Proj. 306 0163 (2)
Pd
PD-AAD-017-B1

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: [A] (A = ADD, C = CHANGE, D = DELETE)

2. DOCUMENT CODE: J

3. COUNTRY/ENTITY: Afghanistan

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 306-0163

6. BUREAU/OFFICE: A. SYMBOL: NE; B. CODE: 03

7. PROJECT TITLE (Maximum 40 characters): Integrated Wheat Development (Phase II

8. ESTIMATED FY OF PROJECT COMPLETION: FY 81

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 77; B. QUARTER 1 (1, 2, 3, or 4); C. FINAL FY 80

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 1977 B. FX	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	C	G
AID APPROPRIATED TOTAL						
(GRANT)	500		500	4,378		
(LOAN)						
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY				1,492		
OTHER DONOR(S)						
TOTALS	500		500	5,870		

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. 1ST FY 77 F. GRANT	G. LOAN	H. 2ND FY 78 I. GRANT	J. LOAN	K. 3RD L. GRANT
(1) FN	143B	073		500		1,861		-
(2)								
(3)								
(4)								
TOTALS				500		1,861		

A. APPROPRIATION	N. 4TH FY 80 O. GRANT	P. LOAN	Q. 5TH FY 81 R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN	V. FUTURE YEAR OBLIGATION
(1) FN	2,017		-		4,378		
(2)							
(3)							
(4)							
TOTALS	2,017		-		4,378		

MM: 10

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

[1] 1 = NO, 2 = YES

BEST AVAILABLE COPY

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: James W. Bonner

TITLE: Acting RD/AGR

DATE SIGNED: MM 08 DD 22 YY 77

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-78)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

1. TRANSACTION CODE: [A] A = ADD, C = CHANGE, D = DELETE — PAF
2. DOCUMENT CODE: 5
3. COUNTRY/ENTITY: AFGHANISTAN
4. DOCUMENT REVISION NUMBER: [-]
PROJECT NUMBER (7 digits): [306-0163]
6. BUREAU/OFFICE: A. SYMBOL: NE; B. CODE: [03]
7. PROJECT TITLE (Maximum 40 characters): [Integrated Wheat Development (Phase I)]
PROJECT APPROVAL DECISION — ACTION TAKEN: [A] A = APPROVED, D = DISAPPROVED, DE = DEAUTHORIZED
9. EST. PERIOD OF IMPLEMENTATION: YRS. [0 4] QTRS [1]

10. APPROVED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 77 F. GRANT	E. 1ST FY 77 G. LOAN	H. 2ND FY 78 I. GRANT	H. 2ND FY 78 J. LOAN	K. 3RD FY 79 L. GRANT	K. 3RD FY 79 M. LOAN
1) FN	143 B	073		500		1,861		-	
2)									
3)									
4)									
TOTALS				500		1,861		-	

A. APPROPRIATION	N. 4TH FY — O. GRANT	N. 4TH FY — P. LOAN	Q. 5TH FY — R. GRANT	Q. 5TH FY — S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
1) FN	2,017		-		4,378	
2)						
3)						
4)						
TOTALS	2,017		-		4,378	

11. PROJECT FUNDING AUTHORIZED (ENTER APPROPRIATE CODE(S)) 1 = LIFE OF PROJECT, 2 = INCREMENTAL, LIFE OF PROJECT: V. GRANT = 2; W. LOAN
C. PROJECT FUNDING AUTHORIZED THRU: FY [8 0]

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED ($000)
B. ALLOTMENT REQUEST NO. ____

APPROPRIATION	C. GRANT	D. LOAN
FN	500	
TOTALS	500.	

13. FUNDS RESERVED FOR ALLOTMENT
TYPED NAME (Chief, REDTE/M/FSD)
SIGNATURE
DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES: [X] 000 [ ] 941 [ ] LOCAL [ ] OTHER ____
15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

BEST AVAILABLE COPY

FOR AID/W USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE MM DD YY	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE MM DD YY

AID 1330-8 (3-78)

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

ASSISTANT
ADMINISTRATOR

PROJECT AUTHORIZATION
AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country: Afghanistan

Name of Project: Integrated Wheat Development

Number of Project: 306-0163

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to Afghanistan, (the "Cooperating Country") of not to exceed Five Hundred Thousand United States Dollars ($500,000) (the "Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The project consists of assisting the Cooperating Country in establishing an integrated regional research and extension system for wheat in Baghlan that will assemble, test, and diffuse at least three efficient wheat production packages, based primarily on improved seeds and fertilizer application, capable of increasing yields on irrigated lands farmed by farmers who are not realizing the full potential from high yielding varieties. By the end of Phase I, the project also expects that at least ten dryland varieties will have been developed and will be ready for field testing in Baghlan. The project will finance technical assistance, participant training, commodities and construction services.

I approve the total level of A.I.D. appropriated funding planned for this project of not to exceed Four Million Three Hundred Seventy-eight Thousand United States Dollars ($4,378,000), including the $500,000 authorized above, during the period FY 1977 through FY 1980. $3,878,000 will be available for additional increments during the period of Grant funding subject to the availability of funds in accordance with A.I.D. allotment procedures.

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

other terms and conditions as A.I.D. may deem appropriate:

a. Source and Origin of Goods and Services

Goods and services financed by A.I.D. under the Project shall have their source and origin (except as provided below) in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

b. Initial Conditions Precedent

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

1) Evidence of the official establishment of a National Wheat Committee;

2) Evidence of the appointment of a Baghlan Center Director.

3) Evidence of rental and operation of temporary office and training space in Baghlan and adequate housing for technical assistance contract team.

c. Additional Conditions

1) Prior to making funds available for construction of the Baghlan Research Center, the Cooperating Country shall furnish a firm cost estimate and necessary plans required under Section 611 for A.I.D. approval;

2) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, for construction of the Baghlan Research Center, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance acceptable to A.I.D. evidence that the Ministry of Agriculture (MOA) has made available sufficient funds for site preparation, operation and staffing of the Center.

3) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, for the first five offices/residences to be financed under the Grant, the Cooperating Country shall, except as A.I.D.

may otherwise agree in writing, furnish in form and substance acceptable to A.I.D. evidence that a) sites acceptable to A.I.D. for the first ten offices/residences have been chosen; b) extension agents have been selected to serve in ten village level installations; and c) the MOA funds have been budgeted for operation/maintenance of those installations.

4) Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement, for the last five offices/residences to be financed under the Grant, the Cooperating Country shall, except as A.I.D. may otherwise agree in writing, furnish in form and substance acceptable to A.I.D. evidence that a) five offices/residences in addition to the five financed under the Grant have been constructed, staffed and operational; b) suitable locations have been chosen for the entire group of twenty offices/residences; c) extension agents have been selected to serve in all twenty village level installations; and d) MOA funds have been budgeted for operation/maintenance of those installations.

d. The following waivers to A.I.D. regulations are hereby approved:

1) A waiver to Code 935 for the procurement of self-propelled plot threshers at approximate value of $72,000;

2) A waiver of the origin requirements for shelf items for the local cost component of the project. Local source in normal commercial channels will be the only requirement for commodity eligibility.

Joseph C. Wheeler
Bureau for Near East

September 20, 1977
Date

TABLE OF CONTENTS

SUMMARY

A. Recommendations

Grant $4,378,000

Waivers:

1. Source/origin for plot threshers from non-U.S. sources.
2. Source/origin componentry for local cost financing.
3. Host country contracting requirements.

B. Introduction and Summary Project Description

Agriculture is the key sector in the economy of Afghanistan. Over 85 percent of the population depends upon it for their livelihood, and it accounts for over 50 percent of GDP and 74 percent of exports. Afghanistan's harsh climate, rugged topography, and poor natural resource endowment impose serious obstacles to development of this sector. The continental climate, with its hot, dry summers and cold winters, limits the growing season and necessitates extensive irrigation. Rugged mountains and deserts account for about 80 percent of Afghanistan's 636,000 square kms, and much of the remaining land is unsuitable for agriculture without irrigation. Traditional farmers rely upon either seasonal diversion of river water, springs, wells or ancient, underground canal systems, and many farmers leave up to half their land fallow for lack of assured water supply. Afghanistan's dependence upon water supply chiefly from melted snow and inadequate irrigation systems makes its agriculture vulnerable to drought. Such phenomena followed by characteristically cold winters cause particular hardships for the predominantly rural population. Slow growth of the sector is due primarily to these physical constraints.

For analytical purposes, it is useful to classify the agricultural area into three categories: fully irrigated land which has a controlled or semi-controlled water supply sufficient to allow irrigated cultivation throughout the summer; partially irrigated land on which supplemental irrigation from snow-melt is possible in the spring and early summer, but not in the period, July-September; and rainfed agriculture based entirely on rainfall and snow. The area of land in each of these categories can only be crudely estimated: perhaps 1.0 million hectares could be classified as fully irrigated with maybe 1.5 million hectares classified as partially irrigated. The area of rainfed is generally estimated to be around 2.5 million hectares.

The production potential for the farmers in the three categories of land is quite different. On fully irrigated land, summer or winter crops can be grown. There is potential for double cropping, and the risk of crop failure is minimal. The main constraints to production increases are inadequate irrigation distribution and drainage systems, inefficient water use, low intensity of land use, seasonal labor and power shortages, low levels of input use, lack of production and development credits and limited technical knowledge. On the partially irrigated land, on the other hand, only winter crops (predominantly wheat) can be grown with any degree of security; and even for this water supply is poorly controlled. Production potential on rainfed land is also largely restricted to wheat, but variations in precipitation increase the risk of crop failure and limit the yield response to fertilizer.

In the agricultural sector of the Afghan economy, wheat production employes the greatest number of farmers and provides their principal means of income and subsistence. Wheat is grown in all parts of the country where irrigated or rainfed production is possible. It accounts for 60% of the total area under all crops and is by far the most important crop in terms of total production. The total area under wheat is about 2.4 million ha. of which 1.3 million is irrigated. Most farmers grow some wheat to ensure a basic food supply for their families, while the small, poorer farmers grow nothing but wheat.

Wheat, therefore, offers the key to increased agricultural production and farmer incomes. For farmers with fully irrigated land, who are generally the more prosperous farmers by virtue of good access to water and other necessary production inputs, increased wheat yields will permit them to meet their food consumption needs with less land, thus freeing more land for diversification into higher value crops. For farmers with partially irrigated land, who constitute a large number of relatively poorer farmers with varying production constraints, some insurmountable, higher wheat yields can mean more income from wheat. For farmers on rainfed land who represent generally the poorest farmers excepting those with sizeable holdings, improved productivity in wheat can translate immediately into more food for their families and potentially a cash income from the sale of suplus production.

Dryland wheat, upon which the subsistence of a majority of marginal farmers depends, is the critical factor in national wheat production, which averages around 2.8 million mt. annually. Fluctuations of 200,000 to 300,000 metric tons nationally owing to inconsistencies in climatic conditions closely parallel the national wheat production deficit in any given year.

Irrigated wheat yields remain well below the potential prescribed by the water supply and can be increased through wider adoption of high yielding varieties and production packages adapted to local conditions and farmer constraints. To ensure sustained yields the genetic base of irrigated wheat varieties now used must be broadened to avoid deterioration of yield potentials and in order to decrease the chances of severe wheat rust infestation which could have a disastrous effect on national wheat production and income and life itself.

Dryland wheat yields can be raised through the introduction of drought resistent varieties and appropriate production packages, stressing improved cultivation and fallowing techniques. These varieties and techniques are poorly developed in Afghanistan.

The objectives of Afghanistan's program of agricultural and rural development implicitly recognize the key role of wheat in the process. The Seven Year Plan seeks:

i) expansion of agricultural production and value added;

ii) assurance of an adequate supply of staple foodstuffs, particularly wheat;

iii) improvement in incomes and standards of living in rural areas and a reduction in the inequality of income distribution;

iv) generation or saving of foreign exchange through growth of exports or import substitution; and

v) generation of revenues to finance government programs.

These objectives are all valid given the structure of the economy, the size of the rural population, and the social and economic aims of the Republican Government. Simultaneous pursuit of all the objectives outlined above, however, is unrealistic, and priorities will have to be set based on analysis of the trade-offs among these objectives.

An agricultural development program that emphasizes measures to raise productivity in high-potential agricultural areas is likely to achieve improvements in agricultural production and value added but at the cost of worsening the distribution of income in the rural sector overall. Conversely, excessive emphasis on social programs to reduce inequities and improve living standards in the poorest rural areas could lead, in the short- and medium-term, to a stagnation of agricultural production that will be reflected throughout the economy. If priority is given to the production of wheat, self-sufficiency in this staple may be achieved, but at the expense of production of other higher value crops with a consequent slower growth in agricultural value added.

AID is particularly interested in supporting a suitable income and income distribution strategy in the agricultural sector. Any such strategy must recognize the aforementioned importance of wheat especially to the poorest farmer and the income generation potential of alternative crops. In order to address both the equity and income aspects in it, the following strategy can be identified:

i) promotion of wheat production on rainfed land through initiation of basic varietal research; the identification of appropriate associated technology; the support of production oriented extension compaigns; and the introduction of a wheat stabilization program to ensure incentive prices.

ii) Intensification of wheat production on partially irrigated land through acceleration of adaptive varietal research and identification of appropriate technological packages; rapid expansion in use of fertilizer and improved seed; improvement and expansion of credit facilities; and the introduction of intensive production-oriented extension campaigns.

iii) promotion of intensification and diversification through cultivation of high-value cash crops on well-irrigated land through development of alternative crops, completion of irrigation distribution and drainage systems; improved water control; rapid increase in use of fertilizers, improved seeds and plant chemicals; expansion of credit for production and development purposes; selective mechanization; removal of indirect taxes; and expansion of processing facilities.

iv) recognizing that some wheat production will continue in the short-run on well irrigated land, recognizing the vulnerability of that production to varietal disease attack, and recognizing the short-term necessity and opportunity for wheat productivity increases on irrigated land, expansion of the genetic base of irrigated seeding through acceleration of adaptive varietal research and the introduction of resulting seed through intensive extension campaigns.

As a first step towards implementing this strategy, AID proposes a Phase I effort directed to integrated wheat production. The first phase would:

i) undertake a basic research program directed at rainfed wheat production.

ii) initiate adaptive varietal research directed to partially-irrigated wheat production and identify

associated technological packages for rapid dissemination through initiation of an intensive production-oriented extension campaign.

III. initiate adaptive varietal research directed to broadening the genetic base of irrigated seed and increasing productivity through intensive extension campaigns in irrigated areas to assure distribution and acceptance of improved seed.

Full implementation of this strategy will also require that attention be focused on the development of alternative crops in subsequent phases. The IBRD has recently appraised and basically accepted a project relating to fruits, nuts, and vegetables.

There is a long history of U.S. assistance to agricultural extension and research dating back to 1954, which included efforts directed at accelerated wheat production beginning in 1966. While some of the substantial increases in Afghan wheat production may be attributable to these efforts, the shotgun approach followed in the past does not appear to have been very cost effective or successful in institutionalizing improvements in the research and extension networks. Past assistance was far too ambitious in scope, overly concerned with national institutional development, neglectful of the rainfed areas and indiscriminate with regard to the distribution of benefits among farmers. The introduction of high yielding wheat varieties benefited most the farmers who did not face the constraints of insufficient water, farm size, lack of credit, inadequate access to fertilizer and markets, which confront the majority of Afghan farmers.

Phase I recognizes that given current administrative deficiencies it is not feasible to develop effective comprehensive national research and extension systems for the short and medium terms. This fact coupled with the lessons of the past dictates a cautious phased approach that first concentrates on adaptive research in wheat and on devising and implementing simple, proven production campaigns at the regional level, based on local cropping patterns, practices, and conditions. Available extension personnel can be more effectively used and skills upgraded through in-service training at the field level. A key concern must be to develop packages that are appropriate to farmers with some of the constraints discussed above.

Accordingly, Phase I plans to use one province as its testing ground, before attempting an expanded regional production effort. Baghlan

Province in northern Afghanistan possesses a number of desirable characteristics in this respect. First it includes fully irrigated, partially irrigated and rainfed wheat lands over large areas. A full range of farmers from most to least progressive live in Baghlan. Alternative crops (e.g., cotton, sugar beets, rice) are already available and market outlets exist. Land tenure is reasonably equitable. A research station already exists which can serve as a center for a large part of northern Afghanistan where much of the country's dryland wheat is produced. Finally, a number of service agencies needed to support the project (e.g., Afghan Fertilizer Company, Agricultural Development Bank, Afghan Seed Company) are represented.

Phase I of this project is specifically aimed at establishing a functioning, integrated regional research and extension system in Baghlan that will assemble, test, and diffuse at least three efficient wheat production packages, based primarily on improved seeds and fertilizer application, capable of increasing yields on partially irrigated and fully irrigated lands, farmed by farmers who are not realzing the full potential from high yielding varieties. By the end of Phase I the project also expects that at least ten dryland varieties will have been developed and will be ready for field testing in Baghlan.

USAID has available to implement the donor portion of the project the services of a consortium of Mid-West land-grant universities (Kansas, Iowa, Missouri and Nebraska) under Title XII. These Universities can provide well-qualified scientists and supporting facilities to assist in a wheat development effort. Kansas and Nebraska are particularly advanced in dryland wheat research, and all of the states have done research on irrigated wheat.

The Ministry of Agriculture will be the responsible GOA agency for the Project. Implementation will be principally the responsibility of the Departments of Research and Extension of the Ministry, with advisory, training and financial assistance provided by AID through the consortium. Success of the project will depend on support and cooperation from several other Afghanistan agencies, including the Afghan Fertilizer Company, the Agricultural Development Bank and the Afghanistan Seeds Company. Particularly as the project goes into the second phase and the impact on total wheat production and prices become substantial, close linkages with the agency responsible for wheat supply and price stabilization will become important. The British are already considering undertaking a grain stabilization program.

C. Summary Findings from Project Analyses

1. The project is believed to be technically feasible in that high yielding irrigated varieties are available for release at the Kabul Resear Station, more drought resistent varieties can be readily obtained from the international research network, and technological packages adapted to agro climatic conditions in Baghlan can be developed for irrigated wheat. Simple changes in cultural practices (e.g., weed control, clean seed, proper planting date) along with recommendations for fertilizer rates and time can demonstrate immediate impact to the farmers adopting these practices. More effective use of MOA research and extension personnel can be made through in-service training and field experience in adaptive research and regional wheat extension campaigns.

2. The project is not expected to have any adverse effect on the environment. Therefore, an Environmental Impact Assessment is not recommended.

3. The project is socially sound in that it is initially focused on t farmers on the partially irrigated land in Baghlan who represent a broad range of social, economic and ethnic groupings with the majority being smal farmers. Ultimately, the project is directed at the dryland farmers who generally constitute the poorest strata. The project accepts the social constraints imposed by a traditional local power structure which controls water rights and seeks to diminish their impact through improved technolo rather than direct manipulation of the social structure. The project will not directly enhance women's participation in the development process sinc traditionally most Afghan women are excluded from the agricultural cycle except at harvest time. But benefits can be expected to accrue to women i the form of more food and income for their families and the greater opportunities they afford.

4. The project is economically feasible registering an internal rate of return in the range of 40 % and offering good prospects for widespread economic benefits over time. Under reasonable assumptions concerning the introduction and diffusion of new technology, production of irrigated wheat in B ghlan could increase by more than 42,000 metric tons or 28% by 1988. The median per capita farm income in Baghlan Province probably does not exceed $100. Net farm income from wheat could be increased by 80% for a farmer with two hectares in wheat if target yields are achieved.

5. The project i financially feasible since the recurrent costs of the project will not be a burden to the GOA, at least in Phase I. Additional costs that will have to be funded by the GOA as a result of this phase are limited to the salaries of 15 new technicians, operations and maintenance of research facilities, equipment and vehicles, and the partial airfare of participants. The GOA contribution to the project represents just over 25%.

6. Other donors are involved in various projects relating to wheat production. These activities are expected to complement and reinforce the objectives of this project.

D. Project Issues

1. Definition of the Target Group

Selecting a target group for this project was no easy process. On the one hand there is the progressive farmer on fully irrigated land whom the project wishes to see shift out of wheat into higher value crops in order to improve the overall performance of the agricultural sector. On the other, there is the large group of farmers on partially irrigated and rainfed lands who represent a natural constituency for AID's income distribution objectives. The project has resolved this question by directing Phase I efforts primarily to the wheat farmer on partially irrigated land, and secondarily to the farmer on irrigated land. Phase II will broaden the target group to include the dryland wheat farmer.

A more difficult problem arises when one attempts to gauge the actual number of farmers involved. Available data suggests there is a large group of farmers cultivating high yielding varieties (HYV) of wheat on partially irrigated land whose yields are far below their potential and that these farmers are faced with an array of constraints, some of the presently insurmountable and some of them well within AID's assistance reach. It is felt that the major constraint on these lands is water and that perhaps 60% or more of the HYV users obtaining low yields are faced with deficient water availability. A number of these low-producers could be helped simply by the introduction of a new HYV which had lower water requirements, a shorter growing season, etc. On the other hand, many of the low HYV producers are unaware of the appropriate cultivation practices required in HYV production. The majority of these latter farmers can clearly benefit from the improved extension efforts which this project will produce. A major uncertainty relates to the severity and extent of the water constraint. If in certain areas it is too great, the number of beneficiaries may be very low; where water is less of a constraint, however, the project may benefit the majority of HYV users who are achieving low yields.

In addition, the project will be attempting to introduce HYV to farmers on partially irrigated land who have been cultivating local wheat varieties, and the above constraints are relevant here, too. While almost every irrigated wheat farmer can increase his yield somewhat if he adopts HYV, adoption rates will be very low if major production constraints cannot be overcome. In the more remote areas, HYV may not have been effectively introduced in the past, and thus a number of farmers who are facing only minimal production constraints (or none at all), if properly introduced to HYV, could obtain dramatic increases in yields.

The farmer on fully irrigated land grows enough to make a sizeable contribution to national production. While unconcerned with the income this farmer derives from wheat per se, the project is interested in avoiding a drastic decline in his production which is threatened by the narrow genetic base and degeneration after years of continual use. Furthermore, increases in his wheat productivity can be expected to encourage his release of land for higher value crops.

Resolution of this issue will require survey and study during Phase I of the target area in greater detail, such that it can be ascertai with greater precision and confidence just who the major beneficiaries are to what extent this project can assist them and what magnitude and distribution of benefits can be expected. The project is confident that there a enough HYV-users and non-users on partially irrigated land in Baghlan who stand to benefit sufficiently to justify Phase I efforts. On the basis of limited field work and available data, however, only poor guesses can be hazarded as to their exact numbers. The data collection and analysis bui into this project, on the other hand, should provide the figures needed at an early stage of Phase I. Attention must then be turned to defining the dryland wheat farmer.

2.. Water Availability

Given the immediate focus of Phase I on the farmers of partially irrigated land, the issue of water availability demands closer examinatio Water supply in traditional irrigation systems is constrained by basically two factors: a) delivery system capacity and reliability, and b) traditional water rights which are known to be skewed along community pow and influence lines.

The traditional irrigation networks are often inefficient in the delivery of available water, subject to structural failure due to floods, and demanding frequent and substantial maintenance. Responsibility for physical improvements in these systems rests with the Rural Development Department (RDD). RDD, with USAID assistance, under a separate project is just starting a program to help improve traditional systems. The Ministry of Water and Power (MWP) has responsibility for major irrigation projects which may replace some of these systems altogether.

The traditional system of water rights gives priority to water users according to their status and influence within the local power structure, starting with the wealthier landholders at the head of the canal. Priority users have no incentive to use water efficiently and farmers in need of more water must forego higher production potential. Th IBRD has concluded that legislation for water rights based on size of land holding is a precondition for improved water use practices.

Although the Project Identification Document included traditional irrigation systems within the scope of this project, Phase I proposes to

to confine its attention in this area to adaptive research in varieties and practices that require less rather than more water. Any other activity in this area would be premature.

3. Increased Wheat Productivity and Farmer Income

There is a rather nagging issue concerning wheat production and income particularly with regard to the fully irrigated areas where the project results in increased wheat productivity. If this leads to a large expansion of acreage planted to wheat, production in these areas could drive wheat prices down and thus negatively affect all wheat farmers' income. This would run counter to the income strategy which implicitly argues for an increase in the percentage of total income generated from wheat in Afghanistan going to the farmers with few alternatives to producing wheat, i.e., the farmers holding partially irrigated or rainfed lands.

