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1

AGENCY FOR INTERNATIONAL DEVELOPMENT

# PROJECT PAPER FACESHEET

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PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: AFGHANISTAN

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8. ESTIMATED FY OF PROJECT COMPLETION: FY 80

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

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 - Afs )

| A. FUNDING SOURCE | FIRST FY 77 B. FX | C. L/C | D. TOTAL | LIFE OF PROJECT E. FX | F. L/C | G. TOTAL |
|---|---|---|---|---|---|---|
| AID APPROPRIATED TOTAL | 7,303 | | 7,303 | 17,336 | | 17,336 |
| (GRANT) | ( 7,303 ) | ( ) | ( 7,303 ) | ( 17,336 ) | ( ) | ( 17,336 ) |
| (LOAN) | ( ) | ( ) | ( ) | ( ) | ( ) | ( ) |
| OTHER U.S. 1. | | | | | | |
| OTHER U.S. 2. | | | | | | |
| HOST COUNTRY | | 380 | 380 | | 2,400 | 2,400 |
| OTHER DONOR(S) | - | - | - | - | - | - |
| TOTALS | 7,303 | 380 | 7,683 | 17,336 | 2,400 | 19,736 |

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 FY 79 L. GRANT | M. LOAN |
|---|---|---|---|---|---|---|---|---|---|
| (1) FN | 259B | 064 | | 7,303 | | 4,415 | | 5,406 | |
| (2) | | | | | | | | | |
| (3) | | | | | | | | | |
| (4) | | | | | | | | | |
| | | | TOTALS | 7,303 | | 4,415 | | 5,406 | |

| A. APPROPRIATION | N. 4TH FY 80 O. GRANT | P. LOAN | Q. 5TH FY ___ R. GRANT | S. LOAN | LIFE OF PROJECT T. GRANT | U. LOAN |
|---|---|---|---|---|---|---|
| (1) FN | 212 | - | | | 17,336 | |
| (2) | | | | | | |
| (3) | | | | | | |
| (4) | | | | | | |
| TOTALS | 212 | - | | | 17,336 | |

12. IN-DEPTH EVALUATION SCHEDULED: MM 08 YY 79

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1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: John Standish

TITLE: Chief, Capital Development & Engineering

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## I. SUMMARY

### A. Recommendations

| | |
|---|---|
| -- Development Grant | $10,666,000 |
| -- Capital Grant | $ 6,670,000 |
| -- Waivers | |
| 1. Source/origin componentry for local cost financing | |
| 2. FAA ¢ 110(a) - Cost Sharing Requirement | |
| Total Grant Obligation | $17,336,000 |

### B. Description of the Project

The Government of Afghanistan (GOA) has recognized that salinization and waterlogging have serious detrimental effects on the current and potential production capabilities of irrigated areas within the Central Helmand Valley. The GOA has requested U.S. assistance in helping to correct these problems. The USAID and Helmand Arghandab Valley Authority (HAVA) worked jointly in 1975 to develop a proposed project to this end. The proposal was for the project to unfold in several phases with each phase building on the successful performance of the preceding phase. With a reasonably successful Phase I coming to an end, this Project Paper proposes assistance for Phase II wherein: 1) HAVA capabilities will be expanded; 1) 130 $Km^2$ of land will be adequately drained; 3) farmers understanding of and participation in the drainage effort will be broadened to include leaching of the salts on their land and maintenance of farm drains running through their land; 4) planning for a possible Phase III will be advanced, including the updating of the Master Drainage Plan, development of a Construction Plan, completion of soils maps and a soils handbook; and 5) the establishment of an effective equipment maintenance and supply program for construction equipment.

It is hypothesized that once produced these outputs will: 1) lower the water table and salinity levels in the areas drained in Phase I and the first year of Phase II; 2) raise average yields in these areas by at least 20%; and 3) bring at least 1,000 additional hectares into production. If these indicators are verified, one can confidently say that the project purposes of reducing salinity and waterlogging of 135 square kilometers, which provide a livelihood to 2,580 farm families, will have been achieved.

The achievement of these purposes is expected to have a favorable impact on advancing the project goal of bringing about increases in agricultural productivity, income, and employment of small-scale farmers and farm laborers in the project area.

The Ministry of Water and Power (MPW) will be the responsible agency for the project. Implementation of the project will be the responsibility of the Helmand-Arghandab Valley Authority (HAVA) serving as the Project Directorate and the Afghan contractor, the Helmand Construction Co. (HCC). U.S. assistance will be confined to advice, review, training, the development grant financing of construction on the basis of 75% reimbursement of actual costs, and the capital grant financing of new construction equipment. It is important that this project be carried out at a pace commensurate with Afghan capabilities, in accordance with Afghan priorities, and that the responsibility for performance be clearly Afghan.

Successful completion of Phase II will set the stage for considering further expansion of the drainage work and introduction of activities necessary to maximize the potential benefits from drainage under a Phase III.

C. Summary Findings

1. Waterlogging has seriously reduced the productivity of the land in approximately 40% of the project area.

2. The more severely salinized lands comprise 26% of the project area and seriously reduce crop production.

3. Construction of an adequate drainage system, coupled with some land smoothing, irrigation systems modification, and leaching and drain maintenance programs can alleviate these problems and restore the productive potential of 135 square kilometers of farm land by 1981.

4. Phase I provided evidence, albeit limited, of the technical feasibility of the proposed drainage solution. Detailed design criteria and construction specifications have been field tested and are suitable for Phase II.

5. Phase II construction targets are realistic and achievable within GOA capabilities.

6. There are no adverse environmental effects expected as a result of this project. On the contrary, adequate drainage can help conserve the soil, increase water availability, and reduce the hazard of malaria as stagnant water areas are drained.

7. Selection of areas for Phase II drainage was based in the first instance on the availability of adequate main drain outlets and then on the severity of salinity/waterlogging, productive potential, drain spacing, and farm size. By and large, the areas so identified are inhabited by farmers in the lowest one-third farm income group and very few, if any, are in the upper 50 percent group.

8. Of the estimated 30,000 - 35,000 farm families living in the region, the project is directed at 2,580 farm families. The vast majority hold parcels of land of less than 10 hectares. These small landowners, along with the sharecroppers and the agricultural laborers in the area, will be the direct beneficiaries of the project.

9. The role of women in the agriculture of the Helmand Valley is limited. The project is not likely to enhance women's participation in the Valley's agricultural development given the strong cultural bias in the opposite direction. Women do stand to benefit, however, from the general increases in production and income accruing to the household as a result of better drainage.

10. The project shows an internal rate of return of 31%. Projected benefits to the target population are substantial. Average net farm income increases from 1975 to 1981 are projected as follows:

| | |
|---|---|
| Owner-operators | afs 7,000 per capita |
| Sharecroppers | afs 1,264 per capita |

Sharecroppers' income gains are diluted by the 59% increase in the number of sharecroppers during this time. Farm laborers stand to gain from an increase of 120,000 man days of additional work over the same period.

