, <sup>1/</sup> the short-run benefits of applying fertilizer to wheat will accrue to wheat producers. The project will have little impact upon wheat prices but will enhance the food security of the nation.

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<sup>1/</sup> Growth in wheat production will not be a smooth progression. There may be relatively big fluctuations due to variations in weather (mainly precipitation in the dryland wheat producing areas). Price demand for wheat is very inelastic. If there is no effective price stabilization program, the benefits of increased use of fertilizer may well go to consumers, not producers. See John R. Berthwick, Food Production and Agricultural Development in Afghanistan, USAID, Kabul, Afghanistan, September 1975, for a good discussion of the problems of a fertilizer program in the absence of a wheat price stabilization program.

GOA REQUEST FOR ASSISTANCE

(Text of this Annex will be cabled to AID/W.)

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ANNEX 2

JOINT EVALUATION  
AFGHAN FERTILIZER COMPANY

and

CHECCHI AND COMPANY ADVISORY TEAM

November 25, 1975

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Minutes of the Meeting Held on November 25, 1975  
in the Conference Room of the Afghan Fertilizer Company

-----

The Meeting convened at 9 A. M. on November 25, 1975 and was attended by the following:

Ministry of Agriculture:

Dr. Abdullah Naqshbandi, Acting President, Planning Department  
Mr. Abdullah Nalk, President of Extension Department

Ministry of Planning:

Mr. Ruhullah Barkzay, Director of Agricultural Section

Agricultural Development Bank:

Mr. Guenter Wiimsen, Finance Advisor  
Mr. Akram Nahis, Asst. Finance Manager

Afghan Fertilizer Company:

Dr. Zarif Salem, President  
Mr. Mohammad Naim, Vice President, Administration  
Mr. M. Aslam Helaly, Commercial Vice President  
and various AFC Department Chiefs

Checchi and Company - Advisory Team:

Mr. Joseph G. Hartsig, Chief of Party  
Mr. A. Helm, Financial Advisor  
Mr. Robert Benton, Supply Advisor  
Mr. Don Goonetilleke, Marketing Advisor

A. I. D. / Washington, D. C. :

Mr. Theodore Lustig, Director, Near East Capital Development  
Mr. Richard Birnberg, Chief, Planning Div., Office of Develop.  
Planning, Near East

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U.S.A.I.D./Afghanistan:

Mr. John Standish, Chief, Capital Development and Engineering  
Mr. Larry Crandall, Evaluation Officer  
Mr. Terrence J. McMahon, Controller

Checchi and Company, Washington, D. C. :

Mr. Harvey Lerner, Vice President

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1. The meeting began with opening remarks.

Dr. Salem welcomed all participants; expressed his view that a meeting convened to evaluate the operations of AFC served the very useful purpose of assessing the reasons for successes and identifying the causes of weaknesses, and expressed the hope that the recommendations flowing from the discussion would strengthen AFC and thus help the Afghan farmer. Dr. Salem then described briefly the major organizational elements of AFC.

Mr. Naik expressed the appreciation of the Government of Afghanistan for the fertilizer loan and the assistance given to AFC. He recalled that the Ministry of Agriculture had not been completely satisfied with the results of its earlier efforts in distributing fertilizer and, therefore, when it sought to develop a new type of organization to take on that task, it had asked the U.S. Government for support in organizing AFC and financing the endeavor. He said that during the last two years AFC had helped the Afghan farmer very substantially by considerably increasing the quantities of fertilizer distributed and supplementing the extension services provided by the Ministry. He considered the distribution system organized by AFC very successful.

Mr. Lustig expressed his satisfaction at being able to attend this meeting, called to review the progress made by AFC during the two years since its creation and to assess whether further assistance might be needed. He noted that AFC had already succeeded in bringing fertilizer to almost every part of the country. He hoped that the meeting would result in identifying problems encountered by AFC in helping the Afghan farmers and in at least beginning to define ways of solving them.

Mr. Lerner said that the work his firm had been doing with AFC had been one of the most satisfying assignments the firm had undertaken. He noted that the organization of a well functioning distribution system was one of the key points for improvements in agriculture and that, in the process of performing that task, not only did the management and staff of AFC affect the life of the people but was itself changed by such changes.

Mr. Hartsig expressed his satisfaction at having worked with AFC during its formation and first years of operation.

2. Dr. Salem then opened the discussion of the Agenda by presenting and elaborating on the "Brief Report on AFC", dated November 24, 1975, a copy of which is attached. In the course of that presentation, the participants asked questions and commented on individual items in the report and in supplementary papers prepared and made available by AFC. The discussion of more significant items is summarized below.

(a) Personnel. Tables showing numbers and classes (types) of personnel assigned to different organizational units of AFC were distributed, showing a total staff of 130 at Headquarters in Kabul and of 405 in the four Regional Offices. The classification, recruitment and training system was explained. A number of employees have Masters and Ph.D. degrees from both Afghan and foreign institutions. Both on-the-job and classroom (in Afghanistan and abroad) training is conducted. AFC management views continued training outside Afghanistan of a limited number of middle-management people as a matter of great importance. Fifteen staff members have been selected for 3-6 months training in the U.S., Iran and Turkey.

(b) Division of Responsibilities between the Supreme Council and The Executive Committee. In response to a question, Dr. Salem stated that so far no major problems had arisen in defining the areas of responsibility of the Supreme Council, which deals with policy questions (such as fertilizer prices, quantities to be purchased, personnel policy) and that of the Executive Committee, which implements those policies.

Authority to commit Company funds has been delegated to the Executive Committee up to a limit of Afs. 2 million; to the President with a limit of Afs. 500,000; to the Vice Presidents up to Afs. 300,000; and to the General Directors up to Afs. 50,000.

In almost all cases, the Supreme Council acts on recommendation, or option of the Executive Committee.

While the Executive Committee has not been given any precise delegations of authority (except for commitment of funds), it acts within the general policy guidelines set forth by the Supreme Council unless it believes that operations involve a question which needs to be referred to the Supreme Council.

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(c) Dealer System. In response to a number of questions, Mr. Helaly stated that dealers (retailers) are selected on the basis of literacy, their past business experience and financial position. Dealers are expected to provide information and services to farmers, but AFC has not yet made brochures and guidelines available to all dealers. The Regional and Zonal AFC offices are, however, in constant contact with all dealers and are expanding their work in education and promotion of dealer participation in demonstration plots. The performance of dealers is regularly evaluated.

Looking to the future, Mr. Salem said that AFC was aiming at a system which involved dealers who specialized in handling all agricultural supplies and did not sell other kind of merchandise but that it would take time to reach that goal. AFC believes there should be at least two dealers in every location where the volume of sales is sufficiently large so that there is some competition. AFC is attempting to strike a balance between too few and too many dealers to ensure that no dealer has a monopoly position which he could exploit to the disadvantage of the farmers and, on the other hand, to avoid discouraging dealers from seeking to expand their sales to the maximum they can handle. He was questioned on his criteria for "too many" dealers.

The question of credit for dealers, through the Agricultural Development Bank or other sources, was raised. The AFC representatives stated that the coupon system, in effect, provides revolving credit to dealers, since they can obtain additional supplies against surrender to AFC of coupons collected from farmers. Bonded dealers (now about 5% of the total) can get credit from AFC. The absence of a credit system for dealers did not appear to have limited sales, but Dr. Salem said that dealer credit would be studied again next year.

(d) Volume of Sales. The current year's sales were discussed on the basis of reports prepared by AFC's Supply and Distribution and Marketing Departments. Sales in the first eight months of the current year have fallen short of AFC's forecast by about 35%, in fact, this year's sales volume is somewhat smaller than in the comparable period of the previous year. Mr. Helaly cited as reasons for slow sales the relatively low price for farm products which makes it difficult for farmers to pay off the previous year's loans and thus to obtain new credit. Furthermore, the cotton crop now coming in is large and cotton

companies are slow in accepting deliveries and processing payments to farmers since the companies are short of funds.

(e) Urea/DAP Ratio. There was then an extended discussion of the ratio of DAP to urea used by farmers and sold by AFC. The Supreme Council recently decided to sell urea and DAP only in the proportion of 3 bags of urea to 1 bag of DAP because DAP supplies were insufficient to maintain the customary 2:1 ratio. The ratio was therefore temporarily increased to 3:1 in order to avoid exhausting DAP stocks before new supplies arrived. At the moment, cash customers and customers using credit coupons must purchase urea along with DAP in the 3:1 ratio. It was expected, however, that the limitations on DAP sales would be removed at the end of the current sales season.