Theoretically, the increase in wheat productivity on fully irrigated lands should lead, ceteris paribus, to an expansion of the area of wheat cultivation. Such an expectation follows from an income maximizing assumption about farmer behavior. However, for farmers who grow wheat on fully irrigated lands, the income maximizing assumption does not hold since there are alternative crops which are more profitable. Therefore, the theoretical expectation is not necessarily borne out in practice. Some farmers may grow wheat strictly for home consumption in which case increased wheat productivity would release land to other crops given fixed wheat consumption in the household. Other farmers may also grow some wheat for sale since there may be a more assured market than for alternative crops. In this case the income maximizing assumption could hold, given risk and uncertainty. A large scale transfer of land into wheat production by these farmers is unlikely since by definition, the farmer is cognizant of the risk involved in concentrating too heavily on one crop and one market. Consequently, farmers growing wheat for either of these reaons will not have a significant impact on the wheat market.

In order for there to be a large scale expansion of fully irrigated land planted to wheat, one would have to attribute irrational (or at least not presently understood) motives to a large number of farmers. Since this is highly unlikely there seems little chance that the farmers with fully irrigated lands would choose to usurp a larger percentage of the wheat market for themselves through large production increases. Thus, there is little expectation that the price of wheat will be negatively affected from this quarter. This being the case, a consistent pattern of wheat surplus in Afghanistan with its associated price income problems is unlikely. The demand for wheat in Afghanistan is growing rapidly and even should the productivity of partially irrigated and rainfed wheat lands tend to outstrip demand (a highly unlikely event) the existence of alternative crop possibilities would act to release fully irrigated wheat land to higher value crops as wheat prices stagnated or fell because of the relative

unprofitability associated with that price and because the greater assurance of wheat supply would entice some farmers to stop growing wheat for home consumption. (For a more detailed discussion of what supply and demand relationships are, see the Economic Analysis in Section III.)

There remains the problem of the occasional wheat surplus years which may become more frequent as wheat productivity increases. Here prices could drop rather drastically in one year due to a windfall production of wheat arising from particularly fortuitious climatic conditions. Very low wheat prices become more devastating to a farmer when he has begun using modern inputs and must pay for them at the end of the crop year. To prevent such a drop in wheat prices, the GOA, with British assistance, is planning a wheat stabilization program. As this becomes effective farmers will be shielded from severe price fluctuations.

Overall, then, one must conclude that the potential for the negative impact of either long-term or cyclical reductions in the price of wheat emanating from the project is highly unlikely. It would require widespread irrational behavior on the part of the farmer or a very ineffective stabilization program for such a situation to arise.

4. Type of Support for Proposed Institute for Agricultural Research

The Project Identification Document had earmarked $2.5 million for this activity, $2 million for construction and $500,000 for equipment.

The GOA, responding to the advice of Indian agricultural scientist of the Indian Technical Assistance Mission, has accepted the concept of establishing such an institute. The Institute would be patterned after the Indian Agricultural Research Institute, Delhi.

The concept of an institute appears sound, but several relevant issues need to be resolved. The first is a matter of timing and allocation of resources. Several observers feel that while facilities and equipment are needed, their lack is not the major limiting factor. Administrative, organizational and decision-making inadequacies hinder the research program, especially research activities outside Kabul.

Another issue is the existing relationship between the Faculty of Agriculture and the MOA. There is little cooperation or coordination between the two agencies at this time. The Faculty possesses considerable research expertise, but minimal research activities are underway. A very clear definition of relationships, function and funding needs to be developed. The Indian scientists visualize the institute as a degree-granting institution. Kabul University now awards degrees. Most observers feel the GOA cannot justify two degree-granting institutions in Kabul. If the Faculty of Agriculture were to be transferred to the Institute, both the University and the Ministry of Higher Education would have to agree.

A semi-autonomous institute responsible for both teaching and research could be a workable entity. This would approach the concept of the U.S. land-grant universities. In time, the extension function might be incorporated as well.

The issues involved in any consideration of the proposed Institute for Agricultural Research are so complex and substantial that any consideration for USAID assistance is premature. The Integrated Wheat Development Project is not the proper vehicle for assistance to the proposed IAR. Any assistance should properly be a separate and distinct project.

5. Utilization of Expertise in the Faculty of Agriculture, Kabul University

In the initial design phase, the designers of the Wheat Project tried to involve the Faculty of Agriculture in Project operations. This initiative came to nought. Individual faculty members were keenly interested, but the bureaucratic procedures became an impossible barrier. Two problems emerged: 1) any substantial contribution by a particular staff member or faculty would have to be reimbursed, and this would be extremely complicated, and 2) the Dean of Agriculture wanted his own project; he did not feel that it was a legitimate academic function to engage directly in farm production problems; that was the kind of activity assigned to the Ministry of Agriculture's Research Depa

For these reasons Phase I has not built into its implementation the services of members of the Faculty of Agriculture. As the Project gains experience, however, it may be possible to utilize faculty members on some type of contractual arrangement on specific research problems and/or training programs.

6. Determination of Proper Balance Between Technical Assistance and Equipment Component

The lines in this issue are simply drawn. The MOA would like to include substantial items, including vehicles and laboratory and field equipment, in the technical assistance package. MOA officials realize the Project will spend proportionately large amounts on technical assistance and less on the equipment component. The MOA argues that since AID left some years ago, there has not been a resupply of equipment, spare parts or supplies on research farms and in extension offices. USAID accepts this fact. MOA now has a large staff and sees as one of its major obstacles the lack of supplies, equipment and vehicles. The MOA feels the need for some technical assistance, but they would prefer to have a much larger portion of the package in the form of equipment, supplies and vehicles, as in the past. The MOA requests are rather indiscriminate, large and possibly redundant, based on observation of the design team. Too often in the past, equipment items unsuitable to the situation have been procured. In designing the commodity component of

the project, the designers have ruled out refurbishing large elements of the MOA establishment and followed the guide of "what does it take to make the project go".

7. Length of Project

An effective ongoing research/extension activity on any crop has no terminal point. Every year new germ plasm and breeder lines are being developed and released from international and national research centers. National and regional experiment stations screen and test this material and ultimately approve a variety(ies) with accompanying cultural recommendations ("a package") for release. The Extension Service then disseminates this "package(s)" to farmers.

The issue that arises is how to determine an appropriate cutoff point for a project such as this. A long-term project of 8-10 years was originally envisaged, but, given the present data base and uncertainties on many fronts, both from the GOA and the USAID side, such a lengthy project was not feasible.

An acceptable alternative was to design a multi-phase project in which a developmental and organizational foundation is to be established in Phase I.

The present status of Afghanistan's wheat research program dictates that, even with this project, thoroughly tested packages of improved practices cannot be expected in less than three crop years. At the end of three years the Extension Service will step in and wage an intensive "Irrigated Wheat Production Campaign" in Baghlan. Thus, the minimum time required for Phase I is four years, whereas dryland wheat research and extension efforts will not begin to pay off until a few years into Phase II.

8. Phasing of Research on Alternative Crops for Wheat

The project is directed at integrated wheat development. In focusing on the wheat development aspect, the project has deliberately excluded detailed descriptions of alternative crops. Conceptually, however, it is important to remember that for the integrated wheat development project to work, there must be alternative crops available to substitute for wheat when the appropriate time comes. This means that research on higher value alternative crops to wheat cannot wait until the end of the wheat development project. Likewise, research in substitute crops (e.g., barley and triticale) which may be more adaptable to certain soil and climatic conditions than wheat will be needed. In fact, the "push" effect of alternative and substitute crops can help stimulate the substitution of crops for wheat.

The project team has recommended a Phase II research thrust on alternative crops for wheat. If Phase I progresses rapidly, some research on substitute, as well as on alternative crops, may be initiated at the end of Phase I.

II. THE PROJECT

A. Evolution of the Project Concept

During the Spring of 1976, Mr. Naim, brother of President M. Daoud, made an official visit to the United States. During this visit, Mr. Naim indicated to the U.S. Government that the Republic of Afghanistan would like the United States to initiate some agricultural projects in Afghanistan. In a follow-up visit in August 1976, Dr. H. Kissinger made a commitment to Afghanistan that the United States would once again become involved in agricultural projects.

A Project Identification Team was sent from the United States to Afghanistan during the month of October 1976. This team was composed of the following members: Dr. R. Fort, Agricultural Specialist, FAO; Dr. R. Olson, Agricultural Economist, NE/TECH; and Mr. P. Guedet, Project Officer, NE/CD. In summary, their report indicated wheat would be the logical crop for AID to focus on, since it is the staple food throughout the country. They indicated the crop's importance in all provinces because it is grown on rainfed as well as irrigated lands and by small as well as large farmers. Recognizing the GOA goal of self-sufficiency in wheat, while at the same time shifting some of the better land out of wheat into higher value crops, the report concluded that the development of a comprehensive wheat program would require technical advice and support to assist farmers in adjusting their cropping plans. The report indicated that such a production program for wheat should emphasize use of high yield varieties, chemical fertilizers, intensive production methods, efficient irrigation, and reduced acreage on good soil with adequate water, thereby releasing some of this acreage to higher value crops. Successful implementation would require: 1) research that defines an appropriate package of technology for each area; 2) a seed industry that produces and distributes the recommended improved seed varieties; 3) a credit agency to make it possible for small farmers to purchase the recommended seeds, fertilizers and chemicals; 4) delivery systems that make the seeds, fertilizers and other inputs easily available to the farmers; and 5) an extension program that extends this "package" to a significant number of farmers.

A.I.D. decided that suitable technical manpower and knowledge could come from the newly enacted Title XII legislation. This legislation provides for U.S. universities to design and implement specific development projects. A PID was developed from the report of the Project Identification Team and, under Title XII legislation, U.S. universities were contacted. Mid-America International Agricultural Consortium was selected as the contractor. This Consortium is comprised of the Universities of Nebraska, Kansas, Iowa and Missouri. Consortium representatives arrived in Afghanistan in May 1977 to design a wheat improvement project.

After two months' study the team produced a rather comprehensive report covering many technological, institutional and economic constraints affecting wheat production in Afghanistan and recommendations to overcome

On the basis of the Design Team's draft report, past U.S. assistance experience in Afghanistan, and U.S. assistance objectives and policy considerations, USAID, in cooperation with a consortium representative, decided on a phased approach to deal with the broad scope of the contract team's report. Phase I as proposed herein focuses exclusively on wheat in one specific area in order to develop appropriate packages for the Afghan farmer and gauge project impact before launching an expanded assistance effort.

The integrated research/extension approach will be expanded in Phase I to northern Afghanistan and emphasize dryland wheat production, without ig irrigated wheat and alternative/substitute crops.

B. Project Design

1. Goal

The goal of the project is to increase wheat productivity on irrigated and rainfed lands in northern Afghanistan, thereby increasing total wheat production and releasing irrigated wheat lands for production of other higher value crops. As discussed above, this goal is in harmony with the GOA's Seven Year Plan objectives for increased food production and value added from diversification to higher value crops and USAID's strategy for increased small farmer income. The goal recognizes the key role wheat can play in making these separate policy aims compatible. It is recognized that achievement of this goal will take a number of years and require the integration of several subsystems into a functioning wheat production system largely dependent on dryland and partially irrigated wheat farmers. In an effort to make realization of the goal more manageable, the project focuses on northern Afghanistan which is the major dryla wheat region, but which also contains large areas of irrigated land. Phase I represents an initial step in this direction.

Interim progress indicators for measuring Phase I impact at this level are keyed to the anticipated spread effect from the Baghlan regional research and extension center by 1985. Thus, the project expects to see:

a) the number of high yielding variety users increased from current estimated 75% to 90% of Baghlan farmers on irrigated land;

b) thirty-three percent of Baghlan's farmers, who are currently deriving less than the full potential from HYV they are using, increase their yields from an estimated average of 2 metric tons to an average of 3 metric tons per hectare;

c) fifteen percent of dryland farmers in Baghlan adopt the recommended dryland package(s) to be developed in Phase I and field-tested and diffused in Phase II; and

d) these adopters of the recommended dryland package(s) increase their yields from a current estimated .5 metric tons to 1 metric ton per hectare.

The impact of Phase I then will be felt as farmers in Baghlan are encouraged to adopt varieties and fertilizer application rates recommended by the project and their progress spreads and is replicated in northern Afghanistan. Actual measurement of the impact attributable to Phase I will be the responsibility of the project's data analysis staff and project evaluations.

2. Purpose

The purpose of Phase I is to establish a functioning integrated regional research and extension system for wheat in Baghlan. This purpose is predicated on the hypothesis that agro-climatic conditions are significant factors affecting the adoption by farmers of new wheat technology, thus requiring local adaptation and field testing before widespread diffusion can be recommended. The projec recognizes that while high yielding irrigated varieties are available at Kabul Research Station for immediate release, little research has been undertaken in dryland wheat and that this effort will require three to four years before high yielding varieties are ready for field testing and diffusion. Dryland varieties must be available to bring on stream before wheat production can begin to shift from irrigated to rainfed lands and generate benefits to the relatively poorer dryland farmers. The project is concerned about the narrow genetic base of high yielding wheat varieties now used in the North and is firmly convinced that the introduction of new high yielding rust resistant varieties is necessary to reduce the risk of crop failure due to disease and to increase and sustain yields of the more progressive farmers.

Achievement of project purpose will be measured against the following End of Project Status (EOPS) indicators:

a) Three appropriate packages of recommended practices and adapted irrigated varieties are developed. A standard high yielding wheat package includes improved seed, fertilizer application rate, seed treatment, date of planting, planting method, use of herbicides, use of pesticides, planting density, and seed bed preparation. Considerations of risk difference, expected income, and cost should dictate which elements are most appropriate to include in a package for a given area and target group. Given Phase I's primary focus on the farmers with partially irrigated land, any package for these farmers must seek to minimize water requirements and maximize the proper use of what water is available to these farmers. The project accepts, based on international experience, that improved seed and fertili-

are the key technological variables affecting yields in any package to be developed. Other elements will be included only as appropriate to local conditons.

b) At least 300 farmers on irrigated land in Baghlan are participating in demonstrations of the packages recommended by the center by the beginning of the fourth cropping season (October 1981). The test of the worthiness of any recommended package of new technology must rest with the willingness of farmers to adopt "a good thing when they see it". If it is really good and appropriate we can expect the rational farmer to try it on his own. A farmer information program reaching out from the center can help to publicize a good package and help speed its diffusion beyond this initial group. For every demonstration carried out on a participating farmer's field it is expected that some of his neighbors who are now using either MexiPak sub-optimally or a local variety are likely to be influenced by the positive results of such demonstrations and try the package the following crop year.

c) Up to ten improved dryland varieties can be selected and ready for testing on farmers' fields in Baghlan by the end of Phase I.

Underlying the Purpose to Goal hypothesis there are a number of critical assumptions:

a) that Afghan farmers, like their counterparts in Turkey and elsewhere, are income-seeking risk averters who are sensitive to the nuances of the local farming environment and who are generally effective decision-makers. Good evidence exists to support the validity of this assumption. Baghlan farmers have already shown a willingness to adopt the Mexipack package introduced in the late 60's. This assumption directly affects the design of an appropriate package for recommendation to Baghlan farmers. For instance, farmers' risk perceptions and constraints to greater productivity must be carefully analyzed to ensure that recommended packages are within their threshold of risk tolerance as well as their ability to follow. Otherwise, adoption rates will be retarded.

b) that farmers' income will not be depressed due to sharp declines in wheat prices. The longer range income objectives of the project obviously depend heavily on the realization of this assumption. rapid increase in production in excess of demand with an accompanying decline in prices would depress small holder incomes. This seems highly unlikely, however, since farmers on well irrigated land can be expected as rational beings to take advantage of higher income opportunities from alternative crops. (A fuller discussion of this point is contained in Project Issue No. 3)

c) that expanded credit availability will be adequate to farmers' needs. Experience clearly shows that credit plays an important role in farmers' ability to finance fertilizer and other necessary production inputs. Thus, credit availability directly influences farmers' adoption

of new production packages. The Agricultural Development Bank is expanding its credit program and becoming increasingly effective as a credit institution. Its programs still reach only a small portion of the farmers. Most credit continues to flow from family, friends, merchants, and money lenders. Effective demand for institutional credit is effectively low owing to the lack of familiarity of many farmers with the advantages of greater input use and improved technology, because of physical isolation and inaccessability to credit outlets, and due to the lack of tradition of use of institutional credit, with the concommitant lack of discipline in respect to repayment. This assumption bears careful monitoring.

d) that supply of fertilizer at reasonable prices will be adequate to farmers' needs. There is little point in developing packages with optimum fertilizer recommendations if farmers cannot procure fertilizer in the requisite quantities or afford it. While fertilizer sales have greatly expanded in the past five years, thanks to the efforts of the Afghan Fertilizer Company, a number of factors continue to thwart rapid growth in the proper use of this key input: 1) the prevalance of sharecropping which discourages farmer investment in costly inputs; 2) uncertain prices, which adds to farmers' risks; 3) fertilizer purchases involve a significant cash outlay to farmers accustomed to the traditional subsistence production system which requires no cash costs; 4) uncertain water supply, which also adds to farmer risks; and 5) lack of access to fertilizer due to isolation and poor transport facilities. For realization of the project goal this assumption must be examined continually.

e) that seed multiplication and distribution will be adequate to farmers' needs. Not surprisingly, farmers' adoption rates of HYV are directly influenced by the ease with which quality seed can be obtained. Through the auspices of the newly created Afghan Seed Company, the GOA has plans for expanding seed multiplication facilities, standardizing quality control, and intensifying distribution. The Asian Development Bank is supporting this program. This assumption also bears close monitoring.

f) that dryland research results obtained in Phase I will be field tested and diffused. This is a straightforward assumption that recognizes the need for continued efforts in dryland wheat development beyond Phase I in order to achieve the project goal.

g) that climate patterns remain normal (e.g., precipitation, frost). This assumption is obviously totally beyond the project's control, but it can delay progress toward project goals if not realized.

3. Outputs

In order to achieve the project purpose a number of elements must be set in place. As part of establishing the Baghlan Research and

Extension Center the project envisages a model farmer approach with trained extension agents located at the village level and supported by the Baghlan Center. The highlights include:

a) conducting plot trials at the Center and cluster and verification trials on farmers' fields in Baghlan (October 1980) in order to develop packages designed for farmers on partially irrigated, as well a fully irrigated land;

b) training 25 Baglan extension agents per year at the Center in the use of new wheat production packages;

c) constructing and equipping a research and extension trainin facility by summer 1979;

d) constructing 10 office-cum-residence units at the village level for use by trained extension agents beginning in the summer 1979, with 10 additional units built by the end of the project;

e) surveying the characteristics, practices, and constraints of Baghlan farmers on irrigated as well as rainfed lands and feeding the findings into the development of the appropriate irrigated wheat package by March 1979, and into the design of a dryland wheat program for a Phase II by June 1981.

f) establishing a system of crop reporting by May 1979.

g) launching an out-reach compaign from the Baghland Center for the recommended irrigated wheat packages by the 4th crop season (October 1981).

In support of the dryland research effort, as well as the Baghla irrigated wheat program, the project will have to:

a) organize the wheat research program at the National Research Station in Kabul so that available irrigated varieties are released to Baglan in time for the first growing season and thereafter, and new more drought resistent varieties for irrigated and dryland wheat, are develop during Phase I. The latter will require importing of germ plasm from th international research network and adaptive research locally. Promising local stains exist which can be selected for further development.

b) ensure that Afghan plant breeders and other researchers are trained to advance degree levels to support this and subsequent phases o the project;

c) carry forward winter wheat research trials at Jalalabad and Kabul and off-season winter trials at Bamiyan. This will give the proje

eight growing seasons of trials to work with during its four-year life and thus give an accelerated impetus to the development of dryland wheat varieties.

Finally, to pave the way for a Phase II, the project plans to develop detailed social and cost/benefit analyses along with a detailed design for a follow-on project. These analyses and plans will have to be completed by September 1981.

Details of how these elements will be combined to produce the desired results are found in the implementation plans in Section IV.

A major assumption underlying the Output to Purpose hypothesis of the logical framework is that AFC, ADB, and ASC will cooperate to assure the ready supply of production inputs and credit to Baghlan farmers participating in the project. The Ministry of Agriculture has already indicated its willingness to coordinate the inputs of these agencies to serve project needs. Operational assumptions made for moving from project inputs to outputs are:

a) that farmers will cooperate with the Baghlan Center. There is no reason at this time to doubt the validity of this assumption; and

b) that all project inputs will be delivered as planned.

C. Project Inputs

1. Technical Services (Contract)

(PM)	($000)
352	2,993

Six U.S. scientists/specialists will provide the technical services requi for the Integrated Wheat Development project as follows:

Extension Coordinator (48 mm)

This person is required to act as a member of the Wheat Develop-ment Board: insure adequate and timely financial and logistic support for Baghlan activities; advise architects in designing the Regional Research/ Extension Center at Baghlan; select sites, with MOA personnel, for office-cum-residences of extension field personnel in Baghlan Province; participate in selecting participants; devise programs for improving the effectiveness of extension subject matter specialists in Baghlan; assist in selection of trainees for in-service training at Baghlan; represent MIAC and perform the planning, coordination, administative and support functions required for the project; and serve as principal liaison between the project and AID/Kabul.

Research Coordinator (48 mm)

This person is needed to coordinate MOA Research Department efforts in obtaining, cataloguing, screening and testing wheat varieties

from international and internal sources; help design and implement a national wheat breeding and production program for both irrigated and dryland wheat varieties; serve on the Wheat Development Board; assists MOA in liaising with CIMMYT, FAO and other worldwide research organizations involved in wheat research activities; assist in the selection of research-oriented participants; coordinate and support wheat research conducted at stations located in Kabul, Jalalabad, Bamiyan and Baghlan; devise and implement a system designed to produce two seed crops per year (at Jalalabad and Bamiyan) and to provide technical guidance for U.S. researchers stationed at Baghlan.

Research/Production Agronomist (48 mm)

This person is required to coordinate research and field trials leading to an improved package of wheat production practices concentrating on irrigated wheat initially; work closely with the senior researcher and MOA personnel in Kabul in screening, testing and analyzing station trials on dryland wheat and field trial results on irrigated wheat; assist Center staff in conducting in-service training for both research and extension personnel; supervise off-station testing of packages on farmers' fields; and guide "farmer-to-farmer" personnel, MOA and AFC personnel in designing and implementing seed multiplication programs in project area.

Curriculum Development and Instruction Specialist (48 mm)

This person is needed to plan the curricula for in-service training; act as a member of the instructional team; develop and maintain a student record and evaluation system for the Center and assist in the selection of personnel to be trained; assist other Center staff in conducting the intensive 4-5 month practical field work where trainees are responsible for planting, growing, and harvesting a crop of wheat; help devise and equip all classroom and teaching laboratories and establish a stores system for the Center and maintenance schedule for all instructional equipment.

Economist/Anthropologist (48 mm)

This person will have to gather data relevent to various project activities, especially in the social, economic and cultural areas; work closely with the extension service in Baghlan in improving crop reporting functions and reliability; work with all research and extension personnel at the Center in an effort to identify obstacles that hold back farmers' adoption of new ideas and practices; and conduct surveys in the area of marketing, prices, transportation, storage, etc.

Extension Agronomist (24 mm)

If needed on the basis of project evaluation, this position would be added to project in January 1980. This person would: work closely with the Extension Coordinator and with MOA extension personnel; help implement an outreach program from the Center; concentrate on conducting verification trials initially and then help design and implement a province-wide wheat production campaign; serve as a member of the instructional team at the Center, concentrating on extension teaching methods; assist MOA personnel in the selection of extension field staff who will undergo specialized training at the Center; and assist in the training of those farmers selected to produce improved seed.

With the exception of the Research Coordinator who will be stationed in Kabul, all U.S. technical personnel will be assigned to Baghlan.