D. Project Issues

1. Mobilization of Labor Force There are currently 423 day laborers employed for Phase I drainage construction. Phase I targets require 500 laborers on board by now. Phase II targets depend on mobilizing 1,000 laborers by November 1977. Labor availability does not appear to be the constraint, rather the implementing agency's ability to recruit and supervise an adequate labor force. GOA contracting formulae are complicated and established wage rates are unattractive. Currently, the labor force is on strike for higher pay. HAVA is considering raising the daily wage from afs 40 to 50. Such a raise would resolve this temporary setback. Efforts are also being made to overcome the contracting problems.

Should this critical input not materialize, however, farm drain construction will be severely hampered unless an alternative approach to labor intensive construction can be found.

2. Pre-implementation Steps. Recognizing the long lead time required to deliver commodities to Afghanistan and the direct relationship between the arrival of new equipment and the accelerated rate of work projected for year three, early steps must be taken to expedite procurement. To this end, a TDY procurement specialist will be needed no later than February 1977 to review equipment specifications and prepare IFBs. Review of bids and recommendation of awards will also have to be ready so that the equipment orders can be placed as soon as funds are available.

3. Project Cost. It has been observed that both the per farm and per hectare of drainage costs seem high. It should be noted that not all the costs shown can be charged to Phase II. For example, it is expected that most of the new equipment will be used for only one year during Phase II, or approximately one-tenth of its useful life. Only one-tenth of its costs can, in undiscounted terms, be charged against the project. Nor can all the construction costs be charged against Phase II since less than half of the capacity of the main drains to be constructed will be utilized by the farms to be drained during the project. Consequently, more than half of the $6 million construction costs of main and sub-mains will have to be allocated to farm land drained in the future. Still, whatever these financial costs show, a much more relevant criterion is the benefits that the project produces relative to the project costs or the rate of return on the investment. USAID's single best estimate for the latter is an attractive 31 percent when foreign exchange is not shadow priced and over 35 percent when it is so priced.

4. Exchange Rate Fluctuations. Project costs are all based on a rate of 50 afs to the dollar. This rate has been used, aside from its obvious convenience, in the belief that it represents a realistic average rate likely to prevail over the life of the project. In the last nine months of 1976, there has been a spasmodic appreciation of the Afghani from a low of afs 57 to the dollar to a high of afs 40 to the dollar. Currently, the rate is hovering around afs 46 to the dollar. If these expectations about the average rate are off the mark, project costs could vary significantly from those projected in this paper.

5. Three Year Life of Project. Considering that the Master Drainage Plan is likely to require 16 years to implement fully, a three-year cutoff for Phase II is somewhat arbitrary. A three-year timeframe has certain advantages, however:

a. It represents the outside limit on realistic planning and the manageability of implementation targets and inputs.

b. It recognizes the inadequacy of the current data base for medium and long-term planning needs and provides for expanding that data base.

c. It offers the opportunity of carefully testing the critical assumptions before committing further U.S. resources; and

d. It leaves a certain amount of leverage for exacting expanded GOA performance as a prior condition for a Phase III. A successful Phase II would in all likelihood permit the design of Phase III extending beyond three years.

## II. BACKGROUND AND CONCEPT

### A. Background

The U.S. for many years assisted the Government of Afghanistan (GOA) in developing new irrigated land in the Helmand Arghandab Valley (HAV). 1/ During most of this assistance period, the GOA focused heavily on adding to the water distribution system in order to bring new land into cultivation. Although recognized as a problem by the GOA, relatively little attention was paid to adequate drainage of the land. As a consequence, the quality of land now being irrigated is declining and some land under the command of the irrigation systems is unusable because of waterlogging and/or salinity.

Because of the obviously deteriorating conditions, the GOA's priorities have changed and now there is a serious concern on its part about upgrading the drainage system. In light of the U.S.'s long-time association with the Helmand Valley and interest in its successful development, the GOA has unsurprisingly turned to the U.S. in requesting assistance to correct this problem. (See Annex A.)

From the American point of view, despite the evidence of physical success, in the past there have been many problems in the Helmand Valley. Expectations were too high. The U.S. demanded more of the Afghans than they could deliver, given their stage of bureaucratic, technical, and economic development. Under the pressure of our demands and in line with its desire to get as much foreign assistance as possible, the GOA made commitments and promises which were not met. This led to poor development performance. The bilateral relationship deteriorated and a termination of the existing pattern was the only apparent solution. In June 1974, U.S. assistance to the Helmand Valley was interrupted and U.S. advisors were withdrawn.

Despite these problems, the Helmand Arghandab development program up to that time represents a significant if not outstanding success. The annual value of farm production in the area is estimated at $60 million compared to the pre-project conditions of perhaps 10 percent of that. Some 4,000 - 6,000 families have been settled on small farms. In 1975 alone, some 23,000 tons of cotton were produced, some 146,000 tons of wheat, 16,000 tons of dried fruits, etc. Nowhere else in the country has so much been accomplished, problems aside.

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1/ Assistance was provided in a number of other fields in the Helmand Valley as well.

There is much to be said for not allowing this "U.S. project" - very successful in the eyes of informed Afghans - to become a problem child. A better drainage system can help prevent any further major deterioration.

Moreover, any drainage improvement efforts will benefit the poor of the Valley. Salinization is particularly a problem of lands being farmed by families "settled" in the project area in the last 10 years. Over the years, a major concern of successive Afghan Governments has been that of providing a permanent source of livelihood for landless tenants and farm laborers. The Helmand Valley with the large tracts of unused land and the largely wasted waters of the Helmand River was viewed as an ideal location to settle these families who owned no land. Irrigation systems were installed and settlers placed on small but livable plots. Although recognized, the need for adequate drainage was not fully addressed. Consequently, farms that should produce a respectable living by Afghan standards deteriorated to the point where some families are barely eking out an existence or even, in many cases, have abandoned their land. It is these small owners who will benefit most from drainage system improvements.

For these reasons, a positive response to the Afghan Government's 1975 request for assistance with drainage system improvement was initiated with Phase I of the current effort, starting in May 1975. A phased response was appropriate, given the difficulty of the task which will take a number of years to address adequately and the need to demonstrate through actual performance that better results will be achieved in the future than were achieved in the past. This paper presents a proposal for Phase II in this assistance effort.

B. Project Development Concepts

The problems of salinization and waterlogging are immediate. Improved drainage will result in production benefits justifying the cost of constructing the drains even without improvements in water management, planned for a later stage. The benefits will occur very soon after construction of the drains. The drain system once constructed is largely passive, except for limited and rather infrequent maintenance requirements, and does not require complex administrative or educational programs to implement. Thus, the Helmand Arghandab Valley Authority (HAVA) as the implementing agency can adequately administer a drainage system.

1. Phase I Experience. The initial desire behind AID's return to the Valley was to define a realistic and jointly agreed upon set of objectives and to establish a new and more businesslike relationship.