The AID representatives then asked about the plans of the Government and AFC to study the proper application rate of phosphatic fertilizers, a study which the Government had agreed to carry out under a covenant in the Fertilizer Loan Agreement. They pointed out that the question was of great importance: for the farmer, who might now be spending more money for DAP than necessary; for the national economy, which might be spending more foreign exchange for the import of phosphatic fertilizer than necessary; and for the Government, which has to finance the high subsidy paid on phosphatic fertilizer. It was pointed out that such a study carefully designed and executed would involve both technical and economic questions. AFC agreed that a study reexamining the recommended application rates for phosphatic fertilizer should be initiated as soon as possible and that a decision on the participating agencies and leadership should be sought promptly. The AID representatives offered short-term assistance in organizing the study should the Government so desire.

(f) Sales Projections. AFC presented its projections of future sales of fertilizer which have been prepared for the draft seven-year development plan. Those figures show an increase of the total quantity of fertilizer sold from 78,750 tons (current Afghan fiscal year) to 103,950 tons (first year of the plan period), to 471,500 tons in the seventh year of the plan period, i. e., a quintupling to be achieved by the last year of the plan, with annual increases ranging from 20% to 40%. The AID representatives pointed out that increases of such magnitude are clearly unrealizable and therefore unsuitable as a basis for an annual operational planning of staff, storage facilities, transportation,

etc. The AFC representatives explained that the Company's original projects had been substantially lower and had been revised on the basis of agricultural production targets developed by the Ministry of Agriculture. Mr. Nalk, who explained this, saw that the projections should, at this time, be considered as a "draft" rather than a "plan" approved by the Government.

The AID representatives went on to point out that the projections as now presented had serious financial implications. If the projected increases were looked upon as operational targets, e.g., imports of urea would have to be financed as early as 1978/79, in addition to projected imports of phosphatic fertilizers, and subsidies to be financed by the Government in that year would approach Afs. 2 billion and would reach over Afs. 3 billion by the end of the plan period.

Mr. Lerner suggested that it might be useful to develop several projections (such as "high", "low", and "medium") and to study their implications.

Dr. Salem stated that AFC would develop annual projections which could then be adjusted on the basis of experience.

(g) Warehousing. Dr. Salem stated that substantial additional warehousing would have to be constructed. \$600,000 are available for warehouse construction from an IBRD loan to the Agricultural Development Bank but additional investment will be required. Except for galvanized sheeting for roofs, all construction materials will be locally available.

(h) Inventory Losses. Based on sales, inventory losses are running at less than 0.5%, a rate which it was agreed was very good. Most losses occur before receipt of material in AFC warehouses and a small portion is due to loss of material in rebagging and similar operations. The financial projections use the 0.5% loss rate as a charge to cost of sales.

(i) Financial Status. AFC made available Balance Sheets and Profit and Loss Statements reflecting the financial status of the Company as of March 31, 1975 and August 31, 1975; it also provided written information on contributions to AFC by the Government and proforma Profit-and-Loss and Cash Flow Statements reflecting projected financial operations for the years through the end of the seven-year plan period, based on the sales projections discussed in paragraph 2 (f), above. Since there had not been adequate time for

the participants to review that material before the meeting, detailed discussions were limited to questions related to finances, namely the level of Government and subsidies and the related question of payments by the Government to support AFC operations.

The level of subsidies, which had previously been discussed in connection with sales projections, was again reviewed. AFC has concluded that it requires a cash balance of about Afs. 700 million to finance its operations, including interest payments relating to a current short-term loan from Da Afghanistan Bank and to AID loans. (The loan from Da Afghanistan Bank is scheduled to be paid by the end of the current fiscal year.) In order to finance annually increasing sales, AFC will require increasing amounts of subsidy payments from the Government which, even on the basis of more conservative sales projections than those presented in the Tables for consideration, are likely to exceed Afs. 1 billion within the next few years.

With respect to payments during the current year, AFC stated that it requires Afs 803,788,000 if it is to maintain the required cash balance. No part of that amount has as yet been received by AFC and it is uncertain when and how much will be received by AFC since until now payments to AFC are not included as a line item in the Government's budget. AFC is acting on the assumption that the Government will provide the funds (or at least most of those needed) from the undisbursed development budgets of other agencies as it has in the past. The AID representatives urged both AFC and the Government representatives to bring this matter to the attention of the Ministries concerned as soon as possible so that next year's budget will include support payments to AFC as a separate item.

In that connection, the AID representatives also urged AFC to prepare monthly, or at least quarterly, cash flow forecasts so that payments could be requested and received from the Government in time to maintain AFC's cash balance at the required level at all times.

(j) External Auditors. During the discussion of the audit of AFC's accounts now in progress, the AID representatives suggested that the performance of the auditors be reviewed after the conclusion of the current audit. They further suggested that it might be well to

consider establishing criteria for the selection of auditors in which the cost of their services would not be given excessive weight (the present system is to place great weight on the bid price); it might then be possible to establish a more permanent relationship with a highly qualified auditing firm which would, in the long run, save auditing time and therefore ultimately be less costly.

(k) New Fields of Activity. Dr. Salem reported that AFC had created a new Division charged with the purchase and sale of agricultural chemicals (primarily pesticides and veterinary products) and small items of farm equipment (in the first instance sprayers and spare parts). A plan for the development of that new activity, planned to be a profit-making enterprise, has been prepared and was made available to the participants. The only aspect of that new operation which was discussed in any detail related to pesticides.

The AID representatives noted that AFC's entry into the pesticide business raised a number of questions which AID would have to explore in some detail before it could offer assistance in this area. Those questions related to environmental problems (training of dealers and users in the proper handling and application of toxic materials, some having potentially fatal effects), to appropriate staffing by AFC and, finally, to the administrative and financial implications of the new line of business for AFC.

Dr. Salem also reported the proposed formation of a National Seed Company for the purchase, multiplication and certification of improved seed varieties. (The Seed Project will be supported by a loan from the Asian Development Bank.) Discussions were reported to have been held aiming at the participation of AFC in the Seed Project as distributor of seeds through its existing dealer organization. The participants agreed that seed participation would be a useful adjunct to AFC's fertilizer business.

(i) Sales Statistics. Mr. Lustig complimented AFC on the detailed breakdowns of sales on a geographic basis included in the Company's sales reports but wondered whether any information on the breakdown by "class of customer" (size of holdings, owner or tenant) was available so one might reach conclusions on what types of farmers were now purchasing fertilizer in what quantities and what steps might be

necessary to reach those classes of farmers not now purchasing fertilizer. In the ensuing discussion, in which both the representatives of AFC and of the Agricultural Development Bank participated, the reasons for difficulties of obtaining reasonably reliable data were explained; discrepancy between cadstral and tax records and claims of ownership, the variety of arrangements governing tenant/owner relationships, and even the differences of usage in describing an area owned or farmed. It appeared that, nevertheless, the records of the Agricultural Development Bank may contain some useful data, and Mr. Wilmsen offered to make these available to AFC and AID. It was agreed that this matter would be pursued subsequently.

3. Checchi Team. Mr. Lerner distributed to the participants a report by Checchi and Company on "Work Performed by the Advisory Team" and orally presented some highlights. The role of the advisors and their method of operation was presented by each member of the Team and responding to a question raised by the AID representatives, the degree to which the team members function in "management" as against "advisory" function were described and discussed.

4. Conclusions. After a short intermission, the participants, except for the representative of Checchi and Company and the Advisory Team reassembled. Dr. Salem then asked each of the participating agencies to summarize its conclusions from the discussion.

Mr. Naik expressed his satisfaction with the performance of AFC which, although not yet perfect, represented a great improvement in fertilizer distribution over the system earlier used. He said that AFC had demonstrated that a Government entity organized along corporate lines could operate with considerably greater efficiency than any other governmental organization and that AFC and the Ministry of Agriculture were working in close cooperation.

Mr. Wilmsen said that the Agricultural Development Bank was very interested in seeing AFC maintained as an independent corporate entity. He urged AFC management to ensure that its audited accounts are submitted to the Bank in time to be incorporated into the Bank's statement before the deadlines included in its Credit Agreement with the IDA.

Mr. Lustig said that he believed AFC was now an established enterprise and that its problems, and some problems beyond its immediate control in agriculture, had been frankly discussed. As was to be expected in the case of a young and, in Afghanistan still unique, organization, there was room for improvement in several aspects of its operations and that he believed AID would be ready to continue its support to AFC. He reemphasized the need to launch the study on use of phosphatic fertilizer promptly.

Mr. Standish noted that most of AID's concerns about problems in the areas of AFC's operations were reflected in the covenants included in the Loan Agreement for fertilizer imports.

Mr. Birnberg emphasized the importance both for AFC and the government of determining the appropriate application of phosphatic fertilizer for the different crops and soil and weather conditions and hoped that the study would be initiated speedily. He also cautioned against establishing unrealizable output goals because these would only make for difficulties in annual operational and investment planning and thus lead to unnecessary inefficiency. The importance of identifying time costs at every level could not be underestimated in the setting of prices for final products.