Summary of U.S. Technical Personnel requirements:

	PM	
Extension Coordinator	48	
Research Coordinator	48	
Research/Production Agronomist	48	
Curriculum Development & Instruction Specialist	48	
Economist/Anthropologist	48	
Extension Agronomist (if needed)	24	
	264	$2,516,0

In addition 64 person-months of consultant services will be provided at a cost of $466,000 in the fields listed below:

FIELD	YEAR	PM	
Weed Scientist	1, 2, 3	6	
Plant Pathologist	2, 4,	4	
Entomologist	2, 4	4	
Plant Breeder	1, 2, 3	6	
Statistician	2, 3	3	
Consumptive Water Use ((1 Physiologist) (1 Agricultural Enginee	2, 3	8	
Rural Sociologist	1, 2, 3	6	
Wheat Marketing	1, 2, 4	6	
Project Evaluators (2)	2, 3	5	
Intermediate Technology	1, 2, 3	4	
To Be Determined		12	
		64	$ 466,0

Finally, a local hire secretary is included for 24 person months at a cost of $16,000.

2. Participant Training (Contract) PM 504 $000 605

Phase I will provide long term training in the U.S. for three PHD's and six MS candidates in the fields of soil science, plant pathology plant physiology, plant breeding, entomology, rural sociology. These participants will return in time to assist the Phase I. An additional two PHD's and three MS are available in order to get a headstart on Phase II, if progress in Phase I justifies sending more participants. Appropriate fields will be determined at that time. These long-term participants represent 444 person-months of training. The project also provides for 6 short-term participants to attend specialized wheat production courses at CIMMYT and in the U.S. (60 person-months).

3. Equipment and Supplies ($000) 311

All commodities will be purchased under the contract. The project commodities required total $311,000. Major cost components are four tractors, two threshers and two replacement vehicles. The balance is for various other equipment needed to supply the Research Center being constructed in Baghlan. There will be grant-in-aid of four vehicles with spare parts to supplement the commodity costs. There follows a detailed list and cost breakdown of project commodity requirements.

Extension Equipment Needs

Two 16mm movie projectors	$2,600
Four overhead projectors (220V)	1,500
Four slide projectors (220V)	800
Two cameras (35mm)	400
Four projection screens	400
Six easels	450
Two speaker/amplifier systems	500
Six bull horns	360
One reproner (slide duplicating machine)	250
Miscellaneous visual instructional materials	500
Twenty-five cassette tape records	2,500
One hundred cassette tapes (60-minute size)	600
Twenty-five steel measuring tapes (50 meters)	250
Twenty-five scales (50 kilograms)	400
Books, periodicals, teaching supplies	10,000
Teaching lab equipment, furniture, office equipment, etc.	10,000
	$31,510
Packing, Freight & Insurance	15,755
SUBTOTAL	$47,265
Inflation 5%	2,365
Residual	370
	$50,000

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Packing, Freight & Insurance	15,755
SUBTOTAL	$47,265
Inflation 5%	2,365
Residual	370
	$50,000

Research Equipment Needs

Item	Number	Location	Cost
Vehicles	2	Replacement	$ 18,000
Tractors	2	Baghlon	$ 30,000
Tractors	2	Kabul	$ 30,000
Garden Tractors	2	Baghlon	$ 5,000
Garden Tractors	2	Kabul	$ 5,000
Hege or Vogel Plot Threster	2	Baghlon	$ 30,000
" " " "	2	Kabul	$ 30,000
Stationary Plot Thresters	2	Baghlon	$ 6,000
" " "		Kabul	$ 6,000
Plow, Mold Board, reversible	3		$ 4,500
Balance Beam	2		$ 2,000
Thoth Harrow	2		$ 500
Tripod	24		$ 480
Scales	24 50k		$ 250
Tapes	20 50m		$ 240
Plot Seeder (cyjord)	2		$ 10,000
Cameras	2 35mm		$ 400
Fertilizer Spreads (Barber)	2		$ 2,000
Moisture Testers	2	Kabul	$ 4,800
" "	2	Baghlon	$ 4,800
Seed Cleaner	2		$ 3,000
Miscellaneous Supplies hand staplers, bags, tags, envelopes			$ 12,500
		Sub Total	$205,470
Packing, Freight and Insurance on minor items at 50%			$20,500
			$ 225,970
		Contingency 10%	22,597
			$ 248,567
		Inflation 5%	12,433
		TOTAL	$ 261,000

* Includes packings, freight and insurance.

4. Construction Costs ($000)

464

The project will be responsible for the construction of a regional research extension center in Baghlan and the construction of ten houses cum offices to be used by the extension agents: MOA is currently constructing houses cum offices for extension agents in Baghlan. The cost of a completed unit has been averaging $5,000. This figure is used for the project's budgeted cost. It is estimated that the construction of the regional extension center in Baghlan will be completed within 1 3/4 years. A detailed design will be done by a local A&E firm. The same firm will supervise construction. A preliminary cost estimate follows:

Preliminary Cost Estimate For Regional Research Extension Center, Baghlan

USAID

1.	Two classrooms 30x25 feet each = 1500 sq.ft. @ $5/sq.ft.	$ 7,50
2.	Two teaching laboratories 30x40 feet each = 2400 sq.ft. @ $8/sq.ft.	19,20
3.	Library - shelves and reading area 30x50 feet = 1500 sq.ft. @ $5/sq.ft.	7,50
4.	Six offices 30x20 feet each = 3600 sq.ft. @ $5/sq.ft.	18,00
5.	Two seed storage rooms 20x30 feet each = 1200 sq.ft. @ $4/sq.ft.	4,80
6.	Three machine/teaching/storage area 30x80 feet each = 7200 sq.ft. @ $4/sq.ft.	28,80
7.	Fuel and lubricant storage, wash rack and out side repair area 40x75 feet = 3000 sq.ft. @ $2/sq.ft.	6,00
8.	Dormitory with dining hall & kitchen accomodation for 50 students = 10,000 sq.ft. @ $8/sq.ft.	80,00
9.	Two research laboratories 30x30 feet each = 1800 sq.ft. @ $8/sq.ft.	14,40
10.	Apartment block for Afghan Staff 1000 sq.ft. per family unit and 600 sq.ft. for single, 10 family and 4 single units = 12,400 sq.ft. at $11/sq.ft.	136,40
	Sub Total	$322,60
11.	Architect and Construction Supervision 10%	32,26
	Sub Total	$354,86
	Contingency factor 10%	35,14
		$390,00
	Inflation factor 5% for 2 years funding	20,00
	TOTAL COST	$410,00

Note: Square foot cost developed by USAID/A Engineers does not include site development, plumbing or electricity.

5. Farmer-to-Farmer Program (non project-funded input)

Two American farmers with extensive wheat farming experience are to be assigned to the Baghlan Center in the first phase under the farmer-to-farmer program. This is a new program so it will be a trial. These farmers will work in two general areas. At the Center they will help develop the cultural practices in the various recommended packages. Their practical skills, common sense and experience will be extremely valuable. Off the Center they will work with extension workers and Afghan farmers in the conduct of cluster trials, farm demonstrations and the multiplication of improved seed.

6. Ministry of Agriculture Personnel Inputs

The MOA has a full complement of extension and research staff in position. The question of assigning Afghan counterparts has been discussed in detail with the President of Extension and Research. Qualified and competent persons will be assigned to support all Project related activities.

Four Afghans, including the President of Research, the Director General of Crop Improvement, the head of the Cereals Section and Agronomy, as well as individual researchers (plant breeders, production agronomists, farm managers, etc.) and the Director of Research (Baghlan) will work closely with the U.S. research coordinator.

The President of Extension, the Director General of Agricultur (Baghlan), the Director of Extension and unit supervisors (Baghlan), and the Director of the Baghlan Center will work closely with the U.S. extension coordinator.

All Afghan research and extension staff members located at the Baghlan Center as well as extension agents as they conduct the cluster and verification trials on farmers' fields will be associated with the U.S production agronomist.

At least two Afghans will counterpart the economist/anthropologist in establishing procedures for collecting data. This team will be responsible for designing crop reporting procedures and tabulating and reporting this data.

Two or three Afghans will be working with the U.S. curriculum development and instruction specialist in developing and conducting the in-service training programs at the Center.

When the project is fully underway, as many as 15 Afghans will be working directly with their U.S. colleagues in various research and extension activities. Fortunately, most of these persons are already in position.

SUMMARY INPUT TABLE

A. AI

	Total
Technical Services (352 pm)	$2,998,000
Participant Training (504 pm)	605,000
Equipment and Supplies	311,000
Research Equipment ($261,000)	
Extension Equipment ($50,000)	
Construction Costs	464,000
Baghlan Research Center ($410,000)	
10 Houses cum offices ($54,000)	
Total AID	$4,378,000

B. GOA

Research Center Site Development	$ 20,000
10 Houses cum Offices	54,000
Equipment now on site	50,000
Local Expenses (Trust Fund)	181,000
Kabul Research Center	879,000
Baghlan Research Center	62,700
Baghlan Extention Budget	101,200
Salaries of Participants	43,100
Participant Airfare	18,200
Vehicle Support Costs	46,900
Land Cost 20 Houses	20,500
Land Cost Research Station	15,000
Total GOA	$1,491,600
Grand Total	$5,869,600

Exchange rate Afs. 44.75 = $1.00

III. PROJECT ANALYSIS

A. Technical Analysis

1. Introduction

Wheat production in Afghanistan is highly dependent upon precipitation. In years of sufficient rain and snowfall, yields are good and total production is high. Unfortunately, drought and near-drought conditions are frequent, and at least once every three or four years the country is unable to meet its subsistence needs. Production fluctuations in the long run, however, are amenable to stabilization. Integrated wheat development programs in other countries, e.g., on the Anatolian Plateau in Turkey, have shown that appropriate production practices (such as fallow rotations) and high-yielding varieties (HYV) can double yields of dryland wheat over an extended period of time; and the introduction of HYV on irrigated fields throughout the world has resulted in greater increases in production, even in dry years. Afghanistan has not been entirely isolated from these developments, and in fact has benefited significantly; for example, total wheat production in the relatively dry current year (1976-77) would have been much lower if not for HYV production. The potential of HYV, however, is still relatively unexploited in Afghanistan. Low-yielding indigenous varieties of wheat continue to occupy perhaps 70 percent of the irrigated land devoted to winter wheat, a portion of the irrigated land under spring wheat, and all of the land planted to dryland wheat. Given the current rate of population increase and the GOA's twin goal of reaching self-sufficiency and increasing the production of higher value crops (which can only expand significantly if less irrigated land is planted to wheat), increased HYV production on both irrigated and drylands is imperative.

Several of the major constraints to increased HYV production have already been addressed by the GOA. First, the Afghan Fertilizer Company has expanded its number of retail outlets and has improved its distribution system remarkably. Second, the Agricultural Development Bank has increased the number of its field offices in the past few years and appears to have adequate capital for loans, much of it earmarked for small farmers. Third, past efforts in wheat production, while not overly-successful, have laid the basic groundwork (research, extension, etc.) necessary for major increases in wheat production (see following section on past U.S. experience). Fourth, the Kabul Research Station has HYV for irrigated wheat available for release and more drought-resistant HYV seed is readily available through the GOA's participation in the international research networks, CIMMYT, FAO, and the International Winter and Spring Wheat Trials.

While these incipient GOA efforts are encouraging, a number of problem areas still exist. First, there has been a lack of new wheat varieties actually released to farmers. At present, an extremely high and potentially dangerous proportion of the HYV originates from a very narrow genetic base. In some areas more than 85 percent of the wheat planted is Mexipak, a variety very susceptible to rusts and which has been replaced in most countries of the world. If favorable growing conditions for rust spores were to develop, extensive areas of wheat within Afghanistan would likely be affected, resulting in disastrous declines in irrigated wheat production.

A second problem area is that virtually no research or testing has been performed on dryland wheat varieties, at a time when the rainfed lands are increasingly expected to provide a larger share of the nation's wheat requirements.

A third problem area is the Extension Service. While the number of agents has increased sizably since the early 1960s, many are poorly trained, reside far from the farmers they are assigned to assist, and lack transportation and mobility. Even if new HYV were available, it is doubtful that the existing extension service would be instrumental in getting it to the farmers.

Given these major existing problems constraining future wheat production, an integrated wheat development program which focuses upon increasing HYV use and productivity on both semi-irrigated land and dryland through adapted research and regional extension campaigns, should have a significant impact in the wheat-producing sector. In general, U.S. agricultural experience in research and extension appears well suited for application in the Afghanistan case. Before dealing with the actual technical feasibility of such efforts, however, it will be useful first to review past U.S. experience in Afghanistan's agricultural sector.

2. Prior U.S. Involvement.

There is a long history of U.S. assistance to Afghanistan in agricultural extension and research, the bulk of which was provided under the National Agricultural Development Project (NAD). The first project agreement was signed on June 28, 1954 and terminated 19 years later on June 30, 1973. In design, the project attempted to cover nearly the whole of agriculture. The first project agreement gave the purpose as being that of strengthening the Ministry of Agriculture "as an instrument for agricultural research, testing, demonstration and training for the benefit of the cultivators, horticulturists and livestock producers of Afghanistan." By mid-1959, project activities included: (1) organizational and operational aid to the technical divisions of the Ministry of Agriculture, (2) agricultural research (including livestock and soils) and varietal testing, (3) plant protection, particularly insect control, (4) agricultur

Related Projects

extension and demonstration, (5) seed increase and plant propagation, (6) improved agricultural practices and farm mechanics, and (7) forestry, particularly afforestation. The agreement in 1959 noted that in all project phases a primary concern was in-service training of Ministry personnel; and while project work was concentrated in the Kabul and Helmand Valley areas, more emphasis was to be placed on increasing the Ministry's capacity to carry forward a practical agricultural development program for the entire country. It was also noted that two other ICA projects -- the Vocational Agricultural School in Kabul (06-62-009) and the Faculty of Agriculture, Kabul University (06-66-028) -- supplemented this project and contributed to the country's agricultural development.

Rel. proj.

In 1966, there was a shift in the project's emphasis. That year's annual agreement for the continuation of NAD called for intensified assistance to the Government's accelerated wheat production program. The project's prime target was to make Afghanistan self-sufficient in wheat and in other food and feed crops and animal products. A second and equally important target was to increase farmers' incomes, their incentives for production, and their purchasing power. A third was to produce and export agricultural products in order to earn foreign exchange for the procurement of farmers' production supplies needed for increased production and income.

Extension. While the Helmand Arghandab Authority (HAVA) had instituted an extension department in 1954, it was not until 1958 that such an organization was formed within the Ministry. Initial ICA assistance to the Ministry's agricultural extension work began in April of that year when one advisor was stationed in Kabul province. By December of the same year, the nucleus of an extension service was established in the Ministry of Agriculture. The 1960 agreement noted that work to date had consisted chiefly of demonstrations involving better seed, pest control, use of fertilizers, and a program of in-service training; and that since the extension service was new, it had been necessary to concentrate on training and a few improved practices.

By 1969, the major problems appeared to be:

- the lack of an organizational plan suitable for the country's need;
- the shortage of trained staff;
- the tendency for agents to live in larger towns/cities where housing was available, and the lack of transportation; and
- the absence of an effective information division.

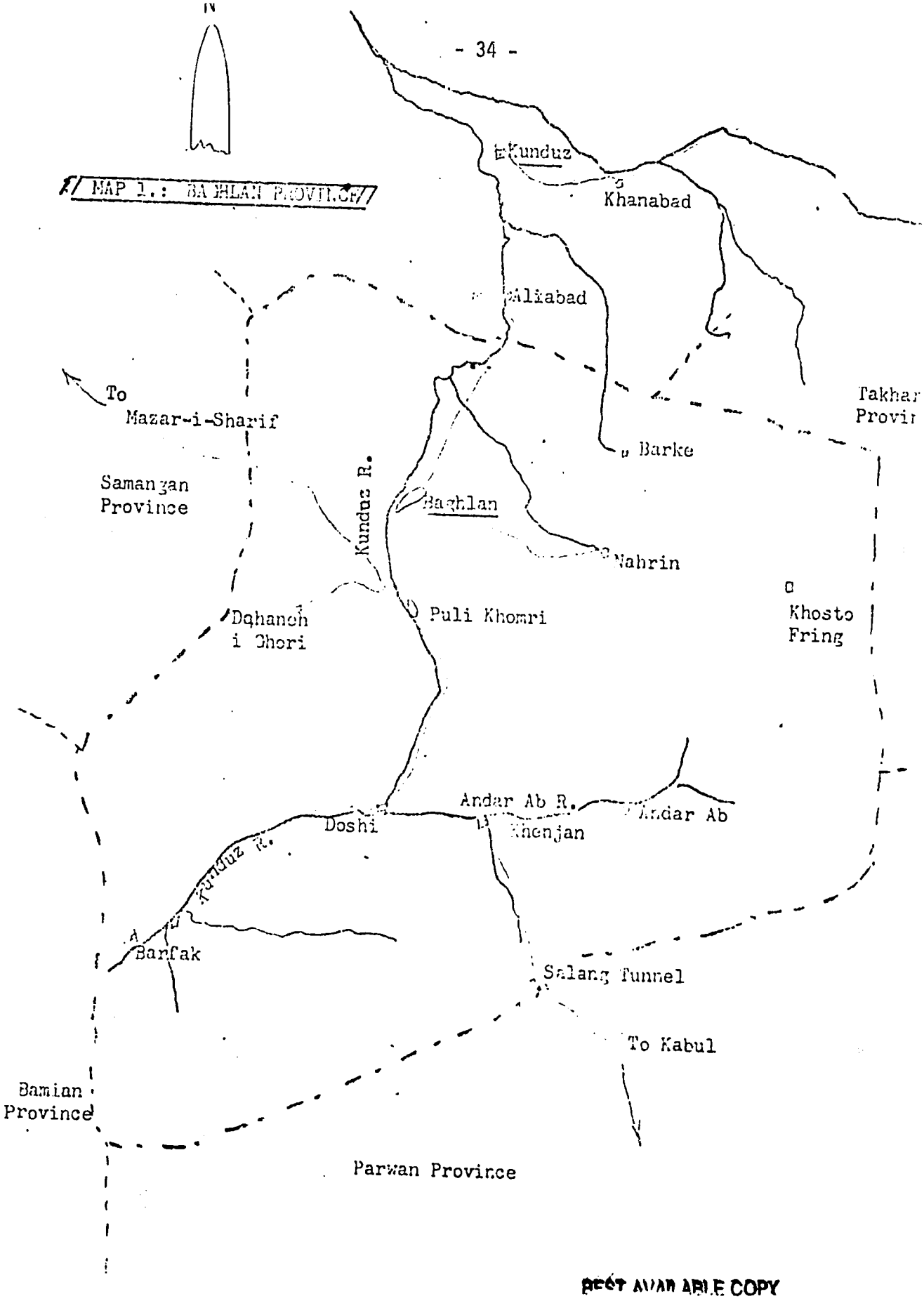
These problems still obtain today.

Research. Organized agricultural research work was started in Afghanistan in 1954 under the aegis of the University of Wyoming contract for Research. On April 21, 1963 the Agricultural Research Agency was established in the Ministry of Agriculture and all agricultural research work including that on crops, livestock and agricultural engineering was placed under the new agency.

The research aims of the NAD project appear to have been unrealistically ambitious. Not only did it attempt to determine fertilizer and irrigation requirements for different crops in different regions and on different soils, but the project worked to develop a National Agricultural Research Center near Kabul and to establish four regional, branch research stations which would serve as multi-purpose agricultural centers for research, seed production, and technical backstopping facilities for the provincial extension program. In addition, much effort was expended in strengthening the organization and administration of the New Agricultural Research Agency which was established within the MOA .

Assessment. It is obvious from the above discussion that the bulk of past U.S. assistance efforts in agriculture was concentrated on building and strengthening national institutions and upper-level infrastructure. While the basic, ultimate objective may have been to provide the farmer, through research and extension, with the very best technological knowledge and inputs available, the impact of this development assistance on the average Afghan farmer has been minimal. Focusing on national institution building and infrastructure has meant that the majority of farmers have been largely ignored. Consequently the linkages between the traditional farmer and these higher-level institutions are only poorly developed, and in some cases non-existent. For example, although the National Agricultural Research Center has thousands of HYV plasms in its possession, few of these have been tested under field conditions, let alone distributed to farmers in significant quantities. Furthermore, little attention has been paid to dryland wheat upon which so many farmers depend. Similarly, even if tested and proven technology were ready for dissemination it is questionable if the existing extension system could serve as an efficient vehicle for the distribution.

It is with these lessons in mind that this follow-on wheat effort has opted for a tightly focused project at the farmer rather than national institutional level. The project follows essentially a cautious, experimental approach in order to learn the field dynamics of the wheat production system before launching an expanded regional production/income oriented project for dryland wheat in northern Afghanistan. Accordingly, Phase I plans to use one province as its testing ground. Baghlan was a natural choice.



MAP 1.: BAGHLAN PROVINCE

3. Selection of Baghlan as Project Area

A number of factors influenced the selection of Baghlan Province as the Project Area. First of all, Baghlan has a full range of agricultural cropping patterns and cultivation practices; most importantly in this regard, there are large numbers of farmers on irrigated land, semi-irrigated land, and rainfed land. Also, there are numbers of alternative crops (e.g., sugar beets, cotton and rice) and market outlets available for those farmers who are able to substitute cash crops for wheat as their productivity of the latter increases. Secondly, a majority of Baghlan wheat farmers have already accepted HYV, and thus the project can move rapidly into adaptive research and regional extension without first having to overcome a number of social/cultural barriers that might otherwise exist to technological change. An implication here is that in its early stages the project will be dealing with relatively progressive farmers whose willingness to accept and experiment with further technological changes will be valuable to the project.

A third reason for selecting Baghlan is that it can serve as a center for a large part of northern Afghanistan (Kunduz, Takhar, Samangan, and Balkh Provinces). Additionally, most of Afghanistan's dryland wheat is grown in the eight northern provinces. Among the features which make Baghlan suitable as a center are: (1) the existence of a research station with sufficient acreage, dryland as well as irrigated, good irrigation supply, adequate staff and equipment, different soil types, and good location; (2) the presence of essential service agencies such as the Afghan Fertilizer Company, the Agricultural Development Bank, and a soon-to-be developed seed farm by the Afghan Seeds Company; and (3) the central location of Baghlan in the northern region and the existence of adequate communication resources linking Baghlan with the rest of this region.

4. Agricultural Production in Baghlan Province

There are approximately 30,000 wheat farmers in Baghlan, cultivating some 235,000 hectares of land. About 22,000 (75 percent) are doing irrigated wheat, with more than 80,000 hectares under cultivation. Yields per hectare on this land average about 1.35 MT. Rainfed wheat is undertaken by roughly 10,000 farmers on about 149,000 hectares (average yield = 0.50 MT per hectare), though less than one-third of this land is under cultivation in any one year

It is estimated that more than 16,000 irrigated wheat farmers (75 percent) are using HYV. Mexipak, a Mexican dwarf HYV introduced over a decade ago, is the prominent improved variety, though there are at least six others in use (e.g., Baktar, Bazostaya, Kavkas). It is doubtful that more than 20 percent of the HYV users are obtaining yields of more than

3.5 MT per hectare. Most HYV farmers, due to poor quality seed, poor production practices, deficient or excessive applications of inputs, or for other reasons, have been averaging yields of only 1.5 to 2.0 MT per hectare. There are virtually no improved varieties of dryland wheat currently in use in the province.

In addition to wheat, Baghlan also produces a number of cash crops, nearly all of which are grown on irrigated land. There are about 36,000 hectares under rice, 11,000 hectares in cotton, and about 5,000 hectares under sugar beets. Average yields per hectare for rice and cotton have been about 3.0 MT and 3.5 MT, respectively, while sugar beets have averaged yields of about 18.0 - 20.0 MT per hectare. Other cash crops include corn, mung beans, melons, and vegetables.

Some of these cash crops are double-cropped annually with wheat, others are part of a complex rotational system involving some fallow, and still others are now a single crop, having replaced wheat production completely.

A number of factors influence a farmer's decision regarding which crop he will plant at a given time on a specific portion of his field. These include the availability of water, the farmer's access to inputs and markets, the length of the growing season, the elevation of his fields, and the availability of cash/credit and labor. Wheat farming operates under many of these same constraints. Naturally, wheat production and cash-cropping affect each other. Notwithstanding the constraints, professional agriculturalists who know Baghlan indicate that the potential for increased production in the Province has barely been touched. Irrigated wheat yields on two or three Baghlan extension demonstration plots in 1976/77 exceeded five tons per hectare. New and better technology, mainly seeds, fertilizer and farming systems, offer the farmer a control over his production capacity simply through his decision to use or not the new technology. The minimum results which could be expected are indicated in Table 1 which shows irrigated areas and the results which can be expected by the use of improved seeds and fertilizer. The Table does not take into account potential yield increases from improved cultural practices.