The very limited Phase I ($1,801,000) was designed as a laboratory in which to establish this relationship prior to proceeding with a Phase II proposal for the requested longer-term assistance effort. Phase I has been a testing and a demonstration phase for Afghans and Americans and we have conscientiously avoided trying to incorporate other activities needed, but not clearly defined as Afghan priorities, to avoid working for separate objectives.

It was considered essential to avoid having Americans do the work. We, therefore, purposely downgraded the responsibility of American technicians in the construction process, restricting their role to monitoring. This reduced the number of technicians. As a result, construction has not proceeded as fast as planned, but has been carried out at HAVA's own pace with its available technical and personnel resources. This has contributed to establishing a realistic relationship. The Fixed Amount Reimbursement (FAR) technique has also been useful. Using this approach, our money has not been at risk while HAVA worked out its implementation problems. Though not fully tested, this approach seems to have provided HAVA with the incentive to solve its own problems and to take necessary action. Although fixed amount reimbursement has proven unsuited to expanded excavation work, as discussed further in this paper, the value of the reimbursement concept has been clearly demonstrated.

As a measure of shared objectives and concerns, promised resources have been delivered by all parties, though after some delays on all sides. Critical implementation problems have been discussed between the parties and significant progress has been made toward their resolution. For example, the in-depth evaluation of the project completed in July 1975 identified the following key actions as prerequisites for Phase I success and a decision to proceed with Phase II:

a. Demonstration that HAVA (or HCC) can establish an effective system to recruit and manage a substantial farm-drain work force (e.g., at least 500 workers per day). At the time of the evaluation, HAVA had some 150 laborers working on farm drains. As of this writing, there is a total of 423 day laborers employed by HAVA for farm drain excavation.

b. Demonstration of a harmonious and effective HAVA-HCC working relationship and of the ability to perform as evidenced by at least four draglines working simultaneously in at least two project areas. During July and August, two draglines were working in the Nad-i-Ali area and one was in the Shamalan area. In September, a fourth dragline began working in Nad-i-Ali. As of this writing, two draglines are working in the Marja area and two are to begin work in the Shamalan area in December. When

the two draglines in Darweshan complete their work on a separate HAVA drainage activity in February 1977, they will also be assigned to Phase I construction.

c. Preparation of jointly accepted master drainage, construction, and equipment plans for Phase II. These plans were completed in November 1976 and are included in Annexes C, D, and E of this report.

d. Demonstration that field data are recognized as essential inputs to the project as evidenced by a fully operational soils laboratory which is adequately staffed and equipped. Since October 15, 1976 the soils laboratory has been fully equipped to analyze field data needs for drainage design and construction and is adequately staffed.

Where Phase I has fallen short is in terms of physical accomplishments. Original construction targets called for completion of 70 kms of farm drains and 50 kms of main drains by September 1976. At the time of the evaluation, 4.1 kms of farm drains and 8.6 kms of main drains had been completed. As of this writing, 15 kms of farm and 19 kms of main drains are complete and 42 kms of farm and 21 kms of main drains are designed and should be constructed by the end of Phase I in June of 1977. While recognizing that original construction targets were ambitious in view of HAVA's existing capabilities, inadequate field data and limited capacity of available equipment, the project implementation was also delayed by late recruitment of U.S. technical services and late delivery of engines and spare parts. Recent physical progress, however, points to improved capabilities that will permit achievement of the more realistic Phase II construction targets.

Finally, Phase I has developed a base of solid farm economic data to assist in planning and measuring the impact of drainage in the project areas. As for soils and other field data, the gaps and weaknesses have been identified and the stage set for developing the needed data during Phase II.

Weighing Phase I accomplishments against shortcomings, USAID concludes that proceeding to Phase II, as outlined in this paper, is justified and implementable.

2. Phase II Proposal. Building upon the close working relationship established beteween HAVA and USAID and drawing on the lessons learned during Phase I, Phase II proposes to shift into operational gear to solve the problems of salinization and water logging in 135 square kilometers of farm lands in the project area. Although this represents only

12.6 percent of the work identified in the Master Drainage Plan, 2,580 farm families will directly benefit from immediate gains in their production yields.

In addition to an expanded construction program, Phase II is designed to upgrade HAVA capabilities by providing training (on the job and abroad) and the contractor's (HCC) capability to perform drainage work by providing new construction equipment to replace the 30-year-old rigs now available to the project.

The scope of Phase II will also include updating of the Master Drainage Plan, development of soils maps, and undertaking planning for a possible Phase III. A farmer information program will be initiated to explain the drainage problem, how the project is working to solve it, when benefits can be expected to accrue to participating farmers, and what responsibilites and actions in the way of maintenance and leaching these farmers will have to assume.

Phase II will retain the governing principle that the drainage effort is an Afghan project to be implemented at their pace against mutually agreed priorities, with USAID support confined primarily to technical advice and financing on a reimbursement basis for work completed to design standards and construction specifications.

3. Phase III Thinking and Beyond. In addition to the Afghan Government requests (see Annex A) for U.S. assistance in establishing better drainage systems for the irrigated project areas of Nad-i-Ali, Marja, Shamalan, and Darweshan, the GOA has indicated an interest in possible assistance in the related activity of establishing improved water use systems.

The long term optimal solution to the Valley's waterlogging and salinity problems will require adequate drainage and proper water use practices. A Phase III, while continuing the installation of drains in accordance with the Master Drainage Plan, would need to address the water management issue directly. This would not be easy.

Existing water use practices are, in contrast to the essentially technical nature of the drainage problem, deeply ingrained in the culture. Attaining more efficient water use would involve rather complex interactions among technical, bureaucratic and cultural systems. It is believed that significant improvement in water use practices is simply beyond the capability (politically and bureaucratically) of this Government in the near term, at the

very least. By Phase III, however, the hope is that the Government will be in a better position to deal with this problem, otherwise USAID assistance in this field would have to be postponed.

USAID would be prepared to proceed in this area as rapidly as workable approaches can be formulated. Several areas appear appropriate for pre-Phase III investigation.

a. Irrigation practices -- Currently crops are often over-irrigated, resulting in some loss in production, increase in waterlogging and in a considerable waste of water. USAID's estimate is that education to overcome such problems will come slowly and that the education would have to be supplemented by a HAVA-encouraged discipline. It is by no means clear that a joint HAVA/USAID activity in this area would meet with success, given current knowledge and relationships. Perhaps a small test data gathering activity can be undertaken during Phase II.

b. Water allocation -- in most of the area traditional ditch tenders allocate water and the system gives preference to the larger landowners and those at the head of the ditch. Some efforts at better water allocation procedures are being tried by HAVA. More time and study are needed to determine how successful these efforts will be.

c. HAVA revenues/water charges -- Currently HAVA collects a negligible $0.20 per year per acre (afs 4 per hectare) charge for water. HAVA could increase its revenues and provide better services if it made a more realistic charge. If the charge were related to quantity of water used, an incentive for the farmers to use closer to optimum (less) quantities of water could result. But there has been reluctance to pursue seriously a program for rational water charges, probably grounded in Koranic injunctions against selling God-given resources. Although some HAVA officials believe realistic water charges are highly desirable, there are few grounds for believing they are culturally possible. A joint U.S./Afghan study team might be able to make some progress on defining a desirable experimental program in this area.