##### 5. Future Advisory Assistance.

Dr. Salem thanked the previous speakers for their comments on AFC's operations and then outlined the requirements he saw for future advisory assistance.

He indicated that AFC wished to terminate the services of the present Advisory Team when the present contract with Checchi and Company expires (in March 1976), but that AFC believed similar services would be needed in the future. He saw a need for four advisors, as follows:

- (a) Team Leader, to advise on general management and planning; to have good background in financing;
- (b) Marketing Advisor, to advise on sales promotion, including dealer training, experimental plots and other methods of marketing;
- (c) Financial Management and Accounting Advisor, to advise on improvement of accounting in Regional Office and at Headquarters, on financial planning and forecasting;

- (d) Pesticide Advisor, to assist AFC in all aspects of its projected pesticide business, both administrative and technical.

One of the four proposed advisors should also be qualified to assist AFC with international purchasing and logistics management.

In addition, Dr. Salem saw the need for continued training outside Afghanistan and for the establishment of a soils laboratory.

Mr. Lustig responded by agreeing that assistance in the first three areas mentioned would be desirable. He said that AFD would have to defer judgment on the Pesticide Advisor for the reasons stated earlier in the discussion; AFD could not consider any assistance in that field unless it was persuaded that all environmental, technical, administrative and financial questions could be satisfactorily answered. He agreed with the need for a continuing training program but left the answer to the request for a soils laboratory open. He asked Dr. Salem to prepare a paper describing the work for which a soils laboratory would be used, existing laboratory facilities that might be used to perform that work and the type and cost of the equipment which AFC believed it would need to own. Mr. Lustig also noted that AFD would have to go through a competitive selection procedure before it could enter into negotiations for a new contract, since the selection of Checchi had been based in large measure on the qualifications of the team which was now about to depart.

The foregoing minutes have been reviewed and are hereby approved as substantively reflecting the subjects discussed, issues raised and conclusions reached during the joint evaluation of the Afghan Fertilizer Company and the Checchi and Company Advisory Team, November 25, 1975.

(The Joint Evaluation Report was distributed to all participants, acknowledged, signed or dissenting views furnished and included as annexes.)

Remarks by M. Z. Salem

The following should be inserted in places indicated.

Pg. 1. AID/W, D.C. : Mr. Charles Jenkins

Pg. 2 after paragraph 1

Dr. Salem pointed out that the meeting should be chaired by AID, according to the Pro-Ag. but all participants asked him to chair the meeting.

Pg. 3 Paragraph 5.

While the Executive . . . . . set forth (add: in AFC Charter and) by the Supreme Council . . . . .

Pg. 5, Paragraph (g), second sentence should be replaced with: \$380,000 are available for financing 50% of warehouse construction from an IDA loan to the Ag. Bank, the balance plus cost of the land will be financed by the ROA.

Pg. 6, (g).....financial status of the company as of August 31, 1974 and March 31, 1975; .....

Pg. 8, After paragraph 5 add: Mr. Jenkins who had visited AFC regions 1, 2 and 4 in the field stated that AFC's success was evident in that in each corner of the regions visited there was a retailer fertilizer outlet supplied with fertilizer and ready to sell it to the farmers.

Pg. 9, add after (d): (e) One of the advisors should have, in addition to above, experience in international procurement and port logistics.

MZS/ZT.

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AGRICULTURAL DEVELOPMENT BANK OF AFGHANISTAN

No. 8116  
Date: 11/9/54  
(12, 2, 75)

To The Esteemed AFC:

The proceedings of the evaluation meeting, along with the letter of 8/9/1354 (Nov. 29, 75) (is) return(ed), after some small changes in the 1st, 8th, and 10th pages. We request you to leave at our disposal (send us) some copies when it is printed and we will be grateful.

Yours Sincerely,

/s/

Mohammad Akram Nahif  
Financial Assistant of the Bank

MEMORANDUM

DATE: 11/30/75

TO : Mr. John Standish, Chief, CDE/USAID/A

FROM : Harvey Lerner, Checchi and Company /s/

SUBJECT: Minutes of November 25 meeting - Joint Evaluation: Afghan  
Fertilizer Company and Checchi and Company Advisory  
Team

We would like to have the following items included in an addendum to the minutes:

Items 2 f. and g.

"Mr. Helm pointed out that the financial implications of the sales projections and the future financial status of AFC can be profoundly affected by decisions of the Government concerning the sales price to AFC of UREA produced by the Mazar Plant, and by other unresolved questions."

Item 3:

"Mr. Lerner distributed and commented on a draft report performed by the Advisory Team. The final version of this report will be reproduced by AID."

"Mr. Lerner commented that the "logical framework" prepared for this project was not particularly well suited to the purpose of evaluations the technical assistance input nor indeed the progress of the project as a whole. He suggested a revision of the logical framework for this project would be beneficial."

In all other respects, we find the minutes of that portion of the November 25, 1975 meeting attended by the Checchi Advisors to be acceptable.

I am attaching a corrected final draft of our report on work performed by the Advisory Team.

CDE:HLerner:sp:11-30-75

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FM KABUL 7721

Nov. 27, 75

TO SECRETARY WASHDC

AIDAC

SUBJECT: AFC Project Evaluation

1. Full-day evaluation meeting held November 25 with participation of AFC Management and staff, AgBank, Ministries of Agriculture and Planning, and Mission/ Washington Evaluation Team. Checchi (Headquarters and Team) participated in all but final portions of meeting.
2. Conclusion reached that (1) GOA wished to confirm AFC as government-owned company functioning substantially along present lines; (2) AFC wished to obtain advisory and training services for additional period, with AID assistance in financing such services; and (3) present Checchi contract for advisory services will be allowed to expire; termination date and competitive proposals will be invited for subsequent services.
3. Findings discussed with Mission November 26. Conclusions reached that (a) project should be continued; (b) new contract for two years be negotiated by AID; and (c) necessary documentation prepared by Mission soonest. Significant points arising from those conclusions discussed below.
4. In course evaluation meeting, we emphasized urgency of starting program designed to explore optimal application of phosphatic fertilizer to major crops under different climatic and soil conditions, a subject on which covenant included in loan agreement for Loan 019 as Section 5.2(a). Hope to raise question with Minister of Agriculture in Meeting November 27 and will then further discuss with Mission. It is clear that persistent follow-up action by Mission will be needed to ensure designation of GOA agency responsible for program, proper design of program and monitoring its execution. Short-term TDY services may be needed.
5. On request of MinAg, AFC has created new division for pesticide supply and wishes to include one advisor in future team to assist in that area. Due to environmental, organizational and financial implications of that new activity, we have

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reserved decision. Believe study is needed to examine (a) present pesticide marketing system in Afghanistan (both through government channels and by private importers/dealers); (b) needs for improving present system; (c) foreseeable pesticide requirements, by type and quantity; (d) needs for training of dealers and users; and (e) specific environmental problems inherent in present system and to be dealt with in future. Suggest you explore whether services of one expert for period of approximately four weeks available under EJC procedure or from which other source. Start of study early in January should be sought. Believe financing and services from Project Development Funds appropriate.

6. AFC has also requested inclusion in project of soils laboratory. We have requested AFC to prepare paper for Mission describing (a) purposes for which laboratory intended; (b) existing soil laboratory facilities in Afghanistan which might be used, and extent to which such facilities considered inadequate; and (c) additional equipment believed necessary to accomplish purposes. Decision whether AID would finance such additional equipment would be made after receipt and analysis foregoing information.

7. Financing of additional two years for services will require (a) inclusion of project in FY 77 CP; (b) supplement to PP, including evaluation report; (c) new ProAg or Grant Agreement, and PIO/L. Mission will cable separately on proposed timing foregoing documentation. We realize desirability of having new team at work soonest after departure present team in February/March, requiring initiation of contract procedure ASAP and considering possible alternatives for proceeding which will follow septel. It is very unlikely, however, that obligation of FY 76 funds for this project will be possible before December 31, 1975, as previously anticipated.

8. Discussed with Mission necessity of closer monitoring of project, which will require fresh look at Project Manager function for this Project.

9. Will draft, before leaving Kabul, Minutes of Evaluation Meeting which we hope will be signed by AID, AFC and Ministries of Planning and Agriculture. Full evaluation report

- 3 -

for internal use ( mentioned in paragraph 6 (b), above will be prepared by Binberg and Lusig upon return to home base.