TABLE 1. Potential Irrigated Wheat Yields with Fertilizer and Seed Inputs Varied*

	DAP (kg/Ha)	Urea (kg/Ha)	Seeding Rate (kg/Ha)	Yield (ton/Ha)
1. Improved Seed with Fertilizer	105	105	140	2.8
2. Improved Seed with One Fertilizer	-	105	140	2.0
3. Improved Seed with no Fertilizer	-	-	140	1.6
4. Unimproved Seed with One Fertilizer	-	75	140	1.5
5. Unimproved Seed with no Fertilizer	-	-	140	1.2

* GOA, third Five Year Plan (1351)

The potential yield increase for dryland wheat is much more difficult to predict. Any increase will be several years in the future, because the research on dryland wheat is in its infancy. Over 1,000 dryland wheat varieties have been identified in the country, but selections adaptable to the Baghlan area have not been tested. Research on fertilizat of dryland wheat varieties so far identified show little if any response.

In time, earlier maturing wheat varieties will be required fo both dryland and irrigated areas. On irrigated areas this will enable the wheat crop to be harvested earlier so other crops can be planted earlier. On dryland, they will be needed to overcome the "short" seasons of precipitation.

5. HYV Production

This project's main target group is the wheat farmer who till semi-irrigated land. Most of these farmers are HYV users, obtaining higher yields than non-HYV users on the same land but significantly smaller yields than HYV users on fully-irrigated land. Phase I's primary objective is to increase production (and thus income) of wheat on this semi-irrigated land through adaptive research and regional extension. Major efforts will concentrate on developing new HYV which are adapted to semi-irrigated conditions. The project will attempt to increase the cultivation of these newer, better adapted, varieties among both current HYV-users and farmers

growing native varieties. In order to assess the feasibility of such efforts, it will be necessary to examine in greater detail the nature of HYV production (and non-production) among all wheat farmers in Baghlan. A useful way of doing this is to sketch a brief profile of three types of farmers: the non-HYV-user, the sub-optimal HYV-user, and the optimal HYV-user. This will lay bare the technical constraints facing the target group in increasing its wheat production and will thus verify the efficacy and technical feasibility of project efforts.

The NON-HYV User.

One of the major reasons for not using HYV is the lack of sufficient irrigation water. HYV currently available requires about two times as much water per season as the native varieties; the latter can often get by on two or three irrigations, while HYV requires at least four and in greater volumes. The reason for increased water requirement is that HYV growth is sparked by heavy applications of chemical fertilizer which can only be dissolved for plant use by providing large volumes of water to the field. In a number of areas of Baghlan, water in such quantities is not available, and a particularly dry spring can endanger even the local wheat varieties; the additional water requirements of HYV are often more than these irrigation systems can provide. One thus finds little if any HYV production in Burke, Barka, Khosto Fring, and parts of Dahane Ghori.

A second major reason for not undertaking HYV is its higher costs of production. The major expense is fertilizer. The recommended dosage of two bags of DAP and 3½ bags of Urea per hectare is often financially prohibitive for the small, poor farmer. Although farmers can borrow money to purchase fertilizer from the Agricultural Development Bank, the farmer must pledge his land as collateral and must borrow collectively in groups of 4 or 5 other farmers. Many find the bureaucratic regulations and paperwork complicated and time-consuming; others are simply afraid to borrow from the government. Local money lenders are available, but their rates are two to three times higher than the government's. Other costs associated with HYV production relate to the application of insecticides or herbicides and additional labor costs for weeding, threshing, and transportation. Even though a farmer can easily recoup his out-of-pocket additional costs of production, a poor farmer without the initial cash reserves or access to credit is unable to undertake HYV production. Sharecroppers, of course, have little incentive to invest in HYV, since they take all the risk (and sometimes pay all the expenses) but must share the profits with the landlord.

A third major consideration which has kept many farmers from cultivating HYV is the larger labor input involved. First, an HYV field requires twice as many plowings as a field under local wheat (which also means that the farmer has to obtain plow-oxen for twice as long).

Second, HYV requires at least one weeding in the spring. Often local wheat is not weeded at all. And finally, the demands for labor at harvesting are greater for HYV than for the local varieties because there is more wheat to be threshed and transported (actual harvesting of HYV does not have a greater labor requirement than the local varieties because HYV does not lodge and is easier to cut). All of these additional labor inputs must be met either from within the farmer's family or by hiring laborers. Small extended families with only one or two adult males may not be able to handle all the labor demands. If they have neither the cas to hire outside help, or the kinsmen and friends to assist them, HYV production is beyond their means (see Social Soundness Analysis section).

There are also a number of culturally-related beliefs and practices which have prevented or discouraged some farmers from planting HYV. First, when HYV was introduced to the area 12 years ago, the seed was not thoroughly cleaned and as a consequence the seeds of weeds and other plants were sown and germinated in the farmers' fields. This led a number of farmers to conclude that HYV produces or fosters weed growth. To some extent, these farmers are correct, since the high dosages of fertilizer provide nutrients to weeds as well as the HYV plants; and unaccustomed to weeding with their indigenous wheat, their discouragement is understandable.

Another cultural constraint to HYV growing is found among wheat farmers who are also engaged in animal husbandry. After the indigenous wheat seed is sown in the fall, germinates and its coleoptile or flag leaf shoot has obtained a height of about 10-15cm, farmers often allow their flocks to graze in their fields for this little bit of fodder before it is covered by the winter's snow. In addition, in the spring, after the snows have melted, a few farmers cut the top few centimeters of the wheat leafs again to use as fodder. One cannot do this with HYV, ho Its coleoptile is much shorter in the fall and its spring leaf does not attain sufficient length after the snows have melted to allow cutting for fodder. Thus, many farmers who rely upon their wheat to provide supplemental fodder in the late fall and early spring have been dissuaded from planting HYV.

Additionally, because HYV is a dwarf wheat, shorter than th indigenous varieties (80-85 centimeters versus 100-120 centimeters), many farmers have concluded that the straw remaining after harvesting HYV is s less than that obtained from their local varieties. In reality, although HYV is shorter, each seed puts out from 7 to 10 stems, while the indigeno varieties put out only 5 to 8 stems per seed. The total amount of straw, thus, for HYV is about equal to the native varieties.

The Sub-Optimal HYV Farmer

As mentioned earlier, a full 75 percent of the HYV users (some 12,000 farmers) are sub-optimal producers, with yields averaging only about 1.5 MT per hectare. Some of their poor yields are a result of poor quality seed and poor HYV cultivation procedures, but the major reason is a deficiency of inputs, particularly fertilizer and water.

One of the major cultural practices related to reduced yields is the depth at which the HYV seed is planted. It was stated above that the coleoptile of the HYV seed was much shorter than that of the indigenous variety. Consequently, when HYV seed is sown on a plowed field it must be plowed under at shorter depth than the indigenous seed. Yet, many HYV farmers consistently plow under their HYV seeds at the same depth as their native varieties. As a result, the seed either does not germinate, or its growth is retarded, resulting in decreased yields.

Another reason for low yields is the late planting date used by many HYV users. For best results, HYV should be planted in mid- to late October. Yet many farmers plant their HYV as late as mid-November just like their local wheat varieties. Part of the reason for this late planting relates to the earlier maturity date of HYV. If HYV is planted in October, it will be ready for harvest before early June. At this time, it is the first ripe cereal or other food in the fields and is thus subject to severe predation by birds. If, on the other hand, it ripens a few weeks later, its maturity will coincide with the mulberry, which the birds prefer, and its losses will be minimal. Farmers thus tend to plant later in the fall. (The problem with birds is only serious, of course, when HYV fields are in isolation from each other, since birds could not significantly damage large expanses of HYV fields.) In addition, some HYV growers are also double-cropping, and this, as discussed earlier, often results in a later planting of wheat.

A very small number of sub-optimal HYV farmers over-apply the most important inputs, water and fertilizer, and consequently they obtain low yields. While HYV needs fertilizer to spark its spectacular yields, too much fertilizer at the wrong time may either 'burn' the wheat plant (particularly if there is not enough water) or produce excessive growth which results in the wheat plant becoming stem-weak and top-heavy, causing the plant to fall over and 'lodge.' In either case, yields are decreased significantly.

Water is very important in HYV production, not only to water the plant but to dissolve the heavy dosages of fertilizer. Too much water however, can deprive the roots of oxygen, waterlog the plant, and/or loosen and soften the soil at the base of the plant such that the stem can no longer support the full, ripening grains and the plant topples over and lodges. With water being such a scarce resource in Afghanistan, over-watering is not an endemic problem, but those at the heads of community

irrigation systems do tend to use more water than they need. In addition, a number of fields are not properly leveled, and this results in over-watering on certain portions within a field.

Most sub-optimal HYV farmers, however, are characterized by their under-use, not their over-use, of scarce resources, again, particularly water and fertilizer. In relatively water-scarce areas, all HYV farmers will have to get by with fewer irrigations. But it is usual to find that those furthest from the irrigation ditches obtain the smallest amounts of water. With insufficient water, these farmers will always suffer from low yields.

Depressed yields resulting from sub-optimal dosages of fertilizer are found primarily among the poorer farmers who cannot afford cash purchases of fertilizer or who do not have access to credit sources, be they government or private. Also, in certain remote areas of Baghlan, fertilizer supplies may be inadequate. Given fertile soil and some fertilizer, HYV will still out-produce the local varieties; but yields are far from what could be achieved. A few farmers, on the other hand, are just not yet aware of the recommended dosages of fertilizer. A further problem is that these fertilizer application rates are not area specific, that is, regardless of the soil type there is only one recommended dosage of fertilizer. This, of course, is clearly inadequate, since different soil types will have different nutrient requirements. Thus, some HYV farmers may be applying the (nationally) recommended amounts of DAP and Urea, but in terms of their specific soil type and fertilizer requirements they are under-employing their fertilizer inputs.

The Optimal HYV Farmer

The optimal HYV farmer, though ideal, is not all that rare in Baghlan. An estimated 20 percent of the HYV users could be placed in this category. In general, in early October he begins preparing his field giving it at least three or four plowings, and a harrowing if necessary. He next irrigates his field slightly to increase the moisture content, and then he sows his seed at the rate of about 140 kg per hectare. Finally he plows his seed under, being careful not to run his plow too deep. Some farmers will spread chemical fertilizer in their field before planting; others wait until about February or March. The extension service recommends that 2 bags of DAP and 3½ bags of Urea be plowed into the soil before planting, and another 1-3/4 bags of Urea are to be top-dressed in the spring before the flag-leaf stage.

The optimal HYV farmer either follows these recommendations or, through his or his neighbors experimentation, applies a dosage more suitable to his field's nutrient needs. Depending upon rainfall, this

farmer will irrigate 4-5 times, flooding his field each time to a depth of about 5-8 cm. About April, he will weed his field. Throughout the spring he will be surveillant of his crop for insects or other pests, and he will purchase insecticide if necessary to protect his crop, and if all has gone well he should obtain yields of 3.5 MT per hectare or better.

6. Technical Constraints and Feasibility

Since this project aims primarily at assisting the cultivator of semi-irrigated land increase his production, two basic questions arise: (1) what technology is presently available to solve the above production constraints? and (2) are the technological solutions proposed by the project the best possible under the given conditions? The discussion below will attempt to answer these questions.

Water is the most critical input in agricultural production in Afghanistan. A number of solutions to Afghanistan's water problems have been proposed and even applied. Large-scale irrigation projects have been successful but at tremendous cost, and the benefits have been slow to reach the farmer. Smaller-scale projects, such as the community irrigation system projects pursued by the Rural Development Department, will provide more cost-effective benefits, but would still require large cash outlays before they could benefit the hundreds of districts which now need improved irrigation systems. In addition, as the World Bank has noted, these small projects should be part of a larger regional program aiming at water storage and distribution.

Another solution to the water problem has been the development of improved water use practices and attempts to make the local distribution system more efficient. This has not met with any significant success because water distribution is a local matter, usually determined by the village power structure. Water usage occurs within this same socio-cultural context and is often determined by factors other than technical recommendations. (In the absence of water rights legislation, outside authorities are powerless to intervene.) Another solution to the problem, one not tried in the past, but accepted as the basic strategy of this wheat project, is to accept the water constraint and then to design a technological package which is adapted to this constraint. HYV in the past has increased wheat production on semi-irrigated lands, but yields have been below their potential because of the deficiency of water. This project will attempt to develop a technological package centered around an HYV that is more drought resistant and/or requires less water. Some varieties of new seed may already be available for testing in the Kabul Agricultural Research Station, others can be obtained through CIMMYT or

other international suppliers. A significant portion of the project's effort will be expended in testing these varieties and discovering those cultivation practices most suitable for them. The approach this project follows to solve the water problem, thus, appears to be technically feasible.

The second major constraint faced by HYV farmers on semi-irrigated land is the unavailability of credit to purchase production inputs. The Agricultural Development Bank is already attempting to alleviate this constraint by expanding its field facilities and staff by making more loans to small farmers, and by simplifying the loan process. This project recognizes the important role of the ADB and commends its efforts toward benefiting more farmers. Believing that the activity of the ADB will eventually reduce the severity of this credit constraint, the project will assist and cooperate with local ADB personnel and field staff in their efforts to assist the small farmer, particularly those on semi-irrigated lands.

A third constraint is the unavailability of production inputs such as fertilizer and labor. Unavailability can mean actual absence of an agricultural input from an area or inability to purchase that input at its current cost. In the latter case, loans from the ADB can assist in giving the small farmer the purchasing power necessary to obtain certain inputs. The former case presents a special problem and usually concerns fertilizer inputs rather than labor inputs. Again, through close cooperation and coordination with its local personnel and field staff, the project will attempt to get the Afghan Fertilizer Company to expand its number of retail outlets and to insure that remote and less accessible agricultural areas are provided with sufficient supplies of fertilizer.

The fourth constraint concerns a lack of knowledge of correct cultivation practices, especially as applied to the growing of HYV wheat. This constraint is clearly one which an active, trained extension service can eliminate, and this project aims squarely at improving the capabilities of this department. If the farmers were instructed in the correct sowing dates, depth of covering the seed, fertilizer and irrigation requirements, and selection and care of next year's seed, a significant increase in wheat production could be accomplished. Proper instruction is not enough, however; it must be reinforced by field trials and demonstrations such that the farmer becomes convinced of the efficacy of adopting the recommendations. The training of extension agents proposed in this wheat project will ultimately produce field workers capable of introducing and getting adopted correct and appropriate HYV cultivation practices.

But how suitable will this technological package of adapted research and regional extension be? First, development of packages will be directed at the main requirement of reducing production constraints

on semi-irrigated lands. Second, in this respect, such an approach appears to be the most cost-effective of possible other technical solutions (e.g. irrigation infrastructure development). And third, it represents the most appropriate technology available.

Phase I's secondary concern is for the farmer on fully irrigated land, whose production potential is less encumbered by the constraints facing his neighbor on semi-irrigated land. One constraint he shares in common, though, is his dependence on HYV of a narrow genetic base. Baghlan farmers use mainly Mexipak. This variety is susceptible to various rusts and has been replaced in most countries in the world. Introduction of new varieties alone may not result in significant yield increases for the farmer on fully irrigated land but it would broaden the genetic base and thus forestall the risk of widespread crop failure due to disease or declining yield vigor due to degeneration. However, consistent performer varieties coupled with improved cultural practice for the less optimal farmer can be expected to impact favorably on increased and self-sustaining yields.

In summary, the project's objectives are technically feasible. Despite production constraints, the potential for higher yields exists. Sufficient new HYV is available in Kabul to provide the required genetic diversity to prevent production disasters due to rust. A number of more drought-resistant HYV are available from CIMMYT and other international suppliers. The adoption of drought-resistant HYV in Baghlan is also technically feasible. Eighty-five percent of Baghlan's farmers on irrigated land are already doing HYV: the substitution of their current HYV for newer more adaptive varieties should be fairly simple, and thus there appear to be no major technical constraints facing either this adoption or its later production.

The next question deals with the institutional capabilities. Can the GOA, the Ministry of Agriculture, and the latter's relevant subdivisions -- the Department of Research and the Department of Extension -- undertake the necessary activities (e.g., organization, training, construction, research, etc.) which will move this readily available technology from the laboratory to the farmer's field. The next section attempts to answer this question.

7. Institutional Constraints and Feasibility

The Ministry of Agriculture is charged with the responsibility of developing, coordinating, and increasing productivity in the agricultural sector of Afghanistan's economy. MOA efforts to date have been hampered by the Government's inability to establish a consistent policy framework and effective public services. This is a direct result of heavy centralization, a lack of delegation of authority, inexperienced staff in both the planning and executive branches of Government, and general under-utilization of available manpower.

The Research Division of the MOA employs about 200 researcher The main emphasis of research work has been concentrated on variety adaptation, fertilizer response, irrigation and cultural practices for irrigated wheat. Little priority has been given to other crops, including dryland wheat. As a result of limited funds and manpower, it is unrealisti to expect Afghanistan to be able to conduct a more comprehensive research program at this time.

The effectiveness of the Research Division, however, could be improved by steering the wheat program toward dryland wheat development along with applied and adaptive research on irrigated wheat through local-level field trials, producing foundation seed and planting material.

The Baghlan Research Farm has many well-qualified personnel; however, they lack an organized approach to research and are hampered by delays in obtaining research materials and supplies. The Director of Research has an MS in Plant Breeding and guides the work of eight scientist with Master's Degrees. Ten technicians with vocational agricultural high school training support the research activities.

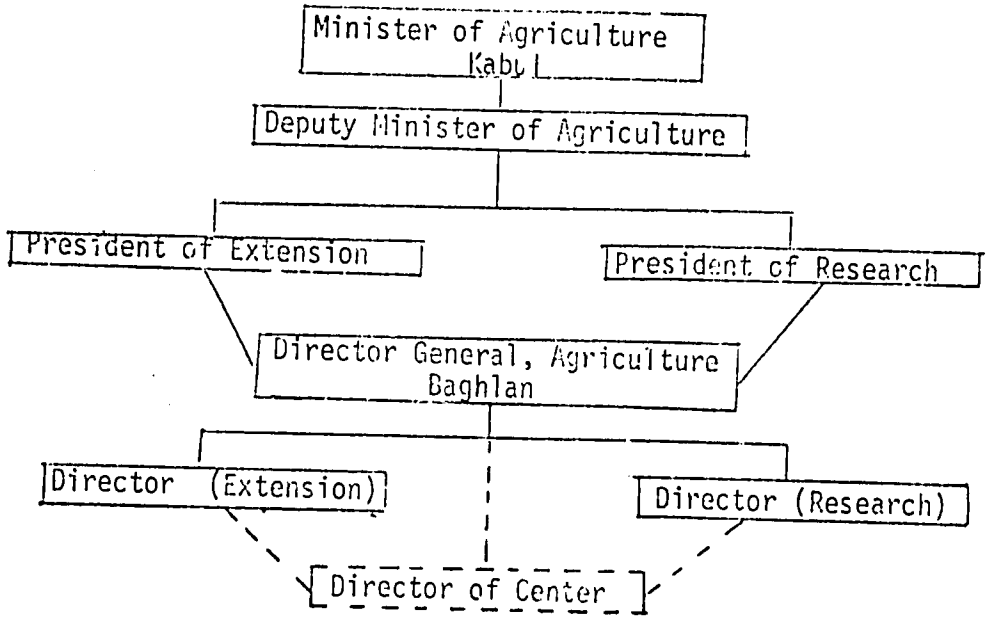
The Extension Division of the MOA employs about 2,300 extension agents. They serve approximately 1 million farm families in over 21,000 urban and rural villages and towns. Their extension task is made difficult by the low level of formal education of the rural populatio poor communications, scattered distribution of production, and the poorly developed or unproven production recommendations which they are asked to push. The Extension Division itself has many weaknesses. Many of the extension workers have very low educational levels, while some have no agricultural training at all. They are thus unable to meet the wide range of pressing needs of the farmers. The extension program is poorly designed and there is underutilization of staff. Funding procedures are time consuming and difficult, resulting in inadequate working and transportation facilities.

It is possible, however, to better utilize the system as it now exists and increase the extension effort's effectiveness. Although the majority of the extension staff are insufficiently trained or experienc to provide across-the-board advice to the farmers' questions, they would be able to promote simple, basic improved production packages for wheat.

Baghlan Province has the manpower needed to undertake a major extension dissemination program. There are 77 extension workers in the Province, including two college graduates who serve as unit supervisors. The Director of Extension is not a college graduate, however, he h graduated from an agricultural technical school and has participated in short-term agricultural training in Iran. The majority of the irrigated lands in the Province are within fairly easy access of the major roads and the dryland areas are more accessible than in other areas of Afghanistan, making the job of meeting farmers a reasonable task.

According to 1976/77 reports, the extension workers contacted 9,583 farmers in the irrigated area -- which totals 86,500 hectares. Accordingly, each field worker (65) was responsible for an average of 1,330 hectares and contacted an average of 156 farmers throughout the Province. Each field worker conducts only one result demonstration per year. Through in-service training and supplied with packages worth extending, Baghlan agents should improve their performance considerably.

The existing Baghlan research farm will be the site of the Regional Research and Extension Center. The Center's Director will coordinate all project related research and extension activities. The following organizational structure is envisaged:



Through such restructuring and better utilization of available research and extension resources, the project designers feel confident that the project is institutionally feasible.

8. Summary of Environmental Impact

This project will have no adverse effect upon the environment. The improved cultural practices, especially under dryland wheat farming conditions, should improve the environment in terms of soil conservation and minimizing natural resource inputs (water, fertilizer). The building activity at the Regional Research Extension Center will take place in an area where deteriorated, unoccupied buildings were recently removed. See Annex ___ for the Initial Environmental Examination. An environmental assessment is not recommended.

B. Social Soundness Analysis

1. Introduction

A major thrust of the Integrated Wheat Development Project in its first phase is to increase the yields of small farmers who are cultivating semi-irrigated land. Some of these farmers are already using high-yielding varieties (HYV), but for the most part they are only sub-optimal producers of HYV, receiving average yields of about 2.0 MT per ha far below the 3.0 - 3.5 MT received by most HYV users on fully-irrigated land. Cultivators of local irrigated varieties, of course, are obtaining even lower yields. Through adaptive research and regional extension, this project aims to provide both groups of farmers with new HYV that is better suited to the semi-irrigated conditions these farmers face. Supplying these farmers with new HYV and getting them to cultivate it, however, is more than just a technological problem with technological results. Agriculture occurs within a social context, and any planned change or technological innovation must take this social context into consideration when appraising a project's feasibility and impact.

The ultimate objective in this section of the project paper to assess the social soundness of the project, i.e., to evaluate the project's social-cultural feasibility, its spread effects, and its social impact in terms of the expected distribution of benefits and burdens. Before commencing with the actual analysis, however, it will be useful to present first a brief summary of the relevant structural features of rural society found in Baghlan Province.

2. Social Structure

There are approximately 265,000 people in Baghlan Province, more than 85 percent of whom are directly engaged in agricultural activities.

Four major ethnic groups are residing in the province: Tadjik, Pushtun, Hazara, and Uzbek. For the most part, they live in separate areas with distinct agricultural practices. For example, the latter two groups are mainly dryland wheat farmers and pastoralists, while the Pushtuns and most Tadjiks are irrigated farmers, cultivating both wheat and cash crops. Basic social organization among these four groups is quite similar, however, and a general social description applicable to all four is possible.

Kinship and Lineage Organizations.

The basic social unit is the patrilineal extended family, consisting ideally of a man and a woman, their unmarried children, and their married sons with their families. These families expand and split

apart over the generations. Wealthy, landed families tend to remain intact for longer periods of time. Numbers of extended families who are related to each other through the male line (i.e., agnatic kin) reside in the same neighborhoods, interact and exchange goods and services frequently, and usually have contiguous farms in the village fields (the lands once possessed by a distant male ancestor and now divided among his descendants). In some cases, entire villages may trace their descent to a single male ancestor.