These are areas of potential improvement but without much promise of success without years of effort. The USAID will want to work closely with AID/W offices in a search for guidelines for future action.

d. Irrigation system improvements -- one final field of activity that may be appropriate for consideration in subsequent phases is

irrigation system improvement. Where drain waters must be diverted from an overloaded drain, a number of alternatives exist for channeling this water for irrigation purposes. Therefore, as one designs the drainage system, logical opportunities will present themselves for designing irrigation system expansion and improvements.

## III. PROJECT DESIGN

### A. Goal

The goal of the project is to bring about increases in agricultural productivity, income, and employment of small-scale farmers* and farm laborers throughout the project area. Specifically for Phase II, it is expected that:

1. Average crop yields will increase at least 50 percent as a result of drainage alone and total production will increase as follows:

| Crops | Average 1975 Yields in Areas to be Drained (MT/ha) | Average Yields in Areas Drained by 1981 (MT/ha) | % Change | Total 1975 Production from Areas to be Drained (1,000 MT) | Total Production from Areas Drained by 1981 (1,000 MT) | % Change |
|---|---|---|---|---|---|---|
| Wheat | 1.06 | 2.22 | 109 | 7.22 | 14.33 | 98 |
| Cotton | 0.66 | 1.05 | 59 | 2.63 | 4.81 | 83 |
| Corn | 0.72 | 1.16 | 61 | 0.83 | 1.52 | 83 |

2. Net annual farm income will increase from a 1975 base of afs 17,500 per farm-owner family to afs 24,500 by 1981 (at constant 1975 prices).

3. Utilization of farm labor will increase from 130,000 man-days in 1975 to 250,000 man-days by 1981.

Selection of 1981 as the measurement point for progress toward goal achievement is based on the hypothesis that the impact of proper drainage on crop production should be discernible soon after salinity levels and the water table are lowered in areas drained during Phase II. (As 1981 is one year beyond end of project, evaluation of results will need to be made during Phase III, if approved, or post Phase II project completion.) It will not be possible to attribute exactly what increases are the result of drainage and which are the result of improved agricultural practices. However, the 1976 Farm Economic Survey which provided the baseline data for the above indicators suggests a strong relationship between saline-free farms and fertilizer use. Farm lands affected by drainage problems do not produce enough to cover costs of modern inputs. Accordingly, adequate drainage by

* i.e. farmers with less than 10 hectares of land

raising the productivity of farm land may encourage adoption of modern practices by the small farmer. In any event, an updated Farm Economic Survey provide data on the general magnitude of production, income, and employment changes to measure project impact.

Obviously productivity, income, and employment benefits throughout the project area assume that the Master Drainage Plan outlined in Phase I will be implemented. The GOA is committed to drainage as witnessed in the ambitious drainage construction targets contained in the Seven Year Plan. The validity of this assumption, insofar as actual implementation over time, will have to be tested. Other important assumptions underlying the purpose to goal hypothesis and achievement of goal targets are:

a. Continued availability of seed and fertilizers on credit. As the programs for the Agricultural Development Bank and the Afghan Fertilizer Company are projected for considerable expansion in the Seven Year Plan, and a large seed improvement project is being planned by the Asian Development Bank, there is no reason to question the validity of this assumption at this time.

b. No changes in on-farm irrigation practices are needed to achieve the stated targets. This is an assumption which rests on a technical assessment of the potential benefits to be derived from drainage alone. There is no reason to question its validity for the time being.*

c. No change in traditional patterns of water allocation among farmers is necessary to achieve project objectives. This critical assumption is predicated on the same technical assessment which underlies the assumption on availability of seed and fertilizers, as well as on the confidence that drains will be installed in areas where farmers enjoy water rights sufficient to grow an average crop. (Socio-economic analyses done throughout Phase II will test this assumption.)*

d. Drains will be adequately maintained. This is perhaps the most critical assumption. To date maintenance of drains has been neglected because of:

(1) Inadequancy of existing drains;
(2) lack of farmer understanding of the need and/or the recognition of their responsibility for farm drain maintenance;
(3) Equipment limitations; and
(4) Lack of a schedule for maintenance.

---

N.B. While such changes would certainly be desirable, they are secondary benefits that are not required to justify the project.

Phase II includes a specific maintenance component. It is recognized that the designed inputs represent only an inducement to HAVA to establish and carry out a maintenance program. If this is insufficient to make this assumption a reality, any Phase III effort would have to address this issue more directly.

e. Land tenure and sharecropping patterns will remain the same or become more equitable. This assumption seems a safe one given the Afghan Republic's social and economic outlook and the fact that the project is directed at settlers whose holdings are limited by law.

f. Additional employment opportunities will not be offset completely by mechanization. This assumption is critical to realization of the targeted employment benefits. It is recognized that increased mechanization in the Helmand Valley is probably inevitable. The hope is that such mechanization will not be labor displacing. This assumption must be carefully observed during the course of the project as more data become available on trends.

B. Purpose

The purpose of Phase II is to reduce the salinity and waterlogging throughout the 135 square kilometers of farm land drained during Phases I and II. This land provides livelihood to 2,580 farm families, who are the intended beneficiaries of the project.

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

1. The areas drained in Phase I and in the first year of Phase II show the water table lowered to design depths and the salinity of the drain water reduced to acceptable levels given the cropping patterns in the given area. (An acceptable range of salinity levels would be between 1,000 parts per million and 1,500 parts per million.) Phase I and the first year of Phase II work have been selected for measuring purposes to allow sufficient time during the remainder of Phase II to collect necessary field data and measure the full effect of drain installation on the water table and salinity levels. The salinity levels, especially, will help gauge the effectiveness of programs for leaching the salts from the land.

2. In the areas defined as drained, average yields show improvement by at least 20 percent. This is considered the minimum acceptable target to justify on an economic basis undertaking drainage construction, especially in areas requiring close farm drain spacing. Analyses by the Socio-Economic Evaluation Unit to be set up within HAVA, as well as updating

of the Farm Economic Survey will provide measurement of progress toward this indicator.

The following assumptions underlie the output to purpose hypothesis:

1. HAVA is committed to working with farmers on project implementation and is committed to farmer education. This assumption is critical since farmers' participation is essential to the success of the leaching and farm drain maintenance programs. To date, farmer involvement has been confined to petitioning HAVA for assistance and supplying hand labor for drain construction. This assumption will have to be carefully tested, therefore, as Phase II unfolds.

2. Farmers will cooperate with HAVA. The other side of the coin is equally critical and untested. In the past farmers have been content to let the government "do it all." Accordingly, a new relationship must evolve. One leverage point to help realize this assumption is to work in areas only after farmers have understood and agreed to well defined responsibilities. This is designed into the project as an implementation procedure.