ELIOT

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THE REPUBLICAN GOVERNMENT

OF

AFGHANISTAN

MINISTRY OF AGRICULTURE AND IRRIGATION

AFGHAN FERTILIZED COMPANY

THE CHARTER

of

AFGHAN FERTILIZER COMPANY

SARATAN

1353

DATE: July 23, 1974

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CHAPTER ONE

DEFINITIONS

ARTICLE 1:

In this CHAPTER, the following terms shall convey the following meanings:

Ministry: Ministry of Agriculture and Irrigation

Company: Afghan Fertilizer Company

Bank: Agricultural Development Bank of Afghanistan

License: A document granted by the Company to individual persons thereby permitting such persons to enter into fertilizer purchase and sales activities on a retail basis.

Retailer: A real or legal person who, privileged by the License, carries out the activities pertaining to the purchase, sale and distribution to the farmers and landholders of the Company's fertilizers, pursuant to this CHAPTER.

NOTE: (1) The term "legal person" herein signifies governmental institutions.

(2) In order that non-governmental institutions, such as agricultural cooperatives, be also strengthened and their development speeded, the task of retailing fertilizer can be committed, according to the Ministry's recommendation, to such organizations as well.

CHAPTER TWO

ESTABLISHMENT AND OBJECTIVE

ARTICLE 2:

Based on this CHARTER, a company, under the name "Afghan Fertilizer Company," shall be established as a joint-stock company. The headquarters of the Company shall be in Kabul; and its branch offices, agencies, and warehouses shall be established, as and when necessary, in other parts of Afghanistan.

ARTICLE 3:

The authorized capital stock of the Company is Three Hundred Million Afghanis (Afs. 300,000,000), divided into Thirty Thousand (30,000) shares, to be issued in the names of shareholders. The minimum value of each share is Ten Thousand Afghanis (Afs. 10,000).

ARTICLE 4:

The Company cannot sell its stock to private institutions or persons. All the Company's stock held by private institutions and persons shall be purchased, after the coming into force of this CHARTER, by the Bank at face value. The Bank can remain as the Company's stockholder.

ARTICLE 5:

The Company's objectives are:

- Procurement and importation into Afghanistan of chemical fertilizers from abroad, or procurement of same from the domestic sources.
- Transportation, storing, distribution of chemical fertilizers to the selected outlets within the country.
- Setting necessary standards for controlling and regulating storage, packing and the matters relating to credit and sale of chemical fertilizers, according to rules and regulations to be established for such purposes by the Company.

ARTICLE 6:

The Company, in order to carry out its tasks, shall acquire the required funds from the following sources:

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- a. Through the issuance of stock.
- b. Through receiving loans via issuing bonds, according to the Supreme Council's approval.
- c. Through the Government's subsidy, and grants made by other sources, pursuant to the Supreme Council's approval and the Government's validation.

ARTICLE 7:

The Company can, in order to carry out its tasks, participate in governmental institutions whose activities would be supporting the Company's objectives.

ARTICLE 8:

The Company shall distribute chemical fertilizers on credit via Bank and other lending agencies.

ARTICLE 9:

The Company shall distribute chemical fertilizers to the farmers and landholders, directly or through retailers, pursuant to separate regulations.

ARTICLE 10:

The Company can, in addition to the tasks and duties set herein, embark upon other agricultural activities which would promote the Company's goals and interests, and which would bring facilities to the farmers, pursuant to the Supreme Council's approval.

CHAPTER THREE  
ORGANIZATION

ARTICLE 11:

The Company is comprised of the following organs:

- The General Assembly of Stockholders
- The Supreme Council
- The Executive Board
- The Board of Auditors

CHAPTER FOUR

THE GENERAL ASSEMBLY OF STOCKHOLDERS

ARTICLE 12:

The ordinary meetings of the General Assembly of Stockholders shall be convened annually within four months after the close of the Company's financial year to handle the following matters:

- (1) Consideration of the Annual Reports of the Executive Board and Board of Auditors, together with the Supreme Council's recommendations regarding the Company's activities. In this Report, the financial status of the Company, also shall be shown, while comparing it with the two preceding years.
- (2) Consideration and approval of the Company's Balance Sheet and Profit and Loss Statement, and distribution of annual profits and losses, on the basis of the Supreme Council's recommendations.
- (3) Election of the members of the Board of Auditors for a term not exceeding three years.

ARTICLE 13:

The extraordinary meetings of the General Assembly of Stockholders shall be convened, pursuant to a demand from the Executive Board and recommendations from the Supreme Council, in the following conditions, within fifteen days:

- In the event that over 20 percent of the Company's paid-up capital stock should have been lost; or there should exist the possibility of a fifty percent loss of such capital stock.
- In the event that there should occur a need for the amendment of the CHAPTER.
- In the event that there should arise reasons for the dissolution of the Company, in accordance with the provisions of the Commercial Law.

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ARTICLE 14:

The stockholder, himself, or his legal delegate, should attend the meetings of the General Assembly of Stockholders. Each share has the power of one vote. The stockholder, or his legal delegate, shall, after registration of his identity, obtain the Admission Card to the meetings. Date, place and the agenda of the meetings shall be announced ten days in advance, at the latest.

ARTICLE 15:

Except in the instances which would be otherwise stipulated by the Commercial Law, the quorum for the ordinary and extraordinary meetings of the General Assembly of Stockholders shall be two-thirds of the paid-up capital stock of the Company. Should this quorum not be attained, the matter shall be announced and a second meeting shall be held after a ten-day space of time by the stockholders possessing at least one-third of the capital stock.

ARTICLE 16:

The General Assembly of Stockholders shall elect, by a majority vote, the chairman and secretary of the meetings.

ARTICLE 17:

The decisions of the General Assembly of Stockholders shall be recorded in a special Book of Decisions and signed by the attending members of the meetings and the secretary.

CHAPTER FIVE

THE SUPREME COUNCIL

ARTICLE 18:

The Supreme Council of the Company is formed of the following members:

- Minister of Agriculture, Chairman
- Minister of Finance, member
- Minister of Planning, member
- Minister of Mines and Industries, member
- Minister of Commerce, member
- President of the Agricultural Development Bank of Afghanistan, member
- Managing President of Afghan Fertilizer Company, member

ARTICLE 19:

The Supreme Council shall meet once every three months at least. Its extraordinary meetings can be convened on the proposal of the Executive Board. The quorum for the Supreme Council's meetings shall be four members; decisions of the meetings shall be made by a majority of votes of the attending members, with each member having the right of one vote. In the event the votes should come to a tie, that side for which the chairman has voted shall govern. The decisions of the Supreme Council shall be put into force after having been recorded by the secretary in a special book and signed by the chairman and the attending members. The secretary shall be elected at the first session from amongst the members or outside thereof, for a term of one year.

ARTICLE 20:

The Supreme Council has the following duties and competences:

- a. Establishing the general policy of the Company, in conformity with this CHAPTER's objectives.
- b. Appointing and dismissal of the members of the Executive Board.
- c. Approving the purchase, sale, mortgaging and leasing the Company's immovable properties.

- d. Establishing and closing the Company's branches, (divisions ?) and agencies at the headquarters (?) and outside the headquarters (?).
- e. Approving the necessary bills and regulations for carrying out the following matters:

- (1) Hiring, transferring and dismissing the Company's employees.

Note: Salaries and costs paid the employees and other dependents and dealers of the Company shall be in accordance with the Bank's scale of salaries and such costs.

- (2) Rewarding and disciplining the employees.

- (3) Other instances required by the Company's activities.

- f. Providing fund resources for the Company, through borrowing, issuance of bonds, and accepting grants.
- g. Determining the extent of government's subsidy and applying for the same to the Government.
- h. Establishing the need for raising claims against members of the Executive Board, according to law.
- i. Deciding on the Company's participation in governmental institutions.
- j. Making decisions about the subjects presented by the Executive Board or the Board of Auditors.
- k. Approving the employment of expatriate advisors and specialists, on the Executive Board's proposal.
- l. Fixing the purchase and sales prices of fertilizers on retail basis, determining the retailer's commission, and approving the bills related to the retailer's activities, pursuant to Executive Board's proposal. In fixing the prices, the cost, the Company's financial status, and the size of Government's subsidy shall be taken into consideration.
- m. Considering the Balance Sheet, the Profit and Loss Statement, as well as the Executive Board's and the Board of Auditors' Report, and referring same to the General Assembly of Stockholders, together with its views and recommendations.

- n. Approving the fertilizers importation agreements, and authorizing the signing of such contracts on behalf of the Company.
- o. Taking on of other duties which, according to this CHARTER and pursuant to the orders issued by the Government, would belong to it.
- p. Establishing and determining the competences of the Executive Board in monetary affairs, concluding agreements, and signing other documents.

CHAPTER SIX

THE EXECUTIVE BOARD

ARTICLE 21:

The Company shall be administered within the framework of its goals and tasks, based on the policies set by the Supreme Council and pursuant to the regulations and bills arranged by the Executive Board.

The Executive Board is comprised of the following members:

- (1) The chairman of the Executive Board, as President of the Company.
- (2) The financial and administrative vice-president.
- (3) The commercial vice-president.