Marriage is generally within the group (i.e., it is endogamous) and from one-third to one-half of all marriages may occur between first cousins (usually the offspring of two brothers). When cousins are not available, other more-distant lineage mates may be chosen. Barring the latter, spouses from non-agnatic groups within the village are usually taken. A village thus consists primarily of a dense network of kinsmen related to each other through both birth and marriage. In addition, of course, most neighborhoods in a village contain a number of non-kin; to the extent that these participate in life-cycle ceremonies, mutual exchanges, and other forms of social interaction, they are likely to be considered close kin, often more so than lineally close kin who live at a distance. As will be shown, a close network of kinsmen and friends can facilitate one's access to scarce resources, e.g., land, water, and labor.

Class Structure and the Distribution of Landholdings

Wealth consists primarily of landholdings and accompanying water rights, and economic classes are based upon differential land ownership. In Baghlan, one can distinguish at least three broad classes: the upper class, who have large holdings and who generally rent out most or all of their land to others; the middle class, who are mainly owner-operators with seldom more than a few hectares of excess land to rent to others; and the lower classes, who for the most part are non-owners and who must either rent land from others, hire out as laborers, or pursue other, essentially non-agricultural, subsistence strategies.

Although no official figures on land tenure in Baghlan are available, a rough sketch of land distribution, based on limited field research, can be offered. The situation is rather complex because there are few distinct categories; that is, a single farmer may be not only an owner-operator, but a renter and a landlord. In general, most of the large landholdings are concentrated in and around the cash-cropping areas of Baghlan; as one moves further away from the well-watered, easily-accessed regions of the province one finds a more egalitarian distribution of land. Stated another way, most of the wheat farming areas consist of small plots of two to three hectares tilled by their owners, while much

of the area under cash crops is held by large landlords who rent their land to others. Of farmland in and around Baghlan City, for example, at least three people own in excess of 600 hectares each, several own more than 400 hectares, and more than 25 have holdings of about 200 hectares. Probably somewhere around five percent of the total landowners in Baghlan Province own one-third of all the irrigated land. If irrigated wheat farmers are considered separately, the breakdown is as follows: 50 percent of the 22,000 farmers are owner-operators; 10 percent both work their land and rent out some to others; and about 40 percent are either renters or sharecroppers, at times renting land from more than one landlord.

Even if a village had egalitarian land tenure patterns, inequalities would still exist. These result mainly from the distribution of water, it being the case that farms closer to the heads of the village's irrigation laterals receive water before farms located on the back rows. As will be discussed further below, these plots are often owned by the wealthier, more powerful members of the village who have become privileged due in part to the location of their fields and who have remained privileged due to their influence over village affairs, especially water distribution.

Local Political Structure

The heads of large extended families comprise an informal council of elders called a jirga. The jirga has no formal leader, but selects one individual, a malek, to represent the village officially in all extraneous matters dealing with the government, the malek serving as a mediator bringing demands from the government to the jirga and giving the latter's requests to the central authorities. The council of elders also selects a mirab, or water master, who oversees the distribution of water within the village.

The jirga is supposed to be a body which represents all individuals (large families) in the village. Often, however, it is comprised and/or controlled by the wealthiest and most powerful of the village families. Significantly, in the latter case, these powerful elders may select mirabs who are related to them or are subordinate to their wishes in some other way. Thus the supposedly egalitarian distribution of water among all landowners in the village often favors the lands of the more powerful villagers.

The upper class of wealthy and powerful villagers, however, is far from a united group. Relations between them are often characterized by rivalry and competition, and the village is often divided into factions. The core of these factions consists of patrons and their client followers. Patronage occurs when a wealthy villager exchanges access to resources and services (land, credit, influence, protection, brokerage) for

loyalty and support from a group of subordinates (tenants, sharecroppers, laborers, and others). While land is an important basis for patronage, often the additional services provided by the patron are more significant, particularly for those who already own land. For this reason, a patron's following will consist not only of his tenants and sharecroppers, but his lower status kinsmen and neighbors; often, too, one will find that small landowners with sufficient land will become tenants to powerful and influential villagers, mainly as a means of obtaining access to these other services and resources (he may even rent part of his holdings to others in order to work the patron's land).

Hierarchies of patronage are the norm. Low-level patrons with perhaps but a handful of clients will themselves be the clients of higher-status patrons, and the latter in turn will be clients or followers of still more powerful patrons, some of whom may reside outside the village at the district or provincial level. The two or three factions found in nearly every rural settlement are usually organized and led by the more powerful patrons in the village.

3. A Social Profile of the Beneficiaries

The project's beneficiaries include a large group of farmers who are cultivating semi-irrigated land. Some are already using HYV; others are not. Since it will be easier to get a farmer who is now using HYV to accept a new, more drought-resistant HYV than it will be to get a non-HYV user to accept a whole new technology, the project's beneficiaries can be grouped into two categories: initial target group and ultimate target group. The major characteristics of each group are described below.

The initial target group -- the farmer planting HYV on semi-irrigated land -- is generally a sub-optimal producer of HYV, receiving yields far below those cultivating HYV on fully irrigated fields. As noted earlier, the main reason for this lower production is that this farmer has insufficient water available for his wheat. Deficient water in itself results in lower yields, but in addition these farmers must use a smaller amount of fertilizer, one commensurate with the amount of water available, and this depletes the yield potential still further. Moreover, as pointed out in the Social Structure section, water distribution is socially controlled.

Many of the HYV farmers on semi-irrigated lands are faced with a number of other constraints. For example, most of the semi-irrigated lands are located in the relatively more remote areas of the province. The main road usually follows a river or stream-bed, and larger villages and towns are located at strategic junctures along these water courses, e.g., at a confluence. These areas, in general, have adequate wa while villages located at greater distances from these rivers and streams

have less water available. Most of these latter villages are not only removed from necessary water supplies, but they are also at a disadvantage in terms of their access to other inputs and markets. While an entire village might be disadvantaged in this way, the richer, more powerful villagers are relatively less disadvantaged, being able to utilize their wealth and influence to obtain these scarce resources.

The major resources other than water are cash/credit, fertilizer, and labor. As noted earlier, wealthier families tend to remain intact longer and have larger extensions than families with fewer resources. Obviously there is an advantage in numbers. Not only can these family members and close kin be relied upon for labor assistance when needed, but they provide one with still more kinship, friendship, and patronage ties through which access to other resources can be gained. Since most HYV users on semi-irrigated lands are sub-optimal producers, they have less resources with which to support these larger kinship, friendship, and patronage relationships; and thus some of the advantages derived from these wider, more extensive ties are lost to the sub-optimal HYV producer.

The relative deprivation faced by the HYV user on semi-irrigated land, however, still leaves him somewhat better off than the non-HYV user. Many of these latter farmers face such overwhelming water deficiencies that they are simply unable to cultivate HYV; others have not yet been convinced of the productivity of HYV and their own ability to undertake the new technology. In general, all of the disadvantages faced by the HYV user on semi-irrigated land are applicable to the non-HYV user: small, less extensive kinship, friendship, and patronage ties; less access to cash/credit; and a smaller available labor pool.

In terms of relative deprivation, with the exception of agricultural laborers, the non-HYV user on semi-irrigated land is likely to be among the poorest of a given village, particularly if he resides in a village where the adoption of HYV has been high. Additionally, there is a greater possibility that this non-HYV farmer is a sharecropper or a renter, rendering him still more powerless and impoverished.

It is obvious then why this project has selected the farmer on semi-irrigated land at its primary target beneficiary. He represents a large majority of the farmers cultivating irrigated wheat and, depending upon whether he is currently an HYV user or not, he suffers various degrees of relative deprivation. Not all of these farmers, of course, represent the poorest of the poor, but a substantial number of them, especially the non-HYV users, fall within the lower socio-economic class. The project's beneficiaries therefore are clearly among those designated for U.S. assistance under the Congressional mandate.

The next question that arises, then, is what will be the time of the distribution of these benefits. Clearly some HYV users on semi-irrigated land could be helped immediately through the adoption of more

suitable cultivation practices (earlier planting, proper seed depth, weeding, etc.). Production increases resulting from such assistance, however, are not likely to be dramatic. Significant increases will only when the technological package of new HYV and appropriate practices is disseminated, which will begin about the third year of Phase I. Since it will be much easier to persuade an HYV user to undertake another type of HYV than it will be to get cultivators of local varieties to try HYV, the former group will likely be the first to benefit, or at least comprise the greater portion of beneficiaries. As the project proceeds, however, there is no reason why the farmers using the indigenous varieties cannot participate in proportion to their numbers, providing of course that their water constraint is not beyond the reach of technological improvement and that they have a greater access to credit through the ADB.

By Phase II, the project will expand the target group to include the dryland farmer. A social profile of this beneficiary will be developed in detail during Phase I.

4. Socio-Cultural Feasibility

There are no major socio-cultural impediments to the success of this project, nor are any changes in the socio-cultural milieu required. The project aims at modifying and improving an existing technology that has already been accepted by more than 85 percent of the irrigated wheat farmers of certain provinces (Baghlan, Kunduz, Takhar). In the decade or more since HYV was first introduced, no major socio-cultural constraints have presented themselves. Although farmers of the higher socio-economic strata are endowed with certain advantages in the cultivation of HYV, they have by no means dominated its production. Every class, including some of the very poor, has been represented in HYV farming. Similarly, every ethnic group -- Uzbek, Pushtun, Hazara, and Tadjik -- has at least some of its members doing HYV. The only groups which have been relatively excluded from HYV are sharecroppers and those without any access to land (i.e., farm laborers). The high rate of adoption of HYV found in certain provinces, therefore, is proof that HYV technology is compatible with the extant socio-cultural setting.*

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* This project recognizes that basically, access to water, a major constraint, is socially controlled. Rather than attempting to change the social structure which regulates water distribution -- a difficult if not impossible undertaking in the absence of water rights legislation -- the project seeks to modify and improve the existing technology -- HYV -- such that it can accommodate itself more readily with the existing socio-environmental conditions.

Resistance, as noted, will come from the non-HYV users on semi-irrigated land. These are usually the more traditional farmers and are less likely to adopt a technological innovation that differs greatly from their past practices. But again, this project does not entail radical changes for this farmer (and hardly any changes for the current HYV users), and the high rates of HYV adoption by a broad range of other farmers indicates that their reluctance is not insurmountable, particularly if an effective demonstration campaign of HYV's benefits is undertaken by the extension service.

Oftentimes when HYV (rice, corn or wheat) has been introduced in other countries, there has been an initial problem in getting people to eat the new grain; its consistency, taste, smell, color and other characteristics were not preferred by the people. To a certain extent this was a problem in Afghanistan. In time, however, people not only became accustomed to the slight change in color (HYV is dark brown, while native varieties produce a light brown flour), but came to recognize that by mixing HYV with local varieties the baking of bread became easier and more efficient. Combining HYV and local varieties produces in the milling process a flour that is (1) more resistant to scorching in the bread ovens, and (2) because of its consistency adheres better to the oven walls and thus fewer loaves drop into the oven coals and are spoiled. Thus, there is little or no problem in regard to palatal preference in producing HYV.

5. The Diffusion of Benefits

Mention has already been made of the temporal requirements for the expansion of benefits from initial beneficiaries (current HYV users) to secondary beneficiaries (non-HYV users). But it is also expected that benefits from this project will diffuse beyond these two primary groups. The major beneficiaries of this diffusion will be those wheat farmers cultivating fully-irrigated land, the great majority of whom are already doing HYV. Some of the varieties of new improved seed will be of shorter duration (one way of decreasing wheat's demand on the village irrigation supply), and many farmers on fully-irrigated fields who are double-cropping, therefore, are likely to adopt these new, shorter-duration varieties, since a time-saving of even a week or 10 days can be critical (see Technical Analysis section).

On the other hand, as part of the project's efforts toward increasing total wheat productivity (and thus releasing wheat fields for production of higher-value crops), a portion of the research will be devoted to discovering and testing still newer strands of HYV which provide both higher yields and better resistance to disease (particularly rust). Most of the benefits in this regard, of course, will go to the farmer on fully-irrigated fields. From an income strategy viewpoint he is not a primary beneficiary, but given the project's desire to increase total wheat production with less irrigated land planted to wheat he cannot be ignored.

It should be noted here that the stress is on productivity. While it is critical that the genetic basis of HYV now in use in Afghanistan be expanded as rapidly as possible to forestall major wheat losses due to rust or other disease, it is unlikely that a farmer will substitute a new variety of HYV for his current variety unless there is a payoff, namely, a higher yield (or lower costs, or similar trade-offs).

For the most part, the diffusion of the project's benefits (if the past can be any guide) should be rapid and unencumbered both within and beyond the intended target beneficiaries, the wheat cultivators on semi-irrigated land. Extensive networks of kinship, friendship, and patronage permeate the rural countryside and serve as information channels. The value of a technological innovation which is well-adapted to local socio-economic-environmental conditions should spread quickly and effortlessly throughout the rural area. Incidentally, it should be mentioned that much of the high adoption of HYV was achieved without the assistance of an active and well-placed extension service.

If all things remain equal, there is no reason why the benefits of this project should not endure over a long period of time. Ceteris paribus conditions, however, do not hold in the real world, and drastic changes in the costs of inputs, e.g., fertilizer, labor, seed, or declines in the price of wheat might make the cultivation of HYV somewhat less attractive, particularly among the lower socio-economic strata. The government's Wheat Storage and Price Stabilization Program and its seed and fertilizer monopolies, however, should mitigate significantly the possibility of such occurrences.

6. Social Impact and Equity

The project's beneficiaries represent a broad range of socio-economic and ethnic types. The benefits of this Integrated Wheat Development Project should impact to some extent on all strata, i.e., Tadjiks as well as Hazara, lower classes and middle classes, owner-operators and renters. Given certain production constraints discussed earlier, however, it is not likely that each stratum will benefit equally. For example, HYV producers on semi-irrigated fields with relatively good water supplies will undoubtedly benefit more than those on semi-irrigated fields with very poor water supplies (since increased drought resistance in HYV is inversely proportional to increased yields); and a farmer with extensive kin and friendship ties will have greater opportunity to procure loans and engage in labor exchange arrangements than will those with less extensive ties. It is obviously beyond the project's ability to change these factors, it being a better approach to dampen these iniquitous tendencies through still more adaptive research and extension and the encouragement of the ADB to expand its credit to small farmers. Moreover, by focusing squarely on cultivators o

semi-irrigated fields, the project will decrease the moderate income gap that has arisen, on the one hand between HYV users and non-HYV users, and, on the other hand, between those on semi-irrigated and those on fully-irrigated lands.

7. Women in Development

As stated earlier, Afghanistan is a very conservative Muslim country, in which the activities of women are relatively restricted through the institution of purda, or seclusion. Most women do not participate in the agricultural cycle at all, although some families may allow or require their women to assist in the harvesting of wheat. This project, thus, will have little direct effect on enhancing the participation of Afghan women in the development process (although they may within the domestic setting have an important input in the decision to substitute HYV for indigenous varieties or to adopt still newer HYV).

Indirectly, of course, by increasing family income, the project will provide a woman and her children with increased amounts of food, clothing, and medicine. Moreover, she may not be a passive beneficiary in this regard but may have an important role in deciding how such additional income will be spent.

A peculiar and difficult-to-evaluate consequence of this income-increasing wheat project concerns the recent trend in provincial areas among nouveau riche, the upwardly mobile middle class, and others to use purda as a status symbol, in effect demonstrating through the seclusion of women, symbolized by the wearing of the chadari, that one's economic situation is sufficiently comfortable that the women can be removed from all "income-earning" activities. Significantly, women themselves frequently encourage their husbands to purchase a chadari and at least publicly play the role of women-secluders. It is likely, therefore, that seclusion and chadari-wearing will become more prevalent in Baghlan as incomes increase among currently non-purda-observing families.

C. Financial Analysis and Plan

1. Recurrent Budget Analysis

The GOA budget is divided into two parts: the ordirary budget which funds most salaries and other recurrent expenses; and the development budget, which funds development activities. Analysis of the Ministry of Agriculture's Development Budget for 1977 shows that only 42% of expenditures come from internal sources; the balance is in the form of loans and grants from donor countries and agencies. Any research undertaken is funded by the development budget. The GOA funds the entire ordinary budget from internal sources.

Recurrent expenses necessary for the GOA to support Phase I will be minimal. Salaries of extension agents are already being paid. Few additional extension agents will be employed as a result of this project. Additional costs that will be necessary to support the project both during its inception and upon completion are the Baghlan Research and Extension Center support and maintenance costs, vehicle spare parts and maintenance costs and the salaries of the research staff in Baghlan and in Kabul.

Research technicians and support personnel will be newly hired to staff the Baghlan Research Training Center. The salary scale for GOA civil servants varies from $29.00 per month for clerical personnel to $134.00 per month for department heads. Allowances for employees with diplomas range from $2.25 per month for Bachelor's Degrees to $9.00 per month for Ph.D's. Assuming newly hired personnel would be in the middle of the salary scale and assuming 10 new employees would be necessary to support this project in Baghlan .8% would be added to the MOA's annual research budget. Research technicians will also be working full time on wheat research in the Kabul Research Center. Assuming five additional full time researchers working on wheat as a result of this project this will add less then .5% to the MOA's Research Budget. Other major recurrent costs are vehicle maintenance, spare part and support costs which will be needed to assist extension agents in reaching farmers. Based on GOA costing data this cost represents 6/100 of 1% of the MOA's Extension Department Budget per vehicle per year. No more than five such additional vehicles will be required. The only other additional cost the GOA will bear as a result of this project is approximated at $20,000 in air fare for participants funded under the contract. This will be spread over 4 years and should not present any funding problem.

Based on this analysis, the recurrent costs of Phase I to be funded by the GOA during implementation and after the AID project ends represent no significant burden to the GOA.

What will the cost to the GOA be if this project is replicated on a national scale? MIAC proposes reducing the number of research stations now operated by the MOA from 10 to three. The rationale is to have efforts concentrated on three regional functioning centers rather than spreading out the limited qualified research technicians and research equipment among many with dubious results. Phase I proposes the construction of a Regional Research Center in Baghlan to concentrate initially on irrigated wheat research but which would become the focus of dryland wheat research. Project funds will be used to equip this center as well as to supplement the existing equipment at the National Research Center in Kabul. The Kabul center will be a second station, coordinating the national research effort. MIAC proposes that the third Center be located in the Helmand Valley to concentrate on irrigated wheat research.

The capital outlay needed to construct and equip a center similar to the one in Baghlan is estimated at $650,000 (construction of the center $410,000, land cost and site development $35,000, equipment $145,000, estimated inflation for two years $60,000). The MOA's Research Department Budget line items for capital improvements and equipment is approximately $30,000 for 1976. While this represents a temporary 20 fold increase in this budget item over the next several years, the increase is from a small base and the GOA could probably finance such an expansion.

Operational costs, however, will be minimal and could easily be funded internally from GOA sources. With merely the consolidation of research personnel in regional locations little additional staff need be hired thereby having no effect on the budget. After the center is constructed and equipped other operational costs will be limited to fuel for the tractors and miscellaneous supplies which should not be a burden to the GOA.

On the extension side of Phase I, 20 houses cum offices are to be constructed in Baghlan province to provide bases of operation for extension agents. These houses are to be built in rural areas where adequate housing is non-existant. The cost of one house is budgeted at $5,000. The cost of extension equipment for this project including slide and movie projectors, cameras, easels and miscellaneous instructional equipment is estimated to total $50,000 or $2,500 per house. Therefore, the total cost of one operational house cum office is estimated at $7,500. Assuming a direct relation of these houses to rural population, replication on a national scale would be of questionable feasibility. Rural population in Baghlan province is estimated by the SUNY Demographic Survey to be 210,488 for which there will be 20 houses. Rural population nationally is estimated by the same survey to be 8,503,824. That would mean approximately 800 houses would be needed to expand nationwide.

At a cost of $7,500 each the cost ($6 million) is prohibitive. The Extension Department line items for equipment and capital improvements in 1976 total approximately $700,000. If the construction of 800 houses were undertaken over a ten year period it is possible that they could be financed internally if a high enough priority were put on them.

Beyond the initial capital investment additional recurrent costs to the GOA would be minimal. Extension agents are currently on board so no additional personnel would have to be hired. There will be the added cost of the electrical supply to operate extension demonstration equipment, which should present no significant problem to the GOA.

To summarize the results of this analysis, it is likely that the GOA will be able to furnish adequate support to Phase I of the Integrated Wheat Development Project and that they have the wherewithal to internally finance replication on a national scale. But, it would require some shift in GOA priorities and the GOA would almost certainly solicit donor assistance for a nationwide program.

2. Financial Plan and Budget Tables

The total cost of Phase I is estimated at $5,869,600. The AID portion, $4,378,000, will fund salaries of US technicians, participant training, various commodities detailed in the Input Section, and construction of the Baghlan Research Extension Center and 10 houses cum offices for extension agents. All AID funding will be through the MIAC contract.

The GOA will contribute land for the Baghlan Research Center and the 20 house sites for extension agent houses, the portion of salaries and operating expenses of the National Research Center and the Baghlan Research station, the construction cost of 10 houses, and various local operating expenses of the project.

The total estimated GOA contribution of $1,491,600 meets the 25% requirement and satisfies section 110 (a) of the Foreign Assistance Act. A detailed cost breakdown and a projection of obligations and expenditures follows:

Financial Analysis

OBLIGATIONS

USG

	FY-1977 PM	FY-1977 $	FY-1978 PM	FY-1978 $	FY-1979 PM	FY-1979 $	FY-1980 PM	FY-1980 $	Total PM	Total $
1. CONTRACT PERSONNEL	60	500	116	854	-		174	1,644	352	2,99
Senior Extension Advisor - Baghlan	12		12				24		48	
Senior Research Advisor - Kabul	-		24				24		48	
Research/Production Agronomist - Baghlan	12		12				24		48	
Curriculum Dev./Instruction Sepecialist - Baghlan	12		12				24		48	
Economist/Anthropologist - Baghlan	12		12				24		48	
Extension Agronomist - Baghla	-		-				24		24	
Short-term Consultants	-		34				30		64	
Secretary (U.S. - Local Hire)	12		12				-		24	
2. PARTICIPANT TRAINING	-	-	193	232	-	-	306	373	504	60
Long-term - U.S.			168				276		444	
Short-term - U.S.			6				6		12	
Short-term - Mexico			24				24		48	
3. EQUIPMENT AND SUPPLIES		-		311		-		-		31
Research Station Equipment				261						23
Extension Field Equipment				50						5
4. CONSTRUCTION		-		464				-		46
Regional Research Extension Center, Baghlan				410						41
10 Residential Quarters				54						5
TOTAL		$500		$1,861				$2,017		$4,37

Project Expenditures

AID	FY-78	FY-79	FY-80	FY-81	T o t a l
Contract Technicians	$ 624,000	$754,000	$790,000	$ 830,000	$2,998,000
Participant Training	68,000	164,000	178,000	195,000	605,000
Research Equipment	243,000	18,000	-	-	261,000
Extension Equipment	50,000	-	-	-	50,000
Construction of Baghlan Research Center	100,000	310,000	-	-	410,000
Construction 10 house	26,400	27,600	-	-	54,000
T o t a l A I D	$1,111,400	$1,273,600	$968,000	$1,025,000	$4,378,000
GOA					
Research Center Site Development	20,000	-	-	-	20,000
10 Houses cum Offices	26,400	27,600	-	-	54,000
Equipment now on site	50,000	-	-	-	50,000
Local Expenses (Trust Fund)	42,000	44,100	46,300	48,600	181,000
Operating Expenses:					
Kabul Research Ctr.	168,000	205,000	246,000	260,000	879,000
Baghlan Research Ctr	5,700	11,900	18,800	26,300	62,700
Baghlan Extension Budget	9,100	19,300	30,300	42,500	101,200
Salaries of Participants	10,000	10,500	11,000	11,600	43,100
Participant Airfare	4,200	4,400	4,700	4,900	18,200
Vehicle Support Costs	10,900	11,400	12,000	12,600	46,900
Land Cost 20 Houses	10,000	10,500	-	-	20,500
Land Cost Research Station	15,000	-	-	-	15,000
T o t a l G O A	371,300	344,700	369,100	406,500	1,491,600
G R A N D T O T A L	$1,482,700	$1,618,300	$1,337,100	$1,431,500	$5,869,600

Exchange rate Afs.44.75 = $1.00

D. Economic Analysis

1. Wheat Production and Demand

Estimated national wheat production in 1975 was 2.85 million tons. Over the period 1968-1975 wheat yields grew by an average 2.8 percent per year. Continued yield increases of this magnitude for 15 years (until 1992) would increase total production to 4.5 million metric tons on the same amount of land that is currently in use. Such continued gains, however, constitute an unrealistic hope. Past increases occurred on irrigated land and were due largely to the introduction in 1967 of high yielding varieties and to a lesser extent to the use of fertilizer. High yielding varieties are now predominant on irrigated fields. Without further innovations yield increases can be expected to diminish perhaps approaching a point of stagnation. Estimates contained below indicate that in areas such as Baghlan yields may only increase by a few percentage points totally, not yearly, without new technological inputs and improved extension methods. The estimate of 4.5 million tons produced in 1992 without new innovations is thus clearly optimistic. (An increase of one percent per year in productivity would only raise production to 3.4 million metric tons.)