3. HAVA is committed to farm drains and will accept technical recommendations for adequate drain spacing. Experience to date indicates HAVA recognizes that farm drains are needed to realize the benefits from drainage. The problem of the limited number of adequate outlets coupled with eagerness to get on with the job makes concentration on main drain installation with farm drains to follow an attractive approach. During Phase I, USAID has stressed the importance of farm drain installation proceeding concurrently with main drains in order to provide early benefits to the farmers. HAVA accepts this approach. Its understandable concern is how to spread these benefits to the widest number of farmers in the shortest time to avoid charges of favoring one group over another. This concern makes wider rather than narrower spacing of farm drains most attractive. Certain areas, however, require very close spacing for adequate drainage. While HAVA recognizes the technical merits of this spacing, the test of the validity of this assumption will be in the implementation of the farm drain program. This is obviously a critical assumption.

C. Outputs

In order to achieve the project purpose and to have an impact on the goal, a number of things must happen:

1. HAVA capabilities must be expanded in the areas of planning, design, field data collection and analysis, construction supervision, socio-economic evaluation, and project-related administration. Hence it is envisaged that:

a. Qualified staff will be added or trained as follows:

| | Year One | Year Two | Year Three | Total |
|---|---|---|---|---|
| Number new staff | 45 | 79 | 30 | 154 |
| Total available staff | 149 | 228 | 258 | 258 |
| Number staff trained | 48 | 21 | 35 | 104 |

b. Adequate field data for planning and design will be collected at least three months in advance of the planned date for completed designs;

c. Drawings and specifications will be available at least three months before contracts need to be signed;

d. Adequate construction supervision will be provided as measured by the reduction in the current disparity between approved designs and as-built accomplishments;

e. The planned numbers of laborers for farm drain construction will be recruited and effectively administered;

f. The socio-economic evaluation unit will provide data to support project area selection before final decision is made to work in an area, as well as analyses of drainage impact on farmers' productivity and income.

g. A reference library of engineering and soils-related materials will be established by June 30, 1979;

h. The soils laboratory will be fully staffed and equipped for Phase III requirements by June 30, 1979;

2. Existing drains will have to be improved. It is projected that the following will be achieved:

| | Year One | Year Two | Year Three | Total |
|---|---|---|---|---|
| a. areas drained ($km^2$) | 22 | 39 | 69 | 130 |
| b. farm drains completed (kms) | 210 | 400 | 650 | 1260 |
| c. main drains completed (kms) | 70 | 55 | 153 | 278 |
| d. land smoothed ($km^2$) | 4.9 | 9.5 | 9.9 | 24.3 |

e. drains constructed in accordance with establish technical, economic and social criteria.

3. An updated and revised version of the Master Drainage Plan will be completed and issued in May 1979, based upon more complete field data.

4. A Phase III construction plan, including identification of areas to be drained and conceptual designs, will be issued in draft by July 1979 and in final form by October 1979.

5. A farmer, drainage-related information program will be tested and in operation by September 1978 reaching farmers whose lands are being drained in Phase II and a farmer information program for Phase III will be designed by November 1979.

6. At least 75 percent of the farmers affected by Phase I and II drains will participate in a leaching program guided by HAVA.

7. Soils handbook and maps for Phases I and II will be completed by September 1978 and for Phase III by December 1979.

8. A shared HAVA/Farmer drain maintenance program will have to be devised. To this end:

a. Maintenance schedules for farm and main drains will be established by June 1979; and

b. At least 90 percent of affected farmers will have signed farm drain maintenance agreements with HAVA.

9. An effective equipment maintenance and supply program for construction equipment will have to be established. The test will be that the existing equipment available for drain construction is kept running until the arrival of new equipment and that the latter is made operational quickly.

The effective management of project inputs to produce the desired outputs will depend in part on the reailization of the following assumptions:

1. The existing social structure will not impede implementation of the drainage effort. Up to the present, there is no evidence that the traditional social structure headed up by the large Khan landowner has impacted adversely on the limited project activities undertaken during Phase 1. As Phase II project activities expand to other areas, this assumption will have to be closely tested. The Khans' support is not critical. He can remain indifferent without affecting project implementation. Opposition from a Khan in a given area, however, would seriously handicap drain installation there.

2. Adequate unskilled farm labor can be recruited for farm drain construction. Although statistics on labor availability in the Helmand Valley are simply estimates, available evidence suggests that up to 6,000 laborers could be available for project work during the four winter months in the off-farming season. The first constraint to labor recruitment during Phase I has been on the HAVA administrative/managerial side. With 423 day laborers now employed in drainage construction and small groups to be hired on contract, the question now is how many laborers will be willing to work for HAVA wage rates and working conditions. This critical assumption bears careful testing.

3. A related assumption is that HAVA is committed to a labor-intensive approach to farm drain construction. Robert R. Nathan Associates in their report Farm Drains in the Central Helmand Valley of Afghanistan: Labor - Intensive vs Capital-Intensive Construction Alternatives conclude that a labor-intensive approach is more cost effective and in some areas the most technically well suited to the work, at least for the next three or four years. HAVA remains uncertain of labor availabilities and is inclined to believe that machines could complete the work more expeditiously. HAVA and SCS have been experimenting with different mixes of labor and machines on farm drains. While this assumption is yet untested, for the time being HAVA appears willing to support a labor-intensive approach.

4. HAVA recognizes the need for water management. While not a critical assumption, such recognition will facilitate and encourage the development of a farmer information and education program. This assumption is untested.

5. Other HAVA activities will not intrude on the drainage effort. During Phase I HAVA has been undertaking certain drainage work on its own which competed for the same resources needed for preparation of Phase II work. As the scope of Phase II encompasses all drainage work within the project areas for the next three years, such competition should disappear. HAVA still maintains, however, some responsibility for areas outside the project (e.g., the upper and lower Helmand and Kandahar areas) as well as responsibility for irrigation improvement throughout the Valley. It remains to be seen whether competing demands will be placed on project-related resources.

6. HAVA can recruit additional manpower to meet expanding needs. The Construction Plan (Annex D) has clearly identified the additional manpower requirements during years one, two and three of Phase II. The test will be whether HAVA's request for this additional staff will be fully met by the central administration. This is a most critical assumption.

7. Reimbursement upon completion of work acts as an incentive for HAVA to perform well and at an increasing rate. Phase I experience with Fixed Amount Reimbursement (FAR) has been mixed. The rate of reimbursement has been so slow and the problems of estimating costs in advance with some accuracy has been so troublesome, that the incentive effect of reimbursement remains largely untested. With increasing disbursements under the more suitable method of percent of actual cost reimbursement proposed for Phase II, there appears to be a high probability that this assumption will prove valid.