ARTICLE 22:

The Executive Board shall carry out its duties pursuant to the Supreme Council's approval and on the basis of the CHARTER and other acts and internal procedures of the Company. The members of the Executive Board, individually and collectively, shall be responsible for their performance to the Supreme Council, according to the provisions of this CHARTER.

The members of the Executive Board, during the tenure of office, cannot work in any other offices or institutions; nor can they require other compensation or financial privileges.

ARTICLE 23:

The Executive Board shall appoint, from amongst its members or outside, a well-qualified person to represent the Company at courts and other tribunals.

ARTICLE 24:

The agenda for the ordinary and extraordinary meetings of the General Assembly of Stockholders shall be prepared by the Executive Board and submitted to the Supreme Council.

ARTICLE 25:

The matters which the Executive Board should regard beyond its competence or duty shall be referred to the Supreme Council for decision.

BOARD OF AUDITORS

ARTICLE 26:

The General Assembly of Stockholders shall elect a Board of Auditors for the Company, comprised of three members.

ARTICLE 27:

The Board of Auditors cannot make its audit known except to legal authorities.

ARTICLE 28:

Other responsibilities and duties of the Board of Auditors shall be regulated according to the Commercial Law.

The Board of Auditors shall perform the following duties:

- a. Auditing the accounts and reconciling them with Balance Sheet and Profit and Loss Statement.
- b. Controlling the accounts of the Company once every three months at least.
- c. Auditing and examining the Company's cash on hand once every three months without warning.
- d. Auditing the Company's Stocks Register.
- e. Analyzing the financial status of the Company.
- f. Analyzing the accounts of debtors with regard to doubtful and non-receivable debts.
- g. Verifying and confirming the conformity of the Company's performance to the prescriptions of its CHARTER and other rules and regulations.
- h. Reporting the conclusion of its audits to the General Assembly of Stockholders, as well as to the Supreme Council.
- i. Supervising and watching the Company's technical works and matters.

ARTICLE 29:

The Board of Auditors is responsible before the General Assembly of Shareholders and the Supreme Council.

ARTICLE 30:

The Board of Auditors can participate in the ordinary and extraordinary meetings of the General Assembly of Stockholders without the right of voting. It can also submit its proposals and recommendations (?) to the Supreme Council.

ARTICLE 31:

In the event of the Company's dissolution, the Board of Auditors shall inspect (?)/take care of (?) the liquidation matters, according to the Commercial Law.

ARTICLE 32:

The duties of the Board of Auditors, either wholly or partly, can be entrusted provisionally, upon the Supreme Council's approval and recommendation, to a group of chartered accountants of international standard.

The General Assembly of Stockholders, pursuant to the Executive Board's proposal and the Supreme Council's recommendation, shall make due decision as to the apportionment and distribution of the remainder of the net profit.

CHAPTER SEVEN

FINANCIAL AND ACCOUNTING RULES

ARTICLE 33:

The fiscal year of the Company shall be the same as the calendar year of Afghanistan.

ARTICLE 34:

The Balance Sheet, the Profit and Loss Statement, and the Annual Report of the Executive Board, after having been confirmed by the Board of Auditors, shall be submitted, within four months after the close of the Company's fiscal year, to the Supreme Council and the General Assembly of Stockholders.

ARTICLE 35:

The net annual profit of the Company shall be distributed as follows:

- a. Forty percent of the net profit, at least, shall be apportioned to the General Reserves. Such apportionment of the net profit to the General Reserves shall be continued until such a time that the aggregate amount of same shall equal the approved capital stock of the Company.
- b. Five percent of the net profit, at least, shall be apportioned to the Special Reserves, to offset the foreign exchange risks and other unexpected losses.

CHAPTER EIGHT

MISCELLANEOUS PROVISIONS

ARTICLE 36:

The Company can be dissolved, upon the decision of the extraordinary meeting of the General Assembly of Stockholders, on the basis of the Supreme Council's resolution, in accordance with the Commercial Law. The decision of the extraordinary meeting of the General Assembly of Stockholders regarding the dissolution of the Company, on the Supreme Council's recommendation, can be made through a majority voting representing three-fourths of the paid-up capital stock. After its dissolution, all accounts of the Company shall be settled through a body of accountants elected by the General Assembly of Stockholders which would operate under the administration of the Board of Auditors.

ARTICLE 37:

Instances not provided for in this CHARTER shall be taken care of according to the provisions of the Commercial Law and other laws of the country.

ARTICLE 38:

This CHARTER which has been prepared in eight chapters, including thirty-eight articles, shall become executable after the approval of the General Assembly of Stockholders, and the ratification of the Cabinet, and publication in the Official Gazette.

Translated by:

A. Ahrari, AFC's Translator  
August 7, 1974

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AFGHAN FERTILIZER COMPANY

Feb. 21, 1976

Mr. Vincent Brown  
Director USAID  
Kabul.

Dear Mr. Brown,

I received your letter of February 2, 1976 in which you enclosed items of information concerning the Afghan Fertilizer Company. I have reviewed these papers, and the matter has been brought to my attention.

I am happy to be able to inform you that:

(1) On Behalf of the Supreme Council of AFC I desire the USAID technical assistance to be continued to the AFC.

(2) The Supreme Council does desire that AFC continue to operate as an independent entity, in accordance with their charter and the loan agreement.

(3) AFC is operating in a normal manner in accordance with the AFC Charter and will continue to do so.

I appreciate your thoughts concerning my health, and I am feeling much better. I hope that you, too, are continuing in good health.

Sincerely,

/s/

Azizullah Wasafi  
Minister of Agriculture  
Chairman of Supreme Council.

ANNEX 5

Fertilizer Recommendation for Different Crops  
by  
Research and Soil Survey Department

Crops	Description	Nitrogen Kg/h	P <sub>2</sub> O <sub>5</sub> Kg/h	Urea Kg/J	LAP Kg/J	K <sub>2</sub> O	Methods and Time of Application
Wheat Irrigated	Improved Winter & Spring	100	50	36	22	-	Split application of urea is recommended in cold regions, 50% in fall and 50% in spring
Wheat Irrigated	Local Spring and Winter	60	30	22	13	-	" " "
Wheat non- Irrigated	Improved and Local	30-40	20-30	11.5	11	-	All at sowing time
Rice Long Grain	Local Tall	40-60	20-30	16.	15.5	-	Urea should be applied in 2-3 applications - flow of irrigation water should be stopped when urea used.
Rice Short Grain	Local	60-80	30-40	25	15.5	-	" " "
Rice	Local Short	60-80	30-40	25	15	-	" " "
Corn	Local	75	75	28	23	-	Split application of urea recommended at first 2 irrigations.
Potatoes	Local and Improved	120	80	40	35	-	Urea should be used 2 times, before 1st and 2nd irrigation to about 8-10 from plant.
Cotton	Improved	60	40	20	18	-	Half of the urea should be used at planting time and the other half after singling.
Sugar Beet	-	90 - 120	60-80	35	33	-	" " "

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ANNEX 5

AFGHAN FERTILIZER COMPANY

Assumptions for Seven Year Plan

1. The figures given for 1354 are according to AFC forecasts for sales, capital and expense budgets. The figures were approved by the Supreme Council.

Sales forecasts in 1355 and following years are an average between those which were provided by the Ministry of Agriculture for Urea and DAP and those forecast by AFC. AFC provided the sales forecasts for Potassium Sulphate and Agro-chemicals.

2. Selling Prices: For Urea - Afs 9600/ton and DAP - Afs 11,000/ton were established by the Supreme Council. These figures will not be changed during this 7 Year Plan. The selling price for Potassium Sulphate will be the same as the DAP selling price. Agro-chemical sales are based on AFC forecasts. A 20 - 23 percent gross margin based on sales is used.

3. Cost of Goods includes tons sold plus 1/2 of one percent of tons sold as an allowance for inventory losses. In the case of Agro-chemical sales, one percent allowance for losses is used. These losses are based on experiences in comparable business.

Included in Cost of Goods Sold is the Freight Allowance which is estimated to be Afs 80 per ton of fertilizer sold.

4. All Afghani figures are rounded to thousands (000).

5. The Conversion rate of afs 57 per \$ is used.

6. Interest expenses are based on payments due on long-term loans of \$19,500,000 and \$8,000,000. Additional money requirements will be provided through subsidies. Interest income is based on Time Deposits of Reserve Funds. The average amount on deposit is assumed to be Afs 400,000,000 and the rate 5 percent. Net interest expense is as follows:

\$ 19,500,000 @ 2% = \$ 390,000; 57 = afs 22,230 rounded	
8,000,000 @ 2% = 80,000; 57 =	<u>4,560</u>
	26,790
Less interest income 400,000,000 5%	<u>20,000</u>
Net interest expense	6,790

7. Principal Payments, which start 9½ years after the first interest payment which was made October 6, 1973 (Meezan 14, 1352) made by the Government or the subsidy will be increased by an equal amount. The first semiannual payments of approximately \$ 319,670 will not be due until April 13, 1983 (Jamal 17, 1362).