There seems to be little reason to expect that any major new lands will be brought into wheat production shortly. There was no expansion of wheat lands under cultivation between 1968 and 1975 and the Seven Year Plan does not anticipate any increase between 1975 and 1982. All production changes will thus be due to productivity changes.

The demand for wheat by 1992 will be primarily determined by population size and income. If current population growth continues, the population of Afghanistan will be approximately 24.6 million.* Present consumption (including seed and waste) is estimated to be 162 kgs per capita. In 1992 this level of consumption would require 4.0 million tons. Incomes are however expected to rise. The GOA Seven Year Plan projects a 3.8 percent per capita rise in incomes. The income elasticity of wheat has been estimated to be of the order of .5. Such figures if they obtained throughout the next 15 years imply a demand for wheat of 5.5 million tons or 223 kgs per capita. This would seem to be an upper limit on the demand for wheat since both the target rate of economic growth is quite ambitious and the income elasticity for wheat is probably inversely related to income levels, i.e., as income levels increase the rate of increase in demand for wheat slackens. Taking a middle position, a two percent per capita growth rate would yield a demand for wheat in 1992 of 4.7 million metric tons or 192 kgs per capita.

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*This uses SUNY estimates. If higher GOA figures were used the population base in 1992 would be on the order of 30 million.

A demand of 4.7 million tons is 200,000 tons in excess even of the overly optimistic supply projection with no fully irrigated wheat land released to other crops. In order for both self sufficiency in wheat and a reduction in irrigated land planted to wheat to be achieved, an increase in wheat yields even more dramatic than what has occurred with the original introduction of high yielding varieties will have to be sustained over the next 15 years. The need for concerted efforts such as this project are thus essential if long-run Afghan goals on wheat production are to be met.

2. An Economic Profile of the Beneficiaries

The direct beneficiaries of the limited Phase I project will be the irrigated-wheat farmers of Baghlan Province especially those with semi-irrigated land. The total number of farmers in Baghlar is estimated to be about 28,000, more than 50 percent of whom are owner/operators. Landlords comprise perhaps 10 percent and sharecropper/renters the remainder. Nationally, more than 60 percent of farmers grow some wheat. In Baghlan Province it is estimated that 80,000 hectares of wheat are planted on the 100,000 ha. of irrigated land. In addition, about 50,000 ha. of dryland wheat were planted in 1977 in the Province.

While no good figures on farm size distribution are available in Baghlan Province, most farmers are small. In 1975, of the more than 1400 sales of fertilizer made by the Afghan Fertilizer Company in Baghlan, 49 percent were for plots of two hectares or less.(The mean plot size was three hectares.) In a 1972 survey of 269 farms in Baghlan, 41 percent consisted of two hectares or less, and 76 percent contained not more than four hectares. In areas of government sponsored settlement, three hectares of land were normally given to farmers, although in some cases only two hectares were provided. All of these figures relate to irrigated farms. Virtually no information is available on the size of dryland farms.

It is roughly estimated that a "composite" irrigated farm of one hectare could grow crops valued at $700 at farmgate prices.1,2

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1. A composite farm is one in which crops are planted in the same proportion as they are for the entire province. Thus, 25 percent of irrigated land in Baghlan Province is planted to local wheat; the same percentage applies to the composite farm. Of course, no one farmer grows all the crops grown in Baghlan; it is merely convenient for exposition.

2. Value of production omits a small amount of other crops and livestock production. Livestock related costs of crop production were also deleted. The livestock component of farm income probably does not significantly alter net income. Crop by-products (animal feed) and livestock consumption and sales would increase income, but livestock related costs for farm (con

Costs of production are more difficult to determine. Using a 1973 study adjusted for price changes as an estimate of production cost would yield a net return to the owner's labor and land of $455 or $65 per capita. A farmer with a two hectare farm may be able to double his output, but his costs would be more than doubled because hired labor would need to be more than doubled. Thus farmers with two hectares of land would earn less than $130 per capita from their agricultural pursuits. This would be the result for an owner/operator. Obviously, renter/sharecroppers would receive less. Thus median farm income for irrigated farms in Baghlan Province is certainly less than $130 per capita and probably is less than $100.

From available data, the percentage of a farm's land planted to wheat is independent of farm size. As farm size increases, marginal costs probably increase for reasons cited above. Thus a small farmer who participates in the project would benefit proportionately more than a large farmer. If participation in the project is independent of farm size, the income distribution pattern of Baghlan Province would become more equal. Farm laborers would also benefit as demand for their service increases.

Secondary beneficiaries will be those irrigated wheat farmers in the four northern provinces of Kunduz, Balkh, Takhar and Samangan. These are the provinces for which the packages developed at Baghlan should be most appropriate. In these areas there are approximately 135,000 farmers working irrigated and dryland farms. Of these, 60 percent are owner/operators, 10 percent are landlords and 30 percent are sharecropper/renters. This distribution is virtually identical to that of Baghlan.

Another group of secondary beneficiaries from Phase I activities are the dryland wheat farmers of Afghanistan who will ultimately benefit from the agricultural research in dryland wheat at the Kabul Research Center. Little is known about dryland wheat farming and the economic characteristics of these farmers. Since these beneficiaries will not be directly affected by Phase 1 activities, no attempt has been made to analyze their situation.

The last group that will be affected by the project are wheat consumers. The project, through production increases, should help eliminate the periodic shortages of wheat and the concomitant price increases. Those most benefiting from more assured wheat supplies will be the people most susceptible to price increases - the non-farming poor. The degree to which they will benefit has not been estimated.

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work and investment costs would decrease income. In any case, livestock holdings by small farmers in Baghlan are small. A 1972 study of 264 farmers showed that farmers with less than two hectares owned an average of 1.3 oxen, 1.3 poultry and less than one of all other livestock.

3. Anticipated Economic Impact

The major impact of the project for the direct beneficiaries will be in the form of increased income derived from greater yields on wheat fields. Ultimately, as project goals are achieved, the benefits will increase a second time as land previously sown to wheat is switched to the production of higher value crops. Attention here is focused only on the benefits to be derived from increased wheat production on irrigated lands. Too little is known at this point on the possibilities for dryland wheat production to hazard a guess regarding costs and benefits.

Two technological improvements in irrigated wheat production have been introduced in Afghanistan in the recent past - high yielding wheat varieties and concomitantly, fertilizer. The high yielding varieties were introduced in 1967/68. Figure 1 gives a very rough indication of the rate of adoption of each of these production improvements for Baghlan Province. The high yielding varieties were relatively inexpensive and easy to utilize and produced dramatic increases in output. These are perfect conditions for a rapid spread effect and a high total participation rate. Fertilizer on the other hand, is very expensive and takes more knowledge in applying it in correct amounts. Often, when risk and cost are taken into account, fertilizer without good extension efforts is not very profitable. In Baghlan Province fertilizer usage for wheat probably has a benefit-cost ratio of less than 1.5 at the present time, a low figure for small farmers when risk is considered. Consequently, a relatively low rate of adoption of fertilizer has been observed.

The package to be developed is expected to spread more rapidly in the early project years than did the high yielding varieties but to reach a lower level of peak participation. The more rapid spread in the early years reflects the anticipated component in extension services which would retard the usual dissipation of the spread effect. Moreover, the project plans to have many demonstration plots throughout the province, thereby providing more nodes from which the spread effect can occur. The lower peak participation is expected because the costs to a farmer (and hence his risk) of adopting the new technologies is greater than it was for simple adoption of high yielding varieties over local varieties and the overall benefits may not be as spectacular.

The logistic curve for "project package" in Figure 1 might be a reasonable target to set for rates of adoption of the technology for Phase I. Within five years the project recommendation would be implemented on 32 percent of the irrigated wheat land of Baghlan and within 10 years this figure would rise to 68 percent.

TableII presents a rough estimate of irrigated wheat production in Baghlan without the project, with the project and the incremental output of the project, assuming no change in area devoted to wheat production. These outputs are derived from the adoption models and average wheat yields for Baghlan Province for fertilized high yielding wheat varieties, unfertilized high yielding varieties and local varieties.[1,2]

Yields in Baghlan Province are not expected to increase much without the project, because 75 percent of the wheat land is already under high yielding varieties with little expected further expansion. While fertilizer usage is low, it has been available for ten years, and without a new impetus to spur its usage, little further spontaneous expansion for wheat can be expected. If this pattern is exhibited on a national scale, it does not bode well for increased wheat production without a concerted new effort to raise productivity levels. The increased production from the project would by the eighth year of extension of the new package increase total output of irrigated wheat in Baghlan by 28 percent. At full adoption, production would have increased by more than 48,000 metric tons per year. A rough estimate of dryland production increases by 1985 in Baghlan Province would be on the order of 2500 tons if 15 percent of the dryland farmers participated by that year.

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1. It is assumed for exposition purposes that 70 percent of the land on which the new technologies will be used was being fertilized before (up to the point where all fertilized land has been switched)and that the remaining land on which the new technology will be used was land planted to high yielding varieties. There is in addition, an anticipated switch from local varieties to high yielding varieties from 75% to 90% of Baghlan farmers by 1985.

2. It is rather unrealistically assumed that the full production increase is achieved in the year of adoption. More realistic rates of progress would alter the year by year total slightly but overall output almost not at all.

FIGURE 1. Adoption Rates for Techno ogical Impro
for Irrigated Wheat Prodi.ction

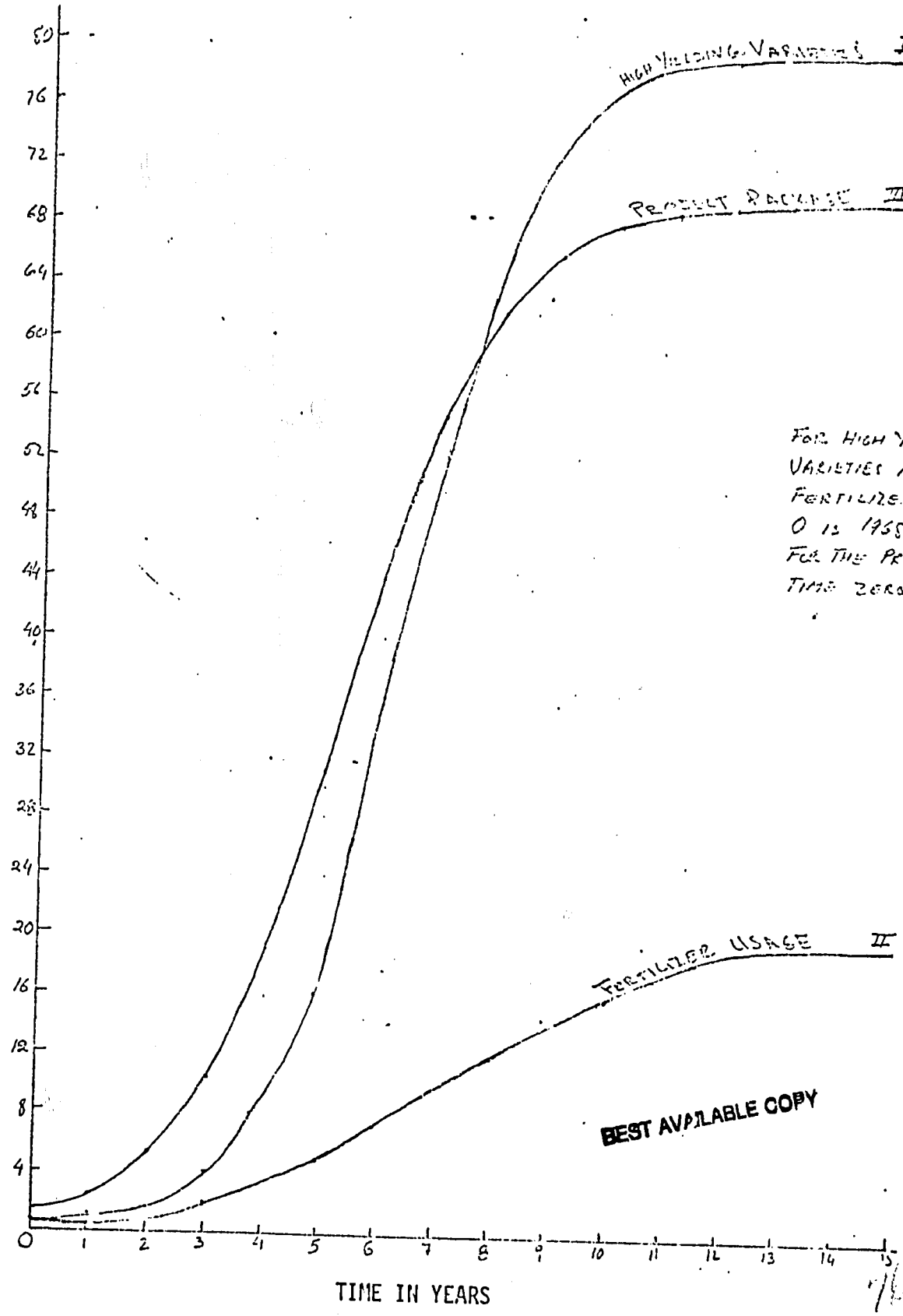

TABLE II

PROJECTED INCREMENTAL IRRIGATED WHEAT PRODUCTION
IN BAGHLAN PROVINCE WITH THE PROJECT
(1000 Metric Tons)

YEAR	WITHOUT PROJECT	WITH PROJECT	INCREMENTAL PRODUCTION
1978	152.9	152.9	-
1979	154.0	154.0	-
1980	154.7	154.7	-
1981	154.9	156.0	1.1
1982	155.0	158.2	3.2
1983	155.1	161.5	6.4
1984	155.3	166.5	11.2
1985	155.3	173.9	18.6
1986	155.3	184.1	28.8
1987	155.3	192.5	37.2
1988	155.3	198.1	42.8
1989	155.3	201.1	45.8
1990	155.3	202.8	47.5
1991	155.3	203.7	48.4
1992	155.3	204.0	48.7

For an individual farmer growing two hectares of high yielding variety wheat but without fertilizer (the most common wheat production technology used in Baghlan) the following table indicates the expected changes in his net income. Fertilizer recommendations are assumed not to differ from current ones for costing purposes and hired farm labor (or increased family labor incrementally valued at hired farm labor cost) is assumed to increase by 10 percent.

	Without the Project	With the Project
Wheat Production	3.8 MT	6.0 MT
Farmgate Value	$ 553	$ 873
Estimated Production Costs	373	549
Net Income	$ 180	$ 324

This change in net income amounts to about $20 per capita. The benefit cost ratio for an individual farmer under these rough assumptions would be 1.82. While this does not quite reach the often cited threshold figure of 2.0 necessary for rapid small farmer acceptance of new technology, it is felt to be acceptable, especially given the circumspection with which this number should be viewed. The profitability to a farmer of a newly developed package will need to be carefully monitored, however.

4. Project Economic Costs

The economic cost of the project only includes the direct costs associated with the project and neglects the very important category of economic costs borne by the farmer. The costs are calculated using both empirical values and a shadow price for foreign exchange. The summary table is shown below. All foreign assistance is included.

A. Empirical Values	Economic Costs ($ thousands)
undiscounted	$ 5,614
discounted at 12%	$ 3,836
B. FX shadow price	
undiscounted	$ 6,763
discounted at 12%	$ 4,679

In calculating the economic costs, all costs of technical assistance and participant training were included. No costs associated with the on-going activities of Kabul and Baghlan research centers were included in the economic costs. It was felt that there would not be a diminution of other activities at these centers to accommodate this project, and there is hence no associated opportunity cost. The personnel and facilities to be used were already focused on wheat reserach. This project will sharpen the focus enhance the capability to undertake the necessary activities.

Foreign exchange costs were shadow priced at 56 afs per dollar, an increase of 25 percent.* It was assumed that wages did not need to be shadow priced. The local wage bill is small in any event, as incremental employment is not very extensive. The social cost of capital was taken to be 12 percent but this may in fact be low. Lastly, it was assumed that relative prices would remain constant.

No comparative cost effective analysis will be presented. While alternatives to the present approach could be made conceptually, this has not been done in any way sufficient to allow cost comparisons to be made.

Tables III and IV show the economic cost breakdown by function and year.

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* This percentage increase is justified in the Helmand Project Phase I

TABLE III

Incremental Economic Costs (Undiscounted) of Establishing and Operating Integrated Wheat Research and Extension Program for Irrigated Wheat and for Dryland Wheat Research
($ 1000s)

	(1) Construction[a/]	(2) Contingency	(3) Equipment	(4) Supplies & Maintenance	(5) Personnel	(6) Participants
FY 78	278	20	317	44	589	94
79	243	20	-	44	745	124
80	-	-	-		716	160
81	-	-	-		748	115
82	-	-	-		30	39
83	-	-	317			15
84	-	-	-			-
85	-	-	-			-
86	-	-	-			-
87	-	-	-			-
88	-	-	317			-
89	-	-	-			-
90	-	-	-			-
91	-	-	-			-
92	-233	-	-	44	30	-
Total	288	40	951	660	3,128	547

a/ Includes land costs

TABLE IV

Incremental Economic Costs (Undiscounted) of Establishing and Operating Integrated Wheat Research and Extension Program for Irrigated Wheat and for Dryland Wheat Research with Foreign Exchange Shadow Priced at 56 Afs/$
($ 1000s)

	Construction[a/]	Contingency	Equipment	Supplies & Maintenance	Personnel	Participant
FY 78	286	21	396	51	726	118
79	251	21	-	51	921	155
80	-	-	-		885	200
81	-	-	-		925	144
82	-	-	-		30	49
83	-	-	396			19
84	-	-	-			-
85	-	-	-			-
86	-	-	-			-
87	-	-	-			-
88	-	-	396			-
89	-	-	-			-
90	-	-	-			-
91	-	-	-			-
92	-241	-	-	51	30	-
Total	296	42	1,188	765	3,787	685

a/ Includes land cost.

5. Internal Economic Rate of Return

Before embarking on this section it is well to remember that the "data" are often little more than guesswork, somewhat educated. One of the project outputs is to be a detailed analysis of cost and benefits.

The costs used in this analysis are the project economic costs and the incremental farmer costs of production. These costs include several items which are at most only partially allocable against benefits related to incremental irrigated wheat production in Baghlan Province during Phase I. These include participant training costs and technician costs which should be allocated over a much broader range of benefit possibilities. Since no handy way of allocating these costs presented itself, they were retained fully and the other benefits partially attributable to them are listed at the end of the analysis. Fertilizer prices were based on world market price estimates and local farm labor was assigned its market wage rate. There may well be project related incremental costs to other entities such as the Afghanistan Seed Company. Such costs were not included in the analysis.

The quantified benefits are totally derived from increases in irrigated wheat production in Baghlan Province. Since the analysis of wheat supply and demand indicates that Afghanistan will be a net wheat importer in the future, wheat was valued at its import parity price at farmgate.

The IERR for this project is calculated to be 41 percent and indicates that the project is economically viable. (See Table V .) Since the data used is so tentative various alternative estimations were made. Valuing wheat at its domestic farmgate price reduces the IERR to 25 percent. If international commodities are shadow priced at 56 afs per dollar, the IERR becomes 42 percent. If all economic costs are 25 percent higher than estimated and shadow prices are used, the IERR drops to 36 percent, while if incremental wheat production falls 20 percent short of expectations the IERR also becomes 36 percent. Finally, a 25 percent increase in costs combined with a 20 percent reduction in incremental production yields an IERR of 31 percent. The range of estimates for the IERR, 25 percent to 42 percent, is not very great. A reduction in incremental yields of 20 percent or a 25 percent increase in costs only reduces the IERR by five percentage points (or 12 percent). Thus even though the estimates are crude, major changes would be required to reduce the IERR to an unacceptable level.

Moreover, there are other unquantified benefits emanating from the project (of course with additional associated costs). One of these is increased production of wheat on dryland farms which will occur partly as a result of the project research activities.

A second unquantified but extremely important benefit of the project arises from the broadening of the genetic base of wheat grown in Afghanistan. There is the possibility of a catastrophic crop failure if the dominant variety is attacked by a rust or other disease. The new varieties to be introduced by the project will help reduce the likelihood of widespread crop failure.

A third unquantified benefit is the aforementioned substitution of higher value crops for wheat. This will not only raise farm incomes but will also enhance the export earnings of Afghanistan.

A fourth type of benefit is related to the increase of agricultural expertise available in the country. The agricultural research and extension services should be permanently improved for all crops, not just wheat.

Finally there are the multiplier effects associated with increased farm income. There will be an increase in demand for consumer items which will be a spur for the expansion of small scale industries, industrial employment and income.

In sum, while hard data are scarce, the high IERR and the relative insensitivity to alternative estimations would suggest that the project is feasible from an economic standpoint.

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TABLE V

Benefits and Costs of the Project
($000's)

	Value of Incremental Wheat Production	Incremental Fertilizer Costs	Incremental Labor Costs	Net Value of Incremental Wheat Productio	Project Economic Costs	Net Benefits	
						Undiscounted	Discounted At 41/0
1978	-	-	-	-	1342	-1342	-952
1979	-	-	-	-	1176	-1176	-592
1980	-	-	-	-	920	-920	-328
1981	308	-	26	282	907	-625	-158
1982	896	36	55	805	113	692	124
1983	1792	67	110	1615	406	1209	154
1984	3136	201	204	2731	74	2657	240
1985	5208	415	342	4451	74	4377	280
1986	8064	1000	485	6579	74	6505	295
1987	10416	1482	602	8332	74	8258	266
1988	11984	1799	680	9505	391	9114	208
1989	12824	1951	723	10150	74	10076	163
1990	13300	2067	746	10487	74	10413	120
1991	13552	2116	758	10678	74	10604	86
1992	13636	2134	762	10740	-159	10899	63
						70731	-31

E. Other Donor Assistance

Assistance to the GOA which is the most closely related to the IWD project includes the following:

Vocational Training: The IBRD will assist the GOA in vocational agricultural training at the secondary (high school) level. It will provide commodities and technical assistance to expand and improve three existing agricultural schools in Lashkar Gah, Farah and Baghlan and to construct and operate four new such schools in Herat, Balkh, Nangarhar and Faryab. The expansion and new construction will increase the capacity of the country's vocational agricultural schools from 2,000 to 6,300 persons. The schools will be a major source of extension agents.

Improved Seed: The ADB is assisting the GOA in a project which will produce and process improved seeds. The first (7-year) phase of the project will concentrate primarily on wheat seed production and secondarily on cotton seed. The activities will be carried out by the Afghan Seeds Company (ASC). Production will take place on four state farms (4000 ha) and on an estimated 1400 privately owned farms (8600 ha). For seed wheat, the production target for the seventh year of the project is 21,000 MT which compares with current production of 2,000-2,500 MT annually. The seed will be distributed by the Afghan Fertilizer Company (AFC). Targeted production of cotton seed is 6,240 MT by the seventh year of the project.

Agricultural Credit: The IBRD, CIDA, the UNDP (technical assistance) and the US will all provide assistance to the Agricultural Development Bank of Afghanistan (AgBank), virtually the only institutional supplier of agricultural credit in the country. The AgBank now finances a rather wide variety of agricultural inputs, including tractors, other equipment, oxen, irrigation pumps, fertilizer, seed and insecticides/herbicides. It also makes farm improvement loans.

Price Stabilization/Wheat Reserve: A team from the Overseas Development Ministry of the United Kingdom is now working on the first phase of a study which hopefully will culminate in an effective price stabilization/wheat reserve program. While tentative and not yet approved by the GOA, the objectives of the "Wheat Price Stabilization and Strategic Storage Reserve Scheme" are given as:

1. To stabilize wheat prices between a market floor price to encourage increased production and a ceiling price to protect consumers within a year.

2. To reduce the more extreme fluctuations in prices between years.

3. To stimulate increasing wheat production by providing an assured market at a fair price with associated market infrastructure, credit and agro-technical input availability.