8. The Helmand Construction Company (HCC) will place sufficient priority on the drainage project. This is a critical assumption. Currently, HCC is establishing its national headquarters in Kabul, to cover its new national scope, leaving a unit in the Helmand Valley responsible for Helmand Valley related construction. It remains to be seen whether this Unit will be able to retain the equipment and staff it needs as the main contractor for the project against pressures from other projects. This assumption proved to be invalid during Phase I. To ensure that this assumption is realized in Phase II, assignment of specific equipment needed for Phase II construction is included as a covenant to the Capital Grant (CG) for new equipment. In turn, this new equipment will be titled in MWP and assigned to HCC for exclusive use on drainage construction and maintenance. Notwithstanding these efforts, the validity of this assumption will have to be carefully evaluated.

9. USAID and PASA personnel with requisite skills can be recruited on a timely basis. Phase I experience argues against the validity of this assumption insofar as timely recruitment is concerned. To the extent, however, that Phase I personnel carry over to Phase II, the validity of this assumption is reasonably assured.

## D. INPUTS

### 1. UNITED STATES GOVERNMENT

| | Relation to Outputs ( ) | Obligations FY 77 MM | FY 77 $000 | FY 78 MM | FY 78 $000 | FY 79 MM | FY 79 $000 | FY 80 MM | FY 80 $000 | Total MM | Total $000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Development Grant | | | 2,303 | | 2,745 | | 5,406 | | 212 | | 10,666 |
| (1) Direct Hire | | 12 | 93 | 48 | 233 | 48 | 236 | 36 | 212 | 144 | 774 |
| Project Administration Advisor | (all) | 3 | | 12 | | 12 | | 9 | | 36 | |
| Engineer Advisor | (all) | 3 | | 12 | | 12 | | 9 | | 36 | |
| Maintenance Advisor | (2,9) | 3 | | 12 | | 12 | | 9 | | 36 | |
| Supply Mgt Advisor | (2,9) | 3 | | 12 | | 12 | | 9 | | 36 | |
| (2) PASA | | 112 | 689 | 108 | 611 | 10[illegible] | 658 | - | - | 324 | 1,958 |
| Team Leader | (all) | 12 | | 12 | | 12 | | - | | 36 | |
| Drainage Planning Adv. | (1,3,4) | 12 | | 12 | | 12 | | - | | 36 | |
| Design Advisor | (1,2,4) | 12 | | 12 | | 12 | | - | | 36 | |
| Design Advisor | (1,2,4) | 12 | | 12 | | 12 | | - | | 36 | |
| Soils Advisor | (1,2,3,7) | 12 | | 12 | | 12 | | - | | 36 | |
| Soils Mapping Expert | (1,7) | 12 | | 12 | | 12 | | - | | 36 | |
| Construction Advisor | (1,2,4,8) | 12 | | 12 | | 12 | | - | | 36 | |
| Water Use/Farmer Educ. Advisor | (5,6,8) | 12 | | 12 | | 12 | | - | | 36 | |
| Consultants | | 16 | | 12 | | 8 | | - | | 36 | |
| (3) Contract | | 36 | 266 | - | - | - | - | - | - | 36 | 266 |
| Long Range Planning Advisor | (1,3,4,7,8) | 36 | | - | | - | | - | | 36 | |

| | Relation to Outputs ( ) | FY 77 MM | FY 77 $000 | FY 78 MM | FY 78 $000 | FY 79 MM | FY 79 $000 | FY 80 MM | FY 80 $000 | Total MM | Total $000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (4) Training | (1) | 64 | 110 | 94 | 151 | 130 | 207 | - | - | 288 | 468 |
| - U.S. | | | | | | | | | | | |
| Long Term | | 24 | 33 | 60 | 86 | 96 | 140 | - | - | 180 | 259 |
| Short Term | | 36 | 70 | 30 | 58 | 30 | 59 | - | - | 96 | 187 |
| - Third Country | | 4 | 7 | 4 | 7 | 4 | 8 | - | - | 12 | 22 |
| (5) Construction Reimbursement (75% of actual cost) | (2) | 1,145 | | 1,750 | | 4,305 | | - | | 7,200 | |
| b. Capital Grant | | | | | | | | | | | |
| (1) Eqpt. and Supplies | | 5,000 | | 1,670 | | - | | - | | 6,670 | |
| (a) Eqpt. for HCC | (2) | 5,000 | | 1,335 | | - | | - | | 6,670 | |
| (b) Eqpt. for HAVA | (1) | - | | 332 | | - | | - | | 6,335 | |
| (c) Reference Books | (1) | - | | 3 | | - | | - | | 332 | |
| | | | | TOTAL DG+CG | | | | | | 3 | |
| | | | | | | | | | | 17,336 | |

2. GOVERNMENT OF AFGHANISTAN

| | Related To Outputs ( ) | FY 77 # | FY 77 $000 | FY 78 # | FY 78 $000 | FY 79 # | FY 79 $000 | FY 80 # | FY 80 $000 | Total # | Total $000 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| a. Counterparts | (all) | 21 | | 28 | | 30 | | - | | - | |
| b. Professional Staff | (all) | 128 | | 200 | | 228 | | - | | - | |
| c. 25% Construction Costs | (2) | | 380 | | 585 | | 1,435 | - | | | 2,400 |
| d. Housing for U.S. Technicians | | Rent Free Houses | | | | | | | | | |
| TOTAL | | | | | | | | | | | |

# IV. PROJECT ANALYSES

## A. Technical Analysis

1. The Problem and the Solution. The Central Helmand Valley enjoyed, before the installation of modern irrigation, natural drainage sufficient to evacuate the water from minimal rainfall and small traditional irrigation. The availability of more water resulting from the development of modern irrigation coupled with the natural tendency of hitherto traditional farmers to over-irrigate has severely overloaded the natural and man-made drainage capacity of the irrigated land causing the familiar problems of waterlogging and salinity to develop.

a. The waterlogging problem -- Lack of adequate drainage has caused the water table to rise to the point that it is interfering with plant growth and cultivation by expelling normal soil gases from the root zone leaving excessive wetness in the soil. This waterlogging condition has seriously reduced the productivity of the land in approximately 40% of the project area.

There are other factors which contribute to the water logging problem. The Shamalan Canal, physically located nearer to the river than to the terraces at the edge of the river valley, acts as a hydraulic barrier to the natural flow of groundwater back to the river. In addition, the existing drainage structures under the Shamalan Canal are of insufficient size to carry the drainage waters from the Shamalan Area, as well as that from the two desert areas of Marja and Nad-I-Ali which must cross the Shamalan Area, back into the river.

Seepage from canals and drains contributes to waterlogging of the lands now being cultivated or considered for cultivation.

Lack of adequate maintenance has allowed weeds to grow and sediment to build up in the drains. This contributes to the waterlogging problem.

The method of irrigation used results in excessive amounts of water being introduced to the land. This over-irrigation is another factor in the problem of waterlogging.

b. The salinity problem -- The salt content of the soil has increased to the point that crop production has been serious affected. This salinization is the result of the raising of the water table and the resultant deposit of salts when the water evaporates. The more severely salinized

lands, which comprise about 26% of the project area, have white deposits of salt on the surface and crop growth is stunted, spotty or non-existent. In areas not so severely affected, the visual evidence is not as great but crop production is seriously affected, nevertheless.