8. Purchases: All Urea will be purchased from the Mazar Plant to the extent of AFC storage capacity and to the extent of the production capability of 100,000 tons per year. When the 100,000 tons are exceeded, Urea will have to be imported. Consideration should be given to the construction of another urea plant or for expansion of the Mazar Plant. By 1357 sales exceed the capacity of the Mazar Plant and by 1361 sales are projected to be double that capacity. Lead time of 5-10 years will be required from exploration to completion of construction.

Consideration should be given to construction of a Diammonium Phosphate plant. Sources of phosphate are said to exist in Afghanistan. These sources should be located and surveys made to determine the feasibility of building such a plant.

For the purpose of this 7 Year Plan no new construction is assumed, and imports of urea are necessary.

	<u>Mazar Urea</u>		<u>Imported Urea</u>
\$ 115/Ton	6,555		Afs 10,260
	<u>1,200</u> av. ft. Rail Ft & unloading Ps		
		220	1,474
	<u>7,755</u> Cost of Mazar Urea	av. truck Ft	<u>800</u>
		<u>Cost of Urea Imported</u>	<u>12,534</u>

	<u>DAP</u>		<u>Potassium Sulphate</u>
CIF Karachi \$200/ton	11,400	\$180/ton	10,260
Rail Ft & unloading	1,474		1,474
Truck Ft	800		800
Cost of DAP	<u>13,674</u>	Cost of K <sub>2</sub> SO <sub>4</sub>	<u>12,534</u>

Purchases and sales of Potassium Sulphate will be insignificant until 1358 when 3,000 tons will be purchased to take care of 1359 sales. Agrochemical purchases will be equal to cost of goods.

9. Inventories: Ending inventories for 1354 will be the beginning inventories for 1355 valued at the purchase price mentioned in #8. Ending inventories, for years when urea is imported, will be valued at the Mazar Plant Cost plus freight.

Ending inventories for urea should be no less than 1/3 of the next years sales. Inventories for Potash and DAP preferable should be no less than 50% of the next years sales. Purchases in each year provide for increases in sales as well as additional inventory requirements.

10. Collection of Receivables Collected 1354

		Collected
<b>1354 Receivables</b>		
Due from wholesaler & Govt	10,286	10,286
Rec from Ag Bank 45%	393,871	177,242
Sales Cotton Program 1354 25%	199,675	49,919
Sales Wheat Program 1354	554,403	554,403
		<u>791,850</u>
<b>1355 Receivables</b>		
Rec from Ag Bank	216,629	216,629
Sales Cotton Program 1354	149,753	67,390
Sales 1355	1,023,800	1,026,800
		<u>1,310,819</u>
<b>1356 Receivables</b>		
Sales Cotton Program	82,333	82,336
Sales 1356	1,379,300	1,379,600
		<u>1,461,966</u>

1357 & following years Collection = Sales

11. Budgeted Expenses AFC 8% of Sales

Agro Chemical - as stated.

12. Ending Cash Balance - This is set at a/s 700,000. This amount is necessary to take care of the required purchases. It may have to be increased by 1357 when cash balances before subsidy are a negative amount.

13. Accounts Payable at Root 29, 1353

Paktia Project	30,460
Due on Urea from Russia	365,124
Due on Mazar Fert.	173,841
Interest to DAF Bank	30,530
Japanese DAP	<u>48,650</u>
Total	<u>648,605</u>

14. Cash on hand and Time Deposits at Root 29, 1353

Cash	126,214
Time Deposits	<u>424,495</u>
Total	<u>550,709</u>

AFGHAN FERTILIZER COMPANY  
Sales Information for 7 Year Cash Flow

Year	Type of Fertilizer	Sales in tons	Sales in Afs Rounded to Thousands	Expenses 8% of Sales	Depreciation	Interest	Capital Budget Outlay
1354	Urea @ 8,400	18,200	152,880				
	" @ 9,600	40,800	391,680				
	Total "	59,000	544,560				
	DAP @ 9,600	4,950	46,728				
	" @11,000	14,800	162,300				
	Total "	19,750	209,528				
Total		78,750	754,088	62,303	5,700	52,914	5,920
1st year							
1355	Urea @ 9,600	68,000	652,800				93,800
	DAP @11,000	34,000	374,000				86,250
	Total	102,000	1,026,800	82,144	8,450	6,790	7,550
2nd year							
1356	Urea @ 9,600	91,000	873,600				
	DAP @11,000	46,000	506,000				
	Total	137,000	1,379,600	110,368	12,004	6,700	51,000
3rd year							
1357	Urea @9,600	114,000	1,094,400				
	DAP @11,000	57,000	627,000				
	Total	171,000	1,721,400	137,712	14,579	6,700	64,850
4th year							
1358	Urea @ 9,600	141,000	1,353,600				
	DAP @11,000	70,000	770,000				
	Total	211,000	2,123,600	169,888	16,647	6,790	74,550
5th year							
1359	Urea @ 9,600	171,000	1,641,600				
	DAP @11,000	85,000	935,000				
	Potash @11,000	3,000	33,000				
	Total	259,000	2,609,600	208,768	18,469	6,790	60,850
6th year							
	Urea @ 9,600	206,000	1,977,600				
	DAP @11,000	103,000	1,133,000				
	Potash @11,000	5,000	55,000				
	Total	314,000	3,165,600	253,248	21,716	6,790	68,100
7th year							
	Urea @ 9,600	243,000	2,332,800				
	DAP @11,000	122,000	1,342,000				
	Potash @11,000	8,000	88,000				
	Total	373,000	3,762,800	301,024	24,334	6,790	68,600

Agrochemical Division

Information for 7 Year Plan

	<u>Sales</u>	<u>Cost of Goods</u>	<u>Operating Expenses</u>	<u>Depreciation</u>	<u>Capital Budget Outlay</u>
1355	46,850	36,300	6,500	287	1,564
1356	83,054	66,443	7,694	540	3,500
1357	113,218	86,375	11,104	961	4,912
1358	145,440	111,123	11,678	1,249	861
1359	175,099	134,079	11,898	1,304	253
1360	277,691	214,945	14,559	1,576	5,188
1361	318,412	246,120	15,330	1,848	25

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AFGHAN FERTILIZER COMPANY  
Cost of Sales 7 Year Projections

		1354		1st Year 1355		2nd Year 1356		3rd Year 1357	
		Tons	Afs	Tons	Afs	Tons	Afs	Tons	Afs
Beginning Inventory	Urea	60,016		40,721		52,381		60,926	
	DAP	20,533		40,284		38,164		31,934	
	K <sub>2</sub> SO <sub>4</sub>	-							
Purchases	Urea	40,000	310,200	80,000	620,400	100,000	775,500	100,000	775,500
	DAP	39,500	102,550	32,000	437,568	40,000	546,960	60,000	620,440
	K <sub>2</sub> SO <sub>4</sub>	-	-	-	-	-	-	-	-
	Ft. All		6,300		8,160		10,960		13,680
Total:			419,050		1,066,128		1,333,420		1,409,620
Available for Sale	Urea	100,016		120,721		152,381		160,926	
	DAP	60,133		72,284		78,164		91,934	
	K <sub>2</sub> SO <sub>4</sub>								
Total:									141,705
Cost of Goods Sold 100,5% of Sales in Tons	Urea	59,295	671,891	68,340	529,977	91,455	709,234	114,570	888,490
	DAP	19,849	433,175	34,120	466,557	46,230	632,149	57,285	783,315
	K <sub>2</sub> SO <sub>4</sub>		6,300		8,160		10,960		13,680
Total:			1,111,366		1,004,694		1,352,343		1,685,495
Ending Inventory	Urea	40,721		52,381		60,926		46,356	
	DAP	40,284		38,164		31,934		36,649	
Total Sales Ft. All 80 Afs/Ton		78,750		102,000		137,000		171,000	
		6,300		8,160		10,960		13,680	

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AFGHAN FERTILIZER COMPANY  
Cost of Sales 7 Year Projections