4. To provide for the maintenance of wheat stocks in order to protect consumers from adverse price changes caused by seasonal shortages in supply and in particular to set up a reserve stock to discourage speculation.

5. To provide an organizational and management structure to efficiently satisfy the objectives 1-4 above.

6. To design a dynamic organization which can evolve to meet future needs.

Briefly, the project would create storage facilities throughout the country for seasonal short-time storage and a few large central facilities for longer term storage. A strategic reserve of from 300,000 tons at the start would be established. This would be replenished in years of high production and distributed in drought years. The details of the operation of the project and the cost have been worked out and will be presented to the Government of Afghanistan in October (1977).

The team envisages, and recommends, multi-donor assistance to the scheme if it materializes.

Agriculture Research: An Indian team is currently providing assistance to the Department of Research, Ministry of Agriculture. Only one of the seven Indian scientists is involved in wheat development. The protocol calls for up to 14 advisors to be furnished by the Indian Government. A small amount of commodity assistance is supplied. There is also a participant training component (degree and non-degree, in India). How this assistance relates to this project has been discussed as an Issue in Section I.

Other: The IBRD is helping to finance the construction of regional fertilizer warehouses for AFC, and the UNDP expects to provide technical assistance to the AFC in the handling and use of insecticides and herbicides. The Japanese are providing assistance in rice production.

These programs are directly complementary to this project.

IV. IMPLEMENTATION PLANS

A. General Description of Project Implementation

Taken in combination, the Project Design Section, the Critical Performance Indicator (CPI) Network, and Project Implementation Schedule, all indicate how the various activities are mutually supportive and complementary.

The focus and ultimate goal of the project are a number of tested "packages of improved practices" from which the Afghan farmer chooses and puts into use those most useful to him.

The basic strategy is to initiate a systems approach patterned after IRRI (International Rice Research Institute, the Phillipines) and CIMMYT (International Maize and Wheat Improvement Center, Mexico). This approach will be modified slightly in two ways. A regional training center for village level extension workers will become part of the research/extension complex, and an "outreach" program from the Center that will "saturate" an area with improved crop technology forms an integral part of the overall design.

Prior to initiating the project a detailed scope of work for the contractor will be developed. For illustrative purposes, there follows a general description of implementation based on current thinking.

Building a "Package"

Increased production stems from improving upon accepted ways of farming. One foundation stone of improvement is better seed. Others are higher fertilization levels; weed, disease and insect control; more efficient cultivation techniques; and more efficient water use. There are others, but these are among the more important.

Through relationships that have already been established, this project will be in a position to tap wheat seed from all international wheat research organizations.

Plot Trials Conducted on a Continuous Basis

Varietal candidates for screening, testing, multiplication and eventual release will be selected by the research coordinator and his various colleagues. As a first step, available irrigated wheat varieties will be released from Kabul Research to Baghlan within the first year. More drought resistant varieties will be imported to support research on varieties for partially irrigated and rainfed lands.

The next step in this systems approach is to establish regular full season plot trials on irrigated wheat at Kabul, Baghlan and

Jalalabad. Normal planting time is October and November with harvesting completed April-June. Off-season (spring) plot trials will be planted at Bamiyan in May, using seed harvested in April in Jalalabad, and harvested in September. This is a tremendous research advantage, for two complete trials can be grown in one year. As dryland varieties are available, plot trials will be initiated at Kabul and Baghlan.

At least five varieties will be selected and planted as plot trials at each of the stations. A larger number may be planted at Bamiyan. Several agronomic variables will be incorporated into these plot trials. The most important will be water requirements, fertilizer response and levels, seeding rates, date of planting and shattering and lodging observations.

Extension workers undergoing training at the Baghlan Center will assist in these trials so they can see how a "package" is developed.

Cluster Trials Conducted Annually

The same varieties grown in the plot trials will be grown as cluster trials on farmers' fields starting with irrigated varieties in the second crop year. These cluster trials will be small, 50 square meters, and are designed to compare farmer results with research station results. Additional variables will be added. At least 25 individual cluster trials (5 varieties replicated on 5 different farmers' fields) will be conducted each year around the Baghlan Center. Extension trainees, under the guidance of Center staff, will conduct these cluster trials, for they can become quite complicated, depending on the number of variables incorporated. MOA extension workers in Baghlan Province will help select the farmers to cooperate in all trials but will not be deeply involved in conducting the cluster trials.

Verification Trials Essential

Those varieties that yield best on farmers' fields (with fully irrigated and semi-irrigated fields) in the cluster trials will be grown over a wider area and on more farmers' fields at the verification trial stage starting with irrigated varieties in the third cropping season. Many, if not all, of the farmers who grew cluster trials could be expected to conduct verification trials. Each farmer will be asked to select two or three "improved wheat technology packages". Up to 50 farmers may be asked to establish verification trials of 1,000 square meters each. Here it will be important to determine which packages are most appropriate to farmers with assured water supply and those packages relevant to farmers with a water constraint.

Regular extension workers, along with trainees, all under the guidance of Baghlan Center staff, will work with farmers in conducting these verification trials.

Three crop seasons are required to complete the verification of a "package". Given the ready availability of irrigated varieties Phase I expects to have tested and verified on farmers' fields a superior variety, along with the most remunerative cultural practices applicable to one climatic and ecological area by the end of the third year. More drought resistent varieties will not be available before the fourth year. Dryland wheat varieties will just be ready for field testing by then.

Cooperating Farmers

An essential ingredient is a core of cooperating farmers. The cluster and verification trials cannot be conducted without them. Again, it will be extremely important to select a wide range of farmers, progressive as well as traditional, with access to plenty of water, as well as farmers with less water. In this way appropriate packages can be developed for a wide group of beneficiaries.

Those inputs that would normally require the farmer to lay out cash will be supplied at no cost, essentially improved seed and fertilizer. Project costs will be small, for the area is small. The farmer will supply all labor, animal power and equipment. If a trial fails for any reason on a farmer's field, he will be reimbursed, in wheat, at a level equal to his normally expected yield. The rate of failure is expected to be low, and hopefully, zero. In every case, the farmer keeps the improved seed produced. Thus, he has no "risk factor" and much to gain.

Demonstration/Intensive Wheat Production Campaign

One "package of improved practices" for a given variety will be selected for a widespread, intensive wheat production campaign throughout Baghlan Province. There will be no variables. The farmer may not incorporate every practice in the package, but that is his choice. No production inputs are supplied at this level.

This campaign would be initiated prior to the planting of the wheat crop in the fourth cropping season. This campaign becomes the absolute responsibility of the Extension Service of Baghlan Province. The research staff from the Center participate only when problems arise on farmers' fields. Such problems would probably center around insect and disease attacks.

By the end of year three, every extension worker in the Province would have been thoroughly trained in a "package of improved practices", whether for farmers on fully irrigated or farmers on semi-irrigated land. Every extension worker would be expected to work with at least five cooperating farmers, none of whom would have been involved in either the cluster or verification trials. Thus, up to 300 demonstration plots will be established in the fourth crop season, after the project begins.

The total number of farmers involved could exceed 400, for at least 25 new farmers will have been involved in each of the three preceding years.

Summary

The integration of both research and extension functions becomes very obvious as implementation of the project unfolds, The impact becomes widespread as the multiplier effect goes into operation. The multiplier effect springs form the fact that:

- dozens of new varieties are screened and tested each year;
- that two complete crops can be produced and harvested each year.
- a new set of plot trials is conducted at each of four research stations each year;
- a new set of cluster trials, with a new group of cooperating farmers, is established each year starting with the second cropping season;
- a new set of verification trials is established each year starting with the third season; and
- a new "package of improved practices" for each variety that is ready is developed at the end of the third season, leading to an intensive compaign before the fourth cropping season.

As far as the extension component is concerned:

- a new group of 25 extension field workers is trained each year;
- all extension unit supervisors receive some in-service training on new techniques and methods each year;
- extension workers have a definite input into the production package at the plot, cluster and verification stages; and
- the research/extension center staff are alwyas available and willing to "backstop" extension staff in the field.

It will be immediately recognized that a high degree of organization is required. To illustrate the complexity of the project, it is to be noted that activities during the fourth growing season will include:

- plot trials on irrigated wheat at Baghlan, Kabul, Jalalabad and Bamiyan;

- plot trials on dryland wheat at Baghlan, Kabul, and Bamiyan;

- three sets of cluster trials on irrigated wheat radiating from the Baghlan Center; and

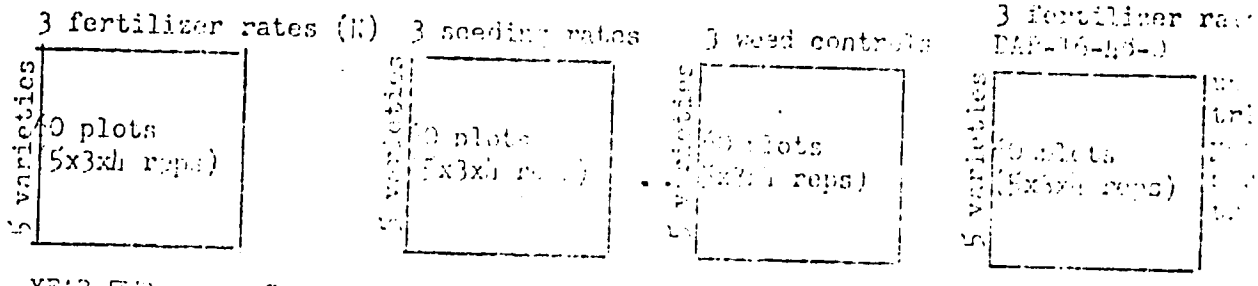
- an intensive irrigated wheat production campaign covering Baghlan Province.

The next page shows a graphical illustration of this sequence. A similar sequence would be followed in Phase II for dryland wheat. It is equally obvious that full administrative support at both the national and provincial level is absolutely essential if the Integrated Wheat Development Project is to be successful.

AREA DEMONSTRATION ON [illegible]
"Packages of Improved Practices"

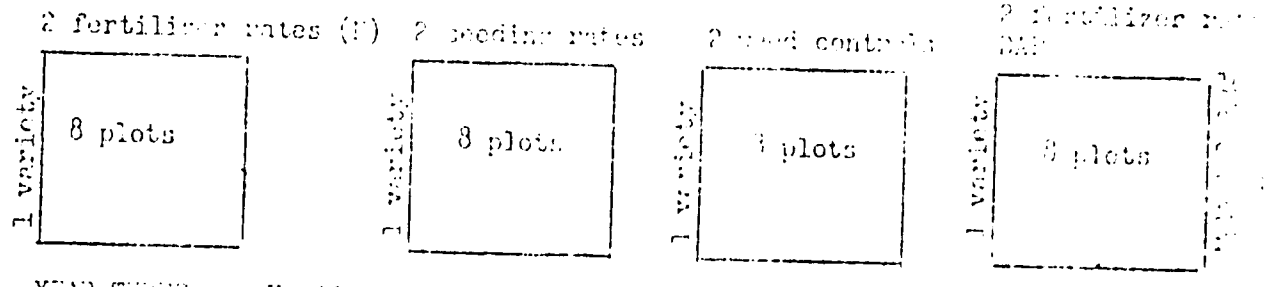
YEAR ONE on research station by Center staff.

Grow plot trials of at least 5 varieties in plots measuring 7.2 sq. meters (six rows 6 meters long, rows 20 cm apart) on the Kaplan Station. Select and incorporate as many variables as practical and necessary. Extension trainees will each grow a set of plot trials, with preferably 4 replications, under the supervision of the Center staff.



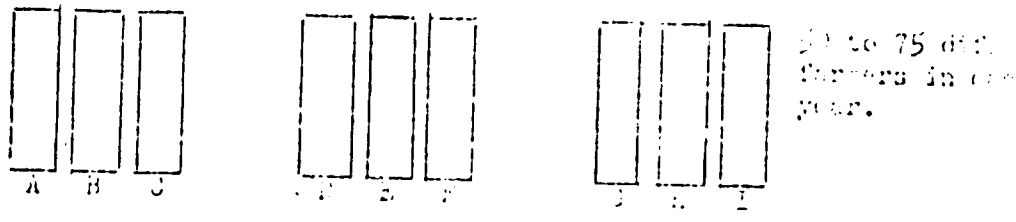
YEAR TWO on farmers' fields by Center staff.

Grow clusters of plots of 50 sq. meters each as trials on farmers' fields, to compare results of the station with farmers' results. Extension trainees will help grow the plot trials on the farmers' fields.



YEAR THREE on farmers' fields by Extension staff under guidance of Center staff.

Verification trials where the practices of the choice which yielded best on farmers' fields in Year 2 are grown on plots of 1600 sq. meters on farmers' fields. Farmers who played cluster trials in Year 2 are invited to set up test plots using different packages to verify on his own land. Each verifier would be limited to [illegible] variety, and select his choice of cultural practices.



50 to 75 diff. farmers in one year.

For example: A = Variety 2 at medium (N) fertilizer rate, hand weeded early and seeded at 3 seers per [illegible].

[illegible] 2 applied

2. Staff Development

There are several staff development components. All are important. Some have short-term implications, others long-term. Staff development is equally important to both the research and extension functions of the MOA.

Short-term Practical Training Abroad

Three MOA staff members would be selected each year for training abroad of a short-term (up to 5 months) nature. At least two of these, one research and one extension, would take part in CIMMYT's intensive and highly practical training in Mexico. They would be selected for training in late 1977 or very early in 1978, as the training program at CIMMYT (Obregon) normally begins in April.

Upon their return in August or early September, these trainees would be immediately assigned to the Research/Extension Center, Baghlan. This timing is very critical, for the first group of 25 trainees are scheduled to report for training in September 1978.

Other technical fields identified for short-term training abroad are seed technology, survey methods and analysis of data, water management, wheat diseases, insect control and marketing. Participants will be identified and selected as dictated by project experience and progress.

Academic Training Abroad

Any research or extension organization must be continually supplied with "new blood" in the form of technically competent persons. Normally this competency is a product of several years of training.

Experienced and mature MOA personnel would be selected for long-term training abroad at both the masters and doctoral level. The MIAC team identified the areas where additional competency is required. These are: planting breeding, entomology, plant pathology, plant physiology, production agronomy, water management, statistics, rural sociology, extension education and intermediate technology.

It will require six to twelve months to clearly identify those individuals most capable of benefiting from such academic training. Hopefully, several could be selected and deputed for training during the first year of the project. It is anticipated that doctoral candidates would be selected first so they could return to make their contribution to the project purpose before the end of Phase I.

The MIAC team recommended that the course work be completed abroad and the thesis or dissertation research activity completed in Afghanistan. In this way all research conducted by these candidates would "plug in" to the project and assist greatly in expanding the data base. Much of the

field research would be under the guidance of MIAC project staff or the consultants who will travel to Afghanistan in support of the Project. In some cases it may be necessary for a professor of a U.S. institution not involved as a consultant to supervise his advisees' work in the field. Support costs of a very limited nature for this activity have been built into project funding.

On-the-Job Experience

This is an important element of any technical assistance activity. On-the-job training can be systematically planned or just allowed to happen. Regardless, it goes on all the time, both during working hours as well as afterward.

Afghan personnel working with their U.S. colleagues will, for the most part, be reasonably well versed in scientific theory. Some of them will have earned a masters degree from abroad. (Advanced work is not available in Afghanistan.) Most, however, will have a weak background in the practical application of this theoretical knowledge.

All project-related personnel will learn many things from each other, but the Afghans will have an excellent opportunity to improve their practical skills while working shoulder-to-shoulder with their American colleagues.

The farmer-to-farmer participants will be the vehicle through which much of this on-the-job training will be relayed to the unit supervisors and field extension agents. This will take place at the Center initially and then on a follow-up basis later. These men will also be imparting their skills and knowledge to Afghan farmers as they work with them on the cluster and verification trials.

In-Service Training

Two types of in-service training have been built into the project design. One is designed for extension unit supervisors. These men are the more experienced, higher trained extension staff. Many are farmer field agents. Two in Baghlan Province are college graduates in agriculture.

The unit supervisors will undergo a 3-4 week in-service training program in the first year of the project in September/October, just prior to the wheat planting season. This instruction will cover two parts. One deals with the concepts of the Wheat Development Project; its design, implementation schedule, objectives and potential outcome; their responsibilities and role in the various project activities; and the latest information available on the practices involved in the packages. The second portion will be technological. Supervisors will be given mini-courses in agronomic practices, fertilizer-soil relationships, disease symptoms, insect identification, area and crop measurement techniques,

yield estimation techniques, etc. They will also perform some of the practical skills involved in wheat cultivation, but not of any great intensity or duration. The objective is to provide them with the technical information and some feeling for the practical skills.

The extension agents will undergo a 4-5 month course of a very intense and practical nature. They will carry out all steps in producing a crop of wheat. The curriculum will be designed to: 1) teach the technical and theoretical knowledge, 2) carry out the practical work associated with the theory, and 3) critique and relate the two. Extension methods techniques and skills will form an integral part of this training.

Practically all project-related personnel will participate in this teaching-training activity. This includes researchers, extension personnel, both Afghan and American, and the farmer-to-farmer participants.

3. Construction

Two construction activities are included in this project design. The major portion will be the construction of a research/extension complex on the Baghlan Research Station. The station comprises 100 hectares (250 acres). Only 3 hectares are required for new buildings. Present facilities are extremely limited, and some are in such a condition they are no longer used. The minor part is the construction of 20 office-cum-residences in the Province.

Research/Extension Center

A local architectural firm will be engaged to design and supervise construction of the complex. Local contractors will be engaged for construction. Buildings in the complex will be 1) simple in design and 2) designed as a multi-purpose facility; i.e., to cater to both research and extension functions either in the same room/laboratory or certainly in the same building.

With the best of luck, it will take 16-18 months to design and construct the complex. Fortunately the two essential building materials, stone and cement, are available locally (there is a cement plant about 10 miles from the existing Research Station).

In the interim, buildings in Baghlan town (2 miles from the Station) will be rented and utilized as temporary classrooms, living quarters, library, laboratory, etc. It is anticipated that the new buildings will be ready for occupancy when the second group of 25 agents arrive for training (September 1979).

Office-cum-Residences

There are 77 extension staff in Baghlan Province. Sixty-five are field extension agents. A few new agents are employed every year. The Director of Extension hopes to employ four or five new field agents each year.

Few of the agents live in the villages. Most have offices in the main towns and ride their bicycles to the villages (as much as 25 kilometers away) where they meet and work with individual farmers.

This approach is known as a "mobile extension service". In the more common "static extension service", prevalent in most developing countries, extension field staff live and work in the villages where their clientele, farmers and their families, are located.

The MOA is in the process of constructing a few office-cum-residences for their staff, but they will all be located in woleswali (county) or alakadari (sub-county) headquarters. This still means workers will have long distances to pedal each day. This effort drastically reduces the efficiency of any extension service.

Agents need a place to live as well as simple office and storage facilities. In an effort to overcome this deficiency, 20 office-cum-residences will be constructed in strategic and selected villages around the Province. Sites will be selected and construction initiated in the early months of the project. They will be built of stone and cement according to the design presently being used by the MOA.

Twenty houses are to be constructed, ten by the MOA and ten from project funds. When the agents complete their specialized training, they will occupy these houses.

A comparison between the effectiveness of those workers under the static concept versus those under the mobile concept is planned.

4. Data Collection and Analysis

Most observers have little confidence in the agricultural statistics available in Afghanistan. This applies to area planted, yields, varieties seeded, cultural practices followed, farmer constraints and so on.

Crop Reporting

The crop reporting activities are the responsibility of local extension agents. Other agencies gather some data, but the major input comes from the Extension Service.

The MIAC draft report recommended that a small cadre, perhaps five per province, be given specialized training in data collection and tabulation. This has been accepted, but activities, at least in Phase I, will be restricted to Baghlan Province.

This training activity would cover a three-month period, mid-March to mid-June. The last segment of training would coincide with wheat harvesting. The first session would be conducted in 1979.

The major portion of the training would be conducted at the Center, but much of it would take place right in farmers' fields. Major emphasis would naturally be placed on wheat.

The major objectives of this activity are:

- train agents in improved techniques for estimating area seeded, variety seeded, area harvested, yields, fertilizer applied, problems encountered;
- design and encourage adoption of a system of obtaining accurate crop reports from areas not covered by extension agents;
- design a system for accurately summarizing and publishing such data;
- relate weather and price data to production and supply by area, to provide an "early warning" system of surplus and/or deficit conditions; and
- design a system to improve the flow, summarization and estimation procedure and a periodical report format.

The ultimate objective is to develop an efficient, sound and reliable system of crop reporting that can be used in every province.

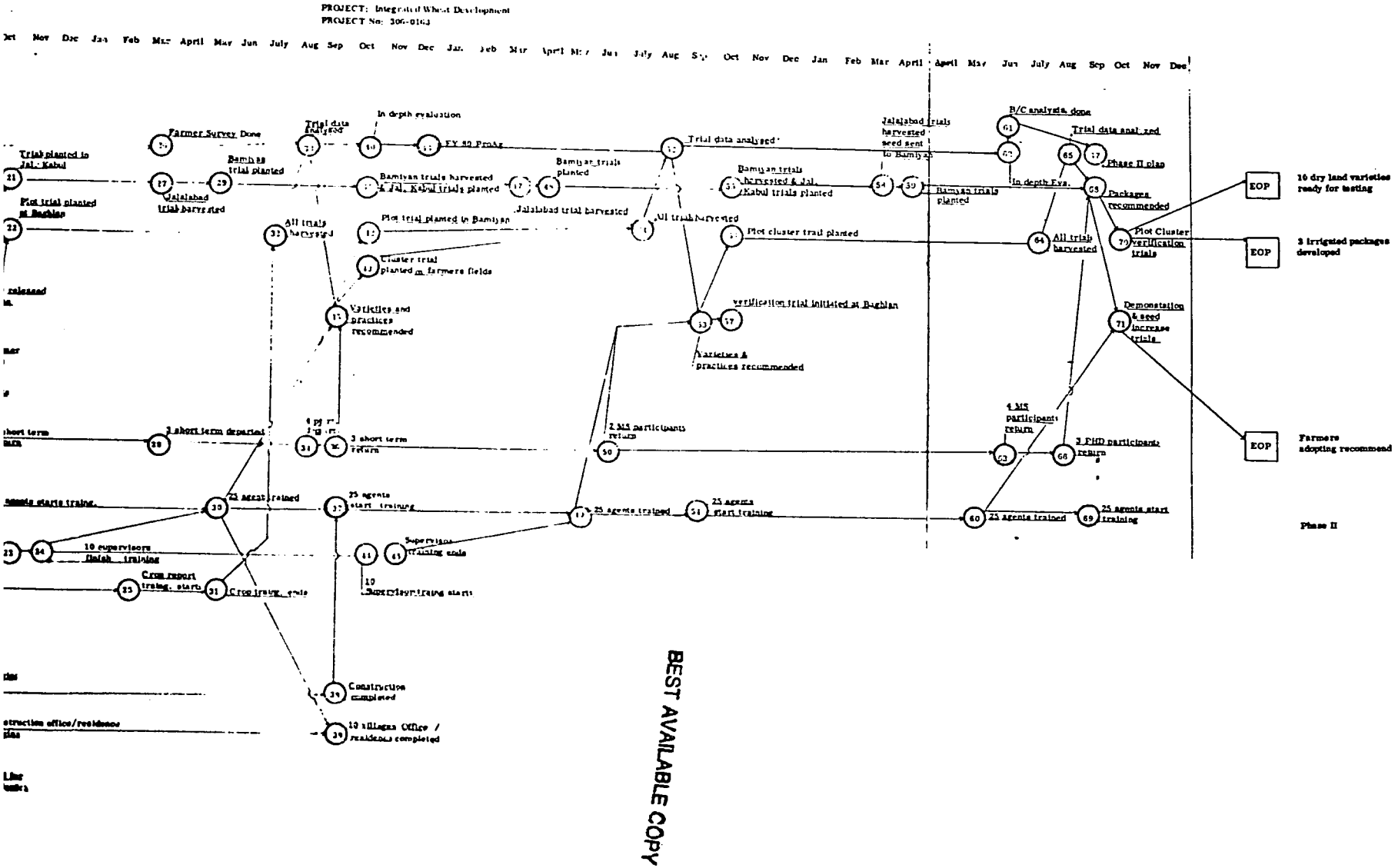
Farmer Constraint Surveys

This aspect of the data collection and analysis activity is designed to identify local obstacles and opportunities relevant to increasing agricultural production in the Baghlan area. This activity would be correlated by, and the major responsibility of, the economist/anthropologist who would also handle the crop reporting function.