HAVA has made studies to determine the extent and severity of the salinity problem in four of the areas. These results are summarized below.

Salinity Level of Land, Percent

| Area | Very Severe | Severe | Moderate |
|---|---|---|---|
| Nad-I-Ali | 8.8 | 32.3 | 58.9 |
| Marja | 9.3 | 48.2 | 42.5 |
| Shamalan | 14.6 | 15.3 | 70.1 |
| Darweshan | 10.8 | 16.2 | 73.0 |

From these tests and data from the USDA, it is estimated that from 25% to 50% of the lands in each of the project areas are salinized to the point where yields are no more than 50% of potential.

c. The drainage solution -- The construction of an adequate drainage system is required to alleviate the problems of waterlogging and salinity.

This drainage system will lower the water table to a point where root development will no longer be hampered and proper leaching can be initiated to reduce the existing salinity to a more acceptable level.

This system will involve on-farm drains and main drains to conduct the water back to the Helmand River. Both open and tile drains were considered for use on this project and it was decided to use primarily open drains for both farm drains and main drains. This decision was made on the basis of the rising costs of petrochemical pipe, the inexperience of HAVA and HCC with installation of tile drains and the poor results obtaine from tile drains which were installed in the past under American guidance. However, some demonstrations with tile drains will be made in three areas in order to determine farmer acceptability.

In addition to provision of on-farm drains and a network of improved or new main drains to conduct the water back to the river, there are other measures needed to correct the current waterlogging and salinity problems.

The seepage from existing canals and drains will be controlled by the use of parallel interceptor drains which will prevent the seepage water from entering the cultivated areas. This procedure will be a quicker and less costly means of seepage control than canal lining. In some areas these seepage waters from the interceptor canals will be mixed with other irrigation water to provide additional irrigation flows while at the same time reducing the flow in existing drainage channels.

The existing drainage structures under the Darweshan and Shamalan Canals will, in some cases, require modification to lower their level or to increase their flow capacities. The reduction in flow in existing channels, as discussed in the previous paragraph, will allow these modifications to be accomplished at less cost.

The problem of weed control and sedimentation will be addressed by the establishment of a maintenance program to be administered by HAVA. This will not be financed by this project but is required by a covenant in the proposed project agreement.

The existing methods of irrigation which result in over-irrigation and resultant inefficient use of water and overloading of the drainage system will be the subject of a farmer information and education program. The farms with newly-built farm drain systems will be used as demonstration plots for introduction of methods of efficient water use. This will follow the leaching program discussed below under the salinity control program.

d. The salinity solution -- When an adequate drainage system has been provided on farms and a main drain system built to conduct the drain flows away, the soil salinity problem can be solved by establishment of a leaching program. Leaching of the soil involves application of excess water to the land in order to dissolve the undesirable salts and thereby flush the salts from the land through the drainage system. This may require controlled application of leaching water over a period of 6 to 24 months before adequate soil salt reduction is achieved. The success of this program will depend, in part, on the farmer information and education program mentioned above. It will not be an easy program to establish since there are new concepts, leaching and efficient water use, to be introduced into an existing, long-used system in which farmers look upon water as a divine-given resource and assume that "more is better". Another problem will be to persuade the farmers to increase initially their water use above present levels to leach the soil and then to decrease abruptly their water use to manage water more efficiently once the leaching has been completed.

e. Land smoothing -- Some of the land to be drained by this project is not level enough to be properly irrigated and cultivated. Where drains are provided to lands with small hummocks and irregularities there must be some smoothing work done to correct this condition. This work will be done by machine to assist the farmers in getting the land under cultivation. This work has been termed land smoothing herein to avoid identifying it as "land leveling" which is a much more precise operation, not a part of the scope of this project.

f. Irrigation structures-- This is a drainage project but of necessity some modification of irrigation supply structures will be necessary in certain areas. This is due to differences in farmers' property sizes and shapes and the variation in drain spacings as determined by the soil characteristics. Since land rearrangement is not a facet of this project, the supply and drain system must be fashioned to the existing configuration and there will be instances where drain spacings require rearrangement of on-farm irrigation supply canals. Main drain installation will also necessitate alteration of some irrigation systems.

g. Technical feasibility -- The experience of Phase I has provided evidence, albeit limited, of the feasibility of the drainage solution proposed herein. The salinity solution, while not addressed in Phase I, has been proven feasible on many other projects in other parts of the world with similar physical conditions. The same is true of the land smoothing work proposed to be done.

2. Phase II Construction

a. General -- During Phase I an extensive planning effort has been undertaken on the basis of previously available data and data collected during the Phase I period. The results of this planning are to be found in Annexes C, D, and E in the form of a master drainage plan, a three-year construction plan and an equipment plan. The inputs designed into this project are those needed to implement the three-year construction plan. The pace of the work to be performed is based on an assessment of those accomplishments that can reasonably be achieved given the existing GOA, HAVA and HCC capabilities supplemented with U.S. assistance resources.

Drainage work will be performed in each of the five areas as discussed in Annex C. The work will vary in location and quantity from year to year and is addressed on a yearly basis. During the first year, the areas to be worked in are determined by availability of adequate drain outlets, size of technical and administrative staffs, limited support equipment and size and condition of the construction equipment pool. As expanded project inputs become available, the scope of work will increase as evidenced by the plans for year 2 and year 3 of the project.

As additional outlets are constructed, the other criteria for selection of areas in which to work will assume greater importance and the work can be concentrated in those areas where greatest benefit will be achieved.

b. Work pace -- The pace of the work during the first year of the project will be accelerated to what is estimated to be reasonably achievable with the planned inputs and represents about a four-fold increase over the average Phase I results. The rate of work is then planned to about double in year 2 and year 3 of the project, and it is anticipated that the year 3 rate would approach the optimum that could be maintained for the balance of the drainage program.

Specifically, the work of each year would drain the following portions of the total project.

| Year | Area Drained |
|---|---|
| 0 (phase I) | 0.5% |
| 1 | 2.1 |
| 2 | 3.8 |
| 3 | 6.7 |
| | 13.1 % |

If the year 3 rate were maintained, the balance of the project area could be drained in about thirteen additional years or at year 16. However, if additional inputs were made, the project completion time could be reduced accordingly.

c. Technical standards and specifications -- During Phase I, detailed design criteria and construction specifications have been drafted, field tested, and put into use. Other than some minor customizing from contract to contract, these documents are adequate for use in Phase II and no further inputs are needed.

The drainage coefficient developed during Phase I is adequate for continued use and would require revision only in the case of major changes in the cropping patterns or irrigation efficiencies of the area neither of which are anticipated to occur in Phase II.

The methods to determine depth of drains, the flow in them, the spacing to be used, and the flow slopes and side slopes have all been established. They will be varied only as dictated by the field data concerning soil characteristics and water table location to achieve the desired difference

in elevation from field level to water surface in the drain and minimum depth of flow to retard growth of vegetation. Field data collection will be planned to concurrently meet the needs of the long-range planner as well as those of the shorter-range planner and the final designer.