		4th Year 1358		5th Year 1359		6th Year 1360		7th Year 1361	
		Tons	Afs	Tons	Afs	Tons	Afs	Tons	Afs
Beginning Inventory	Urea	46,356		38,651		70,796		82,766	
	DAP	36,643		43,299		51,874		62,359	
	K <sub>2</sub> SO <sub>4</sub>			3,000		2,985		3,960	
Purchases		54,000	676,836	84,000	1,052,856	119,000	1,491,546	158,000	1,980,372
	Urea	100,000	775,500	100,000	775,500	100,000	775,500	100,000	775,500
	DAP	77,000	1,052,898	94,000	1,255,356	114,000	1,558,896	134,000	1,832,316
32,000 Loan 7,500 UN									
	K <sub>2</sub> SO <sub>4</sub>	3,000	37,602	3,000	37,602	6,000	75,204	10,000	125,340
Ft. All			16,880		20,720		25,120		29,540
Total:			2,559,716		3,172,034		3,926,206		4,743,368
Available for Sale									
	Urea	200,356		242,651		289,796		340,766	
	DAP	113,649		137,299		165,874		196,359	
	K <sub>2</sub> SO <sub>4</sub>	3,000		6,000		8,985		13,960	
Total:			171,855		207,030		244,215		
Cost of Goods Sold		54,000	676,836	84,000	1,052,856	119,000	1,491,546	158,000	1,980,372
100, 5% of Sales in tons	Urea	87,705	680,152	87,855	681,316	88,030	682,673	86,215	668,597
	DAP	70,350	961,966	85,425	1,168,101	103,515	1,415,464	122,610	1,676,569
	K <sub>2</sub> SO <sub>4</sub>	-		3,015	37,790	5,025	62,983	8,040	100,773
Ft. All			16,880		20,200		25,120		29,400
Total:			2,335,834		2,990,783		3,677,756		4,456,151
Ending Inventory	Urea	58,651		70,796		82,766		96,551	
	DAP	43,299		51,874		62,359		73,749	
		3,000		2,985		3,960		5,920	
Total Sales		211,000		259,000		314,000		373,000	
Ft. All 80 Afs/ton		16,880		20,720		25,120		29,540	

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AFGHAN FERTILIZER COMPANY  
Profit and (loss) 7 Year Projections

	1354			1355			1356			1357		
	AFC	Ag-Chem	Total	AFC	Ag-Chem	Total	AFC	Ag-Chem	Total	AFC	Ag-Chem	Total
Sales	754,088	8,040	762,128	1,026,800	46,850	1,073,650	1,379,800	83,054	1,462,854	1,721,400	113,218	1,834,618
Less Cost of Sales	<u>1,111,366</u>	<u>6,030</u>	<u>1,117,396</u>	<u>1,004,694</u>	<u>36,300</u>	<u>1,040,994</u>	<u>1,352,343</u>	<u>66,443</u>	<u>1,418,786</u>	<u>1,675,665</u>	<u>86,375</u>	<u>1,771,660</u>
Gross (Loss) on Sales	(357,278)	2,010	(355,268)	22,106	10,550	32,656	27,257	16,611	43,868	35,735	26,843	62,758
Operating Expenses	62,303	3,637	65,940	82,144	6,500	88,644	110,368	7,694	118,062	137,712	11,104	148,816
Depreciation	5,700	132	5,832	8,450	287	8,737	12,094	540	12,634	14,579	961	15,540
Interest	<u>52,914</u>		<u>52,914</u>	<u>6,790</u>	-	<u>6,790</u>	<u>6,790</u>	-	<u>6,790</u>	<u>6,790</u>	-	<u>6,790</u>
Total Expenses	120,917	3,769	124,686	97,384	6,787	104,171	129,252	8,234	237,456	159,091	12,065	171,146
Net (Loss)	(478,195)	(1,759)	(479,954)	(75,278)	(3,763)	(71,515)	(101,995)	(8,577)	(93,618)	(123,166)	(14,778)	(108,388)
Cash Flow and Required Subsidy												
Cash Balances	550,709	-	550,709	700,000	-	700,000	850,693	-	850,693	734,132	-	734,132
Collection of Receivables	<u>791,850</u>	<u>8,040</u>	<u>799,890</u>	<u>1,310,819</u>	<u>46,850</u>	<u>1,357,669</u>	<u>1,379,669</u>	<u>83,054</u>	<u>1,462,654</u>	<u>1,721,400</u>	<u>113,218</u>	<u>1,834,618</u>
Total Available Cash	1,342,559	8,040	1,350,599	2,010,819	46,850	2,057,669	2,230,293	83,054	2,313,347	2,455,532	113,218	2,568,750
Out Flow of Cash												
Budgeted Expenses	62,303	3,637	65,940	82,144	6,500	88,644	110,368	7,694	118,062	137,712	11,104	148,816
Interest Expenses	52,914	-	52,914	6,790	-	6,790	6,790	-	6,790	6,790	-	6,790
Accounts Payable	646,605	-	646,605	-	-	-	-	-	-	-	-	-
Purchase & Ft. All	419,050	6,030	425,080	1,066,128	36,300	1,102,428	1,333,420	66,443	1,399,863	1,409,620	86,375	1,495,995
Capital Budget	<u>5,920</u>	<u>2,089</u>	<u>8,009</u>	<u>7,550</u>	<u>1,561</u>	<u>9,114</u>	<u>51,000</u>	<u>3,500</u>	<u>54,500</u>	<u>64,850</u>	<u>4,912</u>	<u>69,762</u>
Total Out Flow	1,186,792	11,756	1,198,548	1,162,612	44,364	1,206,976	1,501,578	77,637	1,579,215	1,614,972	102,391	1,721,363
Cash Balance	155,767	(3,716)	152,051	848,207	2,486	850,693	728,715	5,417	734,132	836,560	10,827	847,387
Amount Required to Restore Balance to Afs 700,000(Subsidy)			<u>547,949</u>			<u>No Subsidy</u>			<u>No Subsidy</u>			<u>No Subsidy</u>
Ending Balance			<u>700,000</u>			<u>850,693</u>			<u>734,132</u>			<u>847,387</u>

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AFGHAN FERTILIZER COMPANY  
Profit and (loss) 7 Year Projection

	1358			1359			1360			1361		
	AFC	Ag-Chem	Total									
Sales	2,123,600	145,440	2,269,040	2,609,600	175,099	2,784,699	3,165,600	277,691	3,443,291	3,762,800	318,412	4,081,212
	<u>2,335,834</u>	<u>111,123</u>	<u>2,446,957</u>	<u>2,960,783</u>	<u>134,079</u>	<u>3,094,862</u>	<u>3,677,788</u>	<u>214,945</u>	<u>3,892,733</u>	<u>4,456,151</u>	<u>246,120</u>	<u>4,702,271</u>
Gross (Loss) on Sales	(212,234)	(34,317)	(177,917)	(351,153)	(41,020)	(310,163)	(512,189)	(62,745)	(449,440)	(608,351)	(72,292)	(681,059)
Operating Expenses	169,888	11,678	181,566	208,768	11,898	220,666	233,248	14,559	267,807	301,024	15,330	316,354
Depreciation	16,647	1,249	17,896	18,459	1,394	19,773	21,716	1,576	23,292	24,334	1,845	26,185
Interest	6,790	-	6,790	6,790	-	6,790	6,790	-	6,790	6,790	-	6,790
Total Expenses	<u>193,325</u>	<u>12,927</u>	<u>206,252</u>	<u>234,027</u>	<u>13,292</u>	<u>247,229</u>	<u>261,754</u>	<u>16,135</u>	<u>297,889</u>	<u>332,148</u>	<u>17,175</u>	<u>349,326</u>
Net (Loss)	(405,559)	(21,390)	(384,169)	(585,210)	(27,318)	(557,392)	(793,940)	(46,611)	(747,329)	(1,025,489)	(17,175)	(970,385)
Cash Flow and Required Subsidy												
Cash Balances	847,337	-	847,337	700,000	-	700,000	700,000	-	700,000	700,000	-	700,000
Collection Of Receivables	<u>2,123,600</u>	<u>145,440</u>	<u>2,269,040</u>	<u>2,609,600</u>	<u>175,099</u>	<u>2,784,699</u>	<u>3,165,600</u>	<u>277,691</u>	<u>3,443,291</u>	<u>3,762,800</u>	<u>318,412</u>	<u>4,081,212</u>
Total Available Cash	<u>2,970,987</u>	<u>145,440</u>	<u>3,116,427</u>	<u>3,309,600</u>	<u>175,099</u>	<u>3,484,699</u>	<u>3,865,600</u>	<u>277,691</u>	<u>4,143,291</u>	<u>4,462,800</u>	<u>318,412</u>	<u>4,781,212</u>
Out Flow of Cash												
Budgeted Expenses	169,883	11,678	181,566	208,768	11,898	220,666	233,248	14,559	267,807	301,024	15,330	316,354
Interest Expenses	6,790	-	6,790	6,790	-	6,790	6,790	-	6,790	6,790	-	6,790
Accounts Payable	-	-	-	-	-	-	-	-	-	-	-	-
Purchase & Ft. All	<u>2,559,716</u>	<u>111,123</u>	<u>2,670,839</u>	<u>3,172,034</u>	<u>134,079</u>	<u>3,306,113</u>	<u>3,926,206</u>	<u>214,945</u>	<u>4,141,151</u>	<u>4,743,368</u>	<u>246,120</u>	<u>4,989,488</u>
Capital Budget	<u>74,550</u>	<u>861</u>	<u>75,411</u>	<u>69,850</u>	<u>253</u>	<u>70,103</u>	<u>68,100</u>	<u>5,185</u>	<u>73,285</u>	<u>68,600</u>	<u>25</u>	<u>68,625</u>
Total Out Flow	<u>2,810,944</u>	<u>123,662</u>	<u>2,934,606</u>	<u>3,443,442</u>	<u>146,230</u>	<u>3,589,672</u>	<u>4,254,344</u>	<u>234,692</u>	<u>4,489,036</u>	<u>5,119,782</u>	<u>261,475</u>	<u>5,381,257</u>
Cash Balance	(160,043)	21,778	181,821	(138,842)	28,869	(109,973)	(388,744)	42,999	(345,745)	(659,982)	56,937	(600,045)
Amount Required to Restore Balance to Afs 700,000(Subsidy)			<u>518,179</u>			<u>809,972</u>			<u>1,045,745</u>			<u>1,300,045</u>
Ending Balance			<u>700,000</u>			<u>700,000</u>			<u>700,000</u>			<u>700,000</u>