Identification of farmer constraints to higher production would be a key element. These constraints may include traditional attitudes and values impressed by the culture, or more physical constraints such as water, seed, fertilizer, labor and so on.

A number of small surveys will be required to gather the socio-economic data necessary. Some surveys will be conducted once, and others will be repeated, so the original baseline data can be verified and up-dated. Surveys will be conducted in many different areas of the province so the data and the analysis will be as complete as possible. Center staff, extension agents, participants conducting research and possibly Kabul University students will help gather data.

This data collection and analysis process will continue through Phase I of the project. The information gained will be extremely useful and valuable, for it will be heavily relied upon in the development of relevant packages and in the design of Phase II of the project.



COUNTRY	PROJECT NO.	PROJECT TITLE	DATE		APPROVED
Afghanistan	306-0163	Integrated Wheat Development	8/9/77	[X] ORIGINAL [ ] REVISION # ____	

PROJECT PURPOSE (FROM PRP FACESHEET)

To establish a functioning irrigated regional research and extension center at Baghlan and b) to initiate research on improved germ plasm and production practices for dryland wheat through Kabul Research Station.

CPI DESCRIPTION	Date	Responsibility
Prior Actions		
1. Project authorized and Congress notified	9/14/77	AID/W
2. FY 77 Project Agreement for $500,000 signed	9/31/77	GOA/USAID
3. Contract with MIAC negotiated	11/15/77	AID/W
4. Recruitment completed	12/77	MIAC
Year One (CY 1978)		
1. FY 78 Project Agreement signed	1/78	GOA/USAID
2. Research advisor takes up post at Kabul Research Station and Research/Agronomist arrives at Baghlan	2/78	MIAC
3. Extension advisor takes up post at Baghlan	2/78	MIAC
4. Economic anthropoligst takes up station at Baghlan	3/78	MIAC
5. Three Short term participants depart for CIMMYT or U.S. wheat breeding programs	3/78	MOA/MIAC
6. Local firm selected to design and supervise construction of Baghlan center	3/78	MIAC
7. Survey of Baghlan farmers' constraints to improved productivity initiated	4/78	Baghlan Center
8. Curriculum Development and instruction specialist assumes duties at Baghlan	4/78	MIAC
9. 3 PHD and 2 MS candidates selected for U.S. training in entymology, plant pathology, plant breeding, plant physiology and rural sociology.	5/78	MOA/MIAC
10. Design for the Baghlan Center completed	5/78	Local firm/ MIAC/MOA
11. Available wheat varieties at Kabul Research Station Catalogued	6/78	Kabul Resear Station/MIAC

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE	ORIGINAL / REVISION #	APPROVED
Afghanistan	306-0163	Integrated Wheat Development	8/9/77	☐ ORIGINAL ☐ REVISION # ___	

PROJECT PURPOSE (FROM PRF FACESHEET)

CPI DESCRIPTION	Date	Responsibility
12. Farmer-to-farmer program begins with arrival of 2 American farmers who will work on package development, in-service training and farmer demonstration activities	7/78	MOA/USAID AID/W
13. Curriculum for in-service training of Baghlan extension agents and supervisors developed	7/78	MIAC
14. Construction of Baghlan Center started	7/78	MIAC
15. Wheat varieties for first year trials at Baghlan and Jalalabad and Kabul released		Kabul Res. Station/MIAC
16. 3 PHD and 2 MS participants depart for U.S.	8/78	MOA/MIAC
17. Sites seleted for extension agent office cum residences in villages	8/78	MOA/MIAC
18. 3 Short term participants return and are assigned to project	9/78	MOA/MIAC
19. 25 extension agents from Baghlan start in-service training	9/78	Baghlan Cente MIAC
20. Construction of offices cum residences started	9/78	Local Contractors/MIAC
21. Wheat trials planted at Jalalabad, Baghlan and Kabul	10/78	Kal u. Researc Station
22. Plot trials of irrigated wheat planted at Baghlan	10/78	Baghlan Cente MIAC
23. 10 extension supervisors start training	10/78	Baghlan Cente MIAC
24. 10 extension supervisors finish training	11/78	"
Year Two (CY 79)		
25. 5 extension agents begin crop report training	2/79	"
26. Survey of Baghlan farmers completed	3/79	Baghlan Center MIAC

CRITICAL PERFORMANCE INDICATOR (CPI) DESCRIPTION

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE	ORIGINAL / REVISION #	APPROVED
Afghanistan	306-0163	Integrated Wheat Development	8/9/77	☐ ORIGINAL ☐ REVISION # ___	

PROJECT PURPOSE (FROM PRP FACESHEET)

CPI DESCRIPTION	Date	Responsibility
27. Trials at Jalalabad harvested and seed sent to Bamiyan for off-season trials.	3/79	Kabul Research center/ MIAC
28. 3 Short term participants depart for CIMMYT or U.S. plant breeding programs	3/79	MOA/MIAC
29. Off season trials planted in Bamiyan	5/79	Kabul Research center MIAC
30. First group of 25 extension agents complete in-service. training	5/79	Baghlan Center/MIAC
31. 5 extension agents complete crop reporting course and are sent out to report on harvesting in Baghlan	5/79	Baghlan Center/MIAC
32. All trials at Kabul and Baghlan harvested	7/79	Baghlan Center/MIAC
33. Data from varietal trials and results of varying practices analysed and compared with farmer survey data.	8/79	Baghlan Cente MIAC
34. 4 MS participants depart for U.S. training	8/79	MOA/MIAC
35. Optimum varieties and practices recommended for coming year's testing	9/79	MOA/Baghlan Center/MIAC
36. Three short term participants return and are assigned to project	9/79	MOA/MIAC
37. 2nd group of 25 agents begin in-service training	9/79	Baghlan Center MIAC
38. Construction of Baghlan Center completed	9/79	Local Contractors/ MIAC
39. 10 village office cum residences constructed	9/79	"
40. In-depth evaluation of project completed	10/79	Independent team/USAID/ MIAC

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE	ORIGINAL / REVISION #	APPROVED
Afghanistan	306-0163	Integrated Wheat Development	8/9/77	☐ ORIGINAL ☐ REVISION # ___	

PROJECT PURPOSE (FROM PRP FACESHEET)

PI DESCRIPTION	Date	Responsibility
1. Bamiyan trials harvested and trials planted at Jalalabad and Kabul	10/79	Kabul Research center/ MIAD
2. Plot trials planted at Baghlan	10/79	Baghlan Center/MIAC
3. Cluster trials planted on farmers fields in Baghlan	10/79	"
4. 10 extension supervisors return for additional in-service training	10/79	Baghlan Center/MIAC
5. Extension supervisors complete in-service training	11/79	"
6. FY 80 Project Agreement signed	12/79	GOA/USAID
Year Tree (CY 80)		
Trials at Jalalabad harvested and seeds sent to Bamiyan	3/80	Kabul Research Station/ MIAC
48. Off-season trials planted at Bamiyan	4/80	Kabul Research Station/MIAC
49. 2nd group of extension agents complete training	5/80	Baghlan Center/ MIAC
50. 2 MS participants return and are assigned to project	6/80	MOA/MIAC
51. All trials at Baghlan and Kabul harvested	7/80	Baghlan Center/ Kabul Research Station/MIAC
52. Data from varietal trials and results from varying practices analysed	8/80	Baghlan Center/ MIAC
53. Optimum varieties and practices recommended for coming year trials	9/80	"
54. 3rd group of 25 extension agents begin in-service training	9/80	"
55. Trials at Bamiyan harvested and trials at Kabul planted	10/80	Kabul Research Station/MIAC
56. Plot and cluster trials planted in Baghlan	10/80	Baghlan Center/ MIAC

COUNTRY	PROJECT NO.	PROJECT TITLE	DATE	ORIGINAL / REVISION #	APPROVED
Afghanistan	306--0163	Integrated Wheat Development	8/9/77	☐ ORIGINAL ☐ REVISION # ___	

PROJECT PURPOSE (FROM PRP FACESHEET)

PPI DESCRIPTION	Date	Responsibility
57. Verification trials initiated at Baghlan	10/80	Baghlan Center/MIAC
Year Four (CY 81)		
58. Trials at Jalalabad harvested and seeds sent to Bamiyan	3/80	Kabul Research Center/ MIAC
59. Bamiyan trials planted	4/80	"
60. 3rd group of 25 extension agents complete training	5/80	Baghlan Center/MIAC
61. Detailed benefit/cost and social analyses for Phase II started	6/80	MIAC/USAID
62. In-depth evaluation to determine feasibility of expanded Phase completed	6/80	Indep. Team/ USAID/MIAC
63. Four MS participants return and are assigned to project	6/80	MOA/MIAC
64. All trials at Baghlan and Kabul harvested	7/80	Baghlan Cent Kabul Resear Station/ MIAC
65. Data on trials and results of varying practices analysed	8/80	Baghlan Cent MIAC
66. 3 PHD participants return and are assigned to project	8/80	MOA/MIAC
67. Phase II plans finalized and Project Paper prepared	9/80	MOA/MIAC/ USAID
68. Optimum varieties and practices recommended and a package selected for dissemination to farmers	9/80	Baghlan Center/MIAC
69. 4th group of extension agents start training	9/80	Baghlan Center/ MIAC
70. Plot cluster, and verification trials planted in Baghlan	10/80	"
71. Demonstration and seed increase trials planted on farmers fields	10/80	"
EOPS ACHIEVED	12/80	

C. Administrative Arrangements

A Wheat Development Board will be established which will function as a policy-making/problem-solving board and serving as a coordinator between research and extension activities related to agricultural production.

This Board will serve as the Varietal Recommendation Committee for the Ministry of Agriculture. It will meet at pre-scheduled and pre-determined dates to provide continuity to the activity and to avoid cancellations and delays.

Timeliness is important in any successful crop release plan. The strategy is to use a systems approach, the objective being to saturate an area, or areas, with improved crop technology involving seed, fertilizer and plant production.

The Board will be composed of the following:

1. President of Extension
2. President of Research
3. President of Planning
4. USAID Agricultural Officer
5. MIAC Extension Coordination
6. MIAC Research Coordinator

A consortium representative will be designated by the contractor. The consortium representative will be the Extension Coordinator of the MIAC staff assigned to Afghanistan.

The Mission Agricultural Officer will be the designated project officer and have the responsibility of general project oversight and guidance. He also will serve to insure the project remains within the guidelines set by the U.S. Congress and AID policy.

Other designated AID officials will have project monitoring and guidance responsibilities.

The consortium-designated home campus representatives will provide technical and administrative support for the project. The consortium representative in the U.S. will receive and administer funds and be responsible for overall project administration to those AID/Washington offices which are responsible for the project.

An administrative assistant in Afghanistan will be required. A qualified Afghan will be recruited as soon as possible to fill the position. The project will provide funds to enable the administrative assistant to spend time on the contractor's home campus in order to become familiar with the contractor's administrative and accounting procedures.

The Ministry of Agriculture will provide offices, office equipment, furniture and secretarial assistance for the U.S. scientists assigned to this project. One or more qualified Afghans will be assigned to work with each American colleague on each specific project activity.

A part of the USAID trust fund of Afghan currency will be used by the project to meet in-country expenditures. The consortium representative will prepare a budget annually for this trust fund to be reviewed by the USAID Agricultural Officer. The consortium representative will control expenditures from the fund.

D. Evaluation Plan

In addition to the continual monitoring and data analysis required to carry out Phase I, this plan envisages two in-depth evaluations during the course of the project.

The first in-depth, independent evaluation will be conducted no later than October 1979 and be designed to assess the progress made to date in producing the scheduled outputs and to determine the validity of a number of critical assumptions underlying the project design. The evaluation should identify and recommend specific actions to overcome any deficiencies in project design or implementation plans. The evaluation should carefully examine the adequacy of resources, technical and material, to carry out the project. The evaluation findings and recommendations should be reflected in the FY 1980 Project Agreement.

The second in-depth, independent evaluation will be conducted no later than June 1981. Its main purpose should be to document the implementation experience and project performance in sufficient detail to permit a decision on whether to proceed with designing an expanded Phase II and to make recommendations, if appropriate, on the steps required before a Phase II can begin.

Both evaluations will be undertaken jointly by two independent evaluators and representatives from USAID, MIAC, and the GOA as mutually agreed.

For annual project review purposes, the Consortium will be expected to submit an annual progress report which will be reviewed, along with other project data, by USAID.

E. Conditions, Covenants and Exceptions

1. Conditions and Covenants:

The following are illustrative of the conditions precedent and covenants that USAID/Afghanistan will attempt to negotiate with the Government of Afghanistan. The text of the CP's and covenants will be worked out at the time the Project Agreement is firmly negotiated.

Conditions Precedent

The project envisages at the moment that the Government will furnish to AID in form and substance satisfactory to AID the following:

a) Legal opinion
b) Designation of the Government's authorized representative(s)
c) The official establishment of a National Wheat Committee.
d) The appointment of a Baghlan Center Director.

Covenants

a) No poppies will be grown in the project area.

2. Exceptions

The following exceptions to usual AID procedures are recommended.

a) Source/Origin Equipment

Research Equipment - each year thousands of small research plots will be harvested at the various research stations involved in the Wheat project. The factors of speed, timeliness and accuracy of measurement, plus saving immense hours of labor, are essential factors. Plots have to be harvested and the seed immediately planted within a few days at sites many miles distant.

Self-propelled plot threshers have been designed especially for this type of research operation. They are used extensively at CIMMYT. Unfortunately, such threshers are manufactured in West Germany and Austria. Permission to purchase this non-U.S. manufactured item is requested.

b. Source/Origin Componentry

It is proposed that only Afghanistan "source" requirements should apply to the local cost financing component of this project, and that origin and componentry requirements be waived. The result of this rule is that as long as commodities and materials are purchased in Afghanistan, the projects into which they are incorporated will be eligible for AID reimbursement. AID will not inquire into the country of manufacture of items purchased in-country.

c. Host Contracting

The MOA has neither the competence nor experience in contracting on its own with a U.S. firm, or private individuals, for advisory services. As it is MOA administrative and management capabilities are fully employed in carrying out its many responsibilities. Adding the additional responsibility of contracting for the required advisory services of this project would inevitably result in unacceptable delays and hamper the project in meeting its objectives; accordingly, a waiver of this requirement is recommended.

AID 1020-28 (1-72)

ANNEX A

PROJECT DESIGN SUMMARY Life of Project:
LOGICAL FRAMEWORK From FY 77 to FY 81
Total U.S. Funding 4,378,000
Date Prepared: 8/3/77

Project Title & Number: Integrated Wheat Development - Phase I (306-0103)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase wheat productivity on irrigated and rainfed lands in Northern Afghanistan, thereby increasing total wheat production and relasing irrigated wheat lands for production of other higher value crops.	Measures of Goal Achievement: 1. HYV users increased from 75% to 90% of Baghlan farmers by 1985. 2. 33% of Baghlan's suboptimal HYV users on irrigated increase yields from 2 MT/ha. to 3 MT/ha. by 1985. 3. 15% of dryland farmers in Baghlan adopt recommended dryland package(s) by 1985. 4. Dryland package adopters increase yields from current .5 MT/ha. to 1 MT/ha by 1985.	Higher Order Objective: Increased small farmer income. Purpose to Goal Assumptions: 1. Afghan farmers are income-seekin averters who are sensitive to local environment and who are generally decision makers. 2. Farmers' income will not be depre to sharp declines in wheat prices. 3. Expanded availability of credit will adequate to farmers needs. 4. Supply of fertilizer at reasonable p will be adequate to farmers needs. 5. Seed multiplication and distribution adequate to farmers needs. 6. Dryland research results obtained Phase I will be field tested and diffu 7. Climatic patterns remain normal.
Project Purpose: To establish a functioning integrated regional research and extension system for wheat in Baghlan.	Conditions that will indicate purpose has been achieved: End of project status. 1. 3 appropriate packages of recommended practices and adapted, irrigated varieties developed. 2. At least 300 farmers on irrigated land in Baghlan demonstrating packages recommended for irrigated wheat by the begining of the 4th growing season. 3. Up to 10 improved dryland wheat varieties selected and ready for testing on farmer's field in Baghlan.	Output to Purpose Assumptions: Cooperation of AFC, ADB, ASC to ass supply of production inputs and credit Baghlan farmers participating in proj
Outputs: 1. a. Baghlan center field testing and adapting irrigated wheat technology packages b. Extension agents trained in use of new irrigated wheat production packages c. Research/Extension Training Center constructed and equipped d. Office cum-residence units constructed for extension workers. e. Survey of farmer constraints completed f. System of crop reporting developed g. Out-reach campaign initiated with irrigated wheat package 2. a. Kabul Research Station releasing available research on irrigated wheat to Baghlan b. Research on improved germ plasm and on production practices for dryland wheat initiated at Kabul Research Station c. Researchers trained d. On going off-season wheat trials at Bamyan 3. Detailed B/C and social analysis for Phase II 4. Detailed plans for Phase II	Magnitude of Outputs: 1. a. - Through plot, cluster, and verification trials in Baghlan b. 25 per crop year. c. Completed by Sept. 1979. d. 10 constructed by Sept. 1979, and 10 more by end of project. e. By March 1979 farmers on irrigated surveyed and by June 1981 dryland farmers surveyed. f. By May 1979 g. By the 4th crop year (Oct. 1981) 2. a. - Starting first crop year b. Starting first crop year. c. 7 by end of project. d. started NLT spring 1979. 3. Developed by June 1981. 4. Developed by Sept. 1981.	
Inputs: U.S. PM $000 Technical Services 370 2,999 Participants 504 605 Commodities 311 Other Costs (Construction) 464 4,378 GOA 1,491.6		Input or Output Assumptions: 1. Farmers will cooperate with Bag Center 2. All project inputs will be deliver as planned.

ANNEX B.

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Afghanistan

Project Title : Integrated Wheat Development

Funding : FY 1977 through 1981; total project cost is estimated at $5,870,000, of which $1,492,000 is to be provided by the Government of Afghanistan

Life of Project : Four years

IEE Prepared by : Warren Sahs, Agronomist, MIAC
Warren Prawl, Extension, MIAC

Date : July 1977

Environmental Action Recommended: The project will have no significant effect upon the environment. In fact, improved cultural practices, specially under dryland wheat farming conditions, should improve the environment in terms of conserving the soil. The building activity at the Regional Research/Extension Center, will be adjacent to an existing building complex. Therefore, we recommend that an environmental assessment not be done.

Concurrence:

Mission Director — Date 8/22/77

Deputy Director — Date 8/22/77

Recommendations:

This Project will have no adverse impact on the physical environment and may improve conditions over the long term. If wheat yields can be increased, irrigated land now planted to wheat can be released for more productive uses, dryland wheat production expanded, and marginal land now planted to dryland wheat may be returned to its original state as grazing land.

If higher yield and production levels are achieved, the socio-economic position of small farmers should improve.

As this Project is designed to have a positive effect on the environment and on the socio-economic situation, it suggests and confirms that an environmental assessment is not required.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-Areas*	Impact Identification and Evaluation**
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil character	N
2. Altering natural defenses	N
3. Foreclosing important use	N
4. Jeopardizing man or his works	N
5. Other factors	
----------	None
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
4. Other factors	
----------	None

* See Explanatory Notes for this form.

** Use the following symbols: N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

Impact Identification and Evaluation Form (contd)

C. ATMOSPHERE	
1. Air additives	N
2. Air pollution	N
3. Noise pollution	N
4. Other factors	
----------	None
D. NATURAL RESOURCES	
1. Diversion, altered use of water (irrigation)	L
2. Irreversible, inefficient commitments	N
3. Other factors	
----------	None
E. CULTURAL	
1. Altering physical symbols	N
2. Dilution of cultural traditions	N
3. Other factor	
----------	None
F. SOCIO-ECONOMIC	
1. Changes in economic/employment patterns	L
2. Changes in population	N
3. Changes in cultural patterns	N
4. Other factors	
	None

mpact Identification and Evaluation Form

G. HEALTH	
1. Changing a natural environment	N
2. Eliminating an ecosystem element	N
3. Other factors	
----------	None
H. GENERAL	
1. International impacts	N
2. Controversial impacts	N
3. Larger program impacts	N
4. Other factors	
----------	None
I. OTHER POSSIBLE IMPACTS (not listed above)	
----------	None

ANNEX C

Afghanistan - Integrated Wheat Development (Phase I
Certification Pursuant to Section 611 (e) of
the Foreign Assistance Act of 1961, as
Amended

I, Charles R. Grader, principal officer of the Agency for International Development in Afghanistan, having taken into account among other things the maintenance and utilization of projects in Afghanistan previously financed or assisted by the U.S. and the commitment of the Republican Government of Afghanistan to carry out an effective Integrated Wheat Development Project (Phase I), do hereby certify that in my judgement Afghanistan has the financial and human resources capability to implement, maintain, and utilize effectively the subject project.

23 August 1977
Date

Charles R. Grader
Director, USAID/Afghanistan

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ANNEX C

Afghanistan - Integrated Wheat Development (Phase I)
Certification Pursuant to Section 611 (e) of
the Foreign Assistance Act of 1961, as
Amended

I, Charles R. Grader, principal officer of the Agency for International Development in Afghanistan, having taken into account among other things the maintenance and utilization of projects in Afghanistan previously financed or assisted by the U.S. and the commitment of the Republican Government of Afghanistan to carry out an effective Integrated Wheat Development Project (Phase I), do hereby certify that in my judgement Afghanistan has the financial and human resources capability to implement, maintain, and utilize effectively the subject project.

23 August 1977
Date

Charles R. Grader
Director, USAID/Afghanistan

FINANCIAL PLAN

COMPONENTS	FISCAL YEARS 1976	1977	1978	1979	(3 mos. only) 1980	TOTAL YEARS
	(In thousands U.S. Dollars)					
A. Counterpart Financing						
1. Additional Personnel Costs IATA	206	359	447	484	131	1,627
2. Land Rentals - fair value	60	100	120	120	30	430
3. Livestock-beef cattle & sheep	60	90	45	-	-	195
4. Capital Investments	300	475	100	-	-	875
5. Additional Operating Costs IATA	70	120	150	160	50	550
6. IATA regular budget supporting expansion plan	250	250	250	250	63	1,063
7. Additional personnel costs - co-operating agencies	255	711	1,324	1,544	386	4,220
Sub-Total - Uruguayan Financing	1,201	2,105	2,436	2,558	660	8,960
B. AID Loan Financing						
1. 12 US Advisors (30 m/yrs.)	195	680	660	220	45	1,800
2. Short-term Experts (36 m/mos.)	40	100	20	20	-	180
3. Training						
a. 36 persons (18 mos. ea. MS Degree)	57	180	171	80	-	488
b. 31 persons (5 or 6 mos. ea.)	24	45	85	24	-	178
c. International Meetings	10	10	10	10	-	40
4. Equipment						
a. Agricultural Equipment	-	1,000	-	-	-	1,000
b. Vehicles	-	80	20	-	-	100
c. Lab. Equipment	25	275	-	-	-	300
d. Central Office	25	265	25	25	-	340
5. Contingency	30	300	70	24	0	424
Sub-Total - AID Financing	406	2,935	1,061	403	45	4,850
TOTAL A & B	1,607	5,040	3,397	2,961	705	13,810

Percent AID - 35% Dollar Financing AID 4,667
Percent GOU - 65% Local Currency A[illegible]

ANNEX D

Waiver of Host Country Contracting Procedures

As principal officer of the Agency for International Development in Afghanistan, I have determined that the provisions of AIDTO CIRC A-564 dated 9/29/76 entitled "Policy with Respect to Contracting Mode for Project Assistance," should be waived for the contract services to be provided to the Ministry of Agriculture (MOA) for the implementation of the Integrated Wheat Development Project (Phase I). In my judgement, the MOA does not have at this time sufficient competence or experience in contracting with U.S. institutions, firms, or individuals. The time required to train and assist the MOA in developing such contracting competence would delay the scheduled implementation of this project and could detract from the MOA's ability to manage the more important task of developing and extending appropriate technology packages to Afghan wheat farmers.

23 August 1977
Date

Charles R. Grader
Director, USAID/Afghanistan