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## Environmental Impact Statement

The environmental aspects of fertilizer use in Afghanistan has been addressed by A. I. D. in its current \$8.0 million Agricultural Inputs Loan 306-T-019. The analysis pointed out that the adverse effects of fertilizers occur when nitrates and phosphates are released into surface and ground waters but that there are no adverse effects on the soil or air from the use of these fertilizers.

In Afghanistan there are few standing bodies of water that receive any significant runoff from cultivated land and the use of fertilizers to date has not had any adverse effects on these waters. Similarly, there has been no known adverse effects by the increase of nitrate content of the drinking water in Afghanistan.

It is not anticipated that there will be any significant adverse effects on surface and ground water by the small amounts of fertilizer normally applied in Afghanistan. The beneficial effects of the application of fertilizer to the crops of Afghanistan far outweighs the potential and unproven adverse effects on the water resources of the country.

For similar considerations, as in the case of fertilizer use, the desire by the Government of Afghanistan to increase its food production and correspondingly its standard of living has led the Government on a course of action to incorporate into its unsophisticated rural agricultural economy the modern chemical disease and pest control compounds of pesticides, insecticides, herbicides, and fungicides. This unilateral Government action has not adequately considered the environmental consequences and human health hazards associated with the use of such compounds. Although the Ministry of Agriculture and Ministry of Public Health have some technically qualified personnel, these individuals are not in policy positions to direct and ensure the proper and safe application of chemical compounds.

To achieve some degree of control, the Government through the Supreme Council of the AFC directed that based on the technical advise of the Ministry of Agriculture, the AFC will purchase, store, distribute and educate, along with the Extension Department of the Ministry of Agriculture, Afghan farmers in the proper use and application of the above chemical compounds. Based on cautions expressed by USAID Afghanistan, UN advisors, and previous

U.S. management advisors to the AFC, the AFC management realized that an action program must be developed to educate its staff and retailers in the safe and proper handling of compounds, many of which are hazardous and toxic.

It is not a question of whether the Government should consider the use of pesticides, insecticides and other crop disease control compounds, this decision has been made whether prudently or not, by the Government. The point is, how can AID best assist in such circumstances? The request for an Agro-chemical Advisor is recognition by the AFC for the need of such guidance not only for the internal handling and operations within the AFC, but the need to develop a program and a system to educate the farmer through AFC retailers in the safe and proper application of these chemical compounds.

## SUMMARY OF FERTILIZER TRIALS

TABLE 8-1--- Irrigated Wheat Response to Various Fertilizer Treatments, 1968 - 69 Trials\*

No.	Treatment:	Mean Yield of Wheat (Kgs/ha)	Mean Increase in Wheat Yield Above (Kgs/ha)
	N - P (Kgs/ha)		
1	0-0	2,190	0
2	0-40	2,190	0
3	0-60	2,519	329
4	0-80	2,628	438
5	0-100	2,409	219
6	67-0	2,884	694
7	67-40	3,212	1,022
8	67-60	3,395	1,205
9	67-80	3,285	1,095
10	67-100	3,395	1,205
11	133-0	3,176	986
12	133-40	3,723	1,533
13	133-60	3,650	1,460
14	133-80	3,869	1,679
15	133-100	4,125	1,935
16	200-0	3,103	913
17	200-40	3,796	1,606
18	200-60	4,088	1,898
19	200-80	4,344	2,154
20	200-100	4,380	2,190

\* Source: P. M. Tamboli, Soil Fertility and Fertilizer Use, Report to the Government of Afghanistan, FAO/UN Rome, 1971. Data to compute Standard Deviations not available.

TABLE 8-2 -- Irrigated Wheat Response to Various Fertilizer Treatments, 1969 Trials\*

	(1)	(2)	(3)	(4)	(5)
	Treatment	Mean Yield	Mean Increase	Standard	Co-
No.	N - P - K (Kgs/ha)	of Wheat (Kgs/ha)	in Wheat Yield Above Treat- ment # 1 (Kgs/ha)	Deviation of Col. (2)	efficient Variation
1	0-0-0	1279	-	218	17.0
2	75-0-0	1530	251	177	11.6
3	150-0-0	1741	462	189	10.9
4	0-75-0	1549	270	246	15.9
5	0-150-0	1644	365	270	16.4
6	75-75-0	2582	1303	329	12.7
7	75-150-0	2229	950	255	11.5
8	150-75-0	2359	1080	144	6.1
9	150-150-0	4295	3016	901	21.0
10	0-75-100	1713	434	324	18.9
11	75-75-100	2603	1324	309	11.9
12	150-150-100	4256	2977	872	20.5

\* Source: P.M. Tamboli, Soil Fertility and Fertilizer Use, Report to the Government of Afghanistan, FAO/UN, Rome, 1971. For this and the following table, the standard deviations are not based upon observations on individual plots for a given treatment, but rather the averages of all plots, by province, for a given treatment. Thus, the number of observations for each treatment is the number of provinces in which the trials were conducted and the value of each observation is the mean yield for all plots of the given treatment in the province. It is thus very likely that there has been substantial smoothing of the data and the standard deviations are likely substantially smaller than they would be if observations were on individual plots.

TABLE 8-3 -- Irrigated Wheat Response to Various Fertilizer Treatments, 1970 Trials\*

(1)	(2)	(3)	(4)	(5)
Treatment N - P - K No. (Kgs/ha)	Mean Yield of Wheat (Kgs/ha)	Mean Increase in Wheat Yield Above Treat- ment #1 (Kgs/ha)	Standard Deviation of Col. (2)	Co- efficient of Variation
1 0-0-0	1736	-	161	9.2
2 75-0-0	2321	585	180	7.7
3 150-0-0	2613	377	263	10.1
4 0-75-0	2044	308	224	11.0
5 0-150-0	2315	579	420	18.2
6 75-75-0	3569	1833	370	10.4
7 75-150-0	2930	1194	255	8.7
8 150-75-0	3008	1272	359	11.9
9 150-150-0	4196	2460	376	9.0
10 0-75-100	2082	346	219	10.5
11 75-75-100	3628	1892	449	12.4
12 150-150-100	4316	2580	416	9.6

\* Source: P. M. Tamboli, "Annual Report (1969-70, Soil Fertility and Fertilizer Experiments on Wheat in Afghanistan", Ministry of Agriculture and Irrigation, Kabul, Afghanistan (no date). 283 trials in 10 provinces

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TABLE 8-4 -- Irrigated Wheat Response to Various Fertilizer Treatments, 1974 Trials\*

	(1)	(2)	(3)	(4)	(5)
	Treatment	Mean Yield	Mean Increase	Standard	Co-
	N - P - K	of Wheat	in Wheat Yield	Deviation	efficient
No.	(Kgs/ha)	(Kgs/ha)	Above Treat- ment # 1 (Kgs/ha)	of Col. (2)	Variation
1	0-0-0	2037	-	901	44.3
2	95-40-0	2669	632	618	23.2
3	134-40-0	3167	1130	887	28.0
4	174-40-0	2945	908	1110	37.7
5	102-60-0	2930	893	891	30.4
6	142-60-0	3605	1568	920	25.5
7	181-60-0	3296	1259	1167	35.4
8	110-80-0	3060	1023	704	23.0
9	150-80-0	3537	1500	1033	29.2
10	190-80-0	3904	1867	1128	28.9

\* Source: AFC. 10 trials for each treatment; urea and DAP were used.

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