3. Environmental Considerations. The assessment of the environmental factors involved in this project is covered in greater detail in Annex G. Only a brief summary of the assessment is presented here.

Many factors have contributed to the salinity and waterlogging problems of the Helmand Valley such as canal seepage, improper water use, lack of land leveling, insufficient infrastructure maintenance, and lack of adequate drainage. This project will concentrate on solving just one of these problems--the need for adequate drainage facilities. With adequate drainage infrastructure, the waterlogging problem will be alleviated and with the introduction of leaching programs salinity will be reduced. Also, the stage will be set for the development of improved water-use practices and land smoothing and leveling procedures to increase irrigation efficiencies and thus provide water to areas not now being irrigated. The first step--drainage--is key to reduction of waterlogging and salinity.

All of these actions will have a positive effect on the human environment of the Helmand Valley. There is no global or regional impact of this project but the positive impact on a national scale is considerable. Soil qualities will be improved and as a result land use can be expected to improve and more land may be brought under cultivation. Water use may become more efficient and water quality, while lowered, will remain of good quality for irrigation use after it leaves the project area and moves on downstream as demonstrated in the annex. The increased use of water is a benefit in the form of additional use of a valuable natural resource. There are no perceivable detrimental effects to the Afghan cultural heritage. The socio-economic benefits are positive in that additional income should flow to those already farming in this area and settlement of new farmers will be possible. Health conditions will be improved since mosquito breeding areas will be eliminated and the malaria hazard reduced, given proper maintenance of the drainage system.

There are no adverse environmental effects expected as a result of this project. The alternatives to this project would be different combinations of inputs to drainage improvements but environmental benefits would result in any case. The alternative of no inputs to this project is unacceptable since a further deterioration of the area would result and the environment would be even further degraded.

## B. Social Analysis

### 1. The Context

a. General description --- The government political priority of land settlement, both past and present, is key in understanding the socio-political context in the Helmand Valley, the selection of sites, or beneficiaries, for on-farm drains, and the importance of this selection for a successful project. The priority of land settlement was stated first in the early documents establishing HAVA, and has been restated and reemphasized since the 1973 change of government in statements by President Daoud. It has also been reflected in action by HAVA and other regional development projects.

There are an estimated 30 - 35,000 farm families living in the Helmand-Arthandab Region, 5-6,000 of which were settled there over the past 20 years. Before 1973 land settlement activities had not been particularly impressive in terms of numbers (in spite of policy), with an average of less than 300 families settled per year. Settlement services, however, in the early years were fairly comprehensive, e.g., generous farm size, an ox, housing, land preparation, seeds, and food programs. In some ares, such as south Nad-i-Ali, there have been high attrition rates resulting from the early attempts to settle nomads (who were inexperienced farmers) on marginal land with poor drainage, that requires a very careful use of water.

While the settlers represent nearly every ethnic group in Afghanistan (including Ozbek, Tajik, Hazara, Turkman, Baluch, and numerous Pashtun tribal groups, the one dominant ethnic group in the region is the Pastun of the Durrani tribes, e.g., Barakzai, Popalzai, Nurzai, Achakzai, Alikozai. Field visits suggest that a large proprotion of the most recent settlers are also of Pashtun origins. In any case, a major fraction of the region's population consists of recently settled, formerly landless poor. Moreover, in the areas where drains are most needed, the predominance of settled families is much greater than in the project area as a whole. The reason for this is that the Helmand flood-plain areas with their traditional, naturally drained, good sandy soils and relatively easy access to water were indigenously populated long ago. The more marginal areas in terms of soils and water access were left for recent settlement under HAVA. These required modern technology for land development.

In contrast to the past (pre-1973), HAVA figures indicate there were 3,617 farm families settled in the region during a 10-month period of 1974-75. Of these, the following numbers were settled in areas of present USAID project interest:

| | |
|---|---|
| Marja | 607 |
| Nad-i-Ali | 169 |
| Shamalan | 217 |
| Darweshan | 1,777 |
| Total | 2,770 farm familes settled |

During the past year (1975-76), 1,359 more farm families have been settled in the region. This is an impressive performance by past standards and the facts tend to reconfirm that the new Government is translating its oft-stated concern for the landless poor into action.

Based on figures collected by the joint HAVA/USAID 1976 Farm Economic Survey (FES), the percentage of settler households in each of the project areas, except for Upper Boghra where FES data have yet to be analyzed, is calculated to be:

| Area | Percent Settlers | Sample Size |
|---|---|---|
| Marja * | 100 | 80 |
| Nad-i-Ali * | 100 | 77 |
| Shamalan ** | 28.8 | 146 |
| Darweshan | 41.8 | 67 |

Both Shamalan and Darweshan include large indigenously populated areas in the Helmand flood plain. Both areas have been centers of government interest for further settlement since the construction of the major canals which deliver water to previously dry areas. But because of a combination of gross seepage from other irrigated areas or structures and surface salt accumulation resulting from desert conditions, these newly settled areas require drainage structures and reclamation action by the settlers and HAVA (e.g., smoothing and leaching of the soils). Thus, the project has and will likely continue to focus more on the settler rather than the indigenous population of the area, although the settlers may not be of very recent origin, c.f., Nad-i-Ali, Marja.

b. Land tenure patterns -- The pattern of land parcels over the Helmand varies considerably and, in some cases, may affect project implementation. Two elements will be considered: parcel shape and size.

Generally settlers have been given plots of rectangular shape which are arranged in regular blocks, allowing surface drains to be constructed along field borders and other agriculturally non-desruptive lines. The prime examples are Nad-i-Ali and Marja.

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* Before the development of the modern irrigation systems, the clay desert steppe was unsettled.

** Includes Bolan and Aynak for the purpose of this analysis.

In areas of indigenous farmers, as north Shamalan, the land parcels are highly irregular in shape and frequently fragmented into many parts in terms of any one farmer's holdings. A cadastral map of these areas commonly looks like a jigsaw puzzle, with many inaccuracies. These patterns are products of the original settlement arrangements reflecting geographical irregularities and centuries of the Islamic inheritance system which tends to fragment holdings. Surface drains constructed in straight lines across such areas will likely further fragment holdings, eliminate unluckily located small fields, and unequally benefit farmers relative to land lost.

Some examples of variations in farmer reaction to project plans have already surfaced as they relate to parcel size. What portion of a man's field will be given to the surface drain? In Gowargi where each farmers has 9-1/2 jeribs* of farm land, 59 of 88 farmers (67%) considered closed drains good as opposed to pen drains, mostly for reasons relating to loss of farm land. Twenty farmers stated dissatisfaction with project plans generally for the same reasons. While no one in Zargun Kale stated dissatisfaction with project plans, 9 of the 19 farmers interviewed stated a preference for closed drains as opposed to open drains, mostly for the same reason, land loss. Of the nine, five were the recent (since 1973) settlers with half the original settlers land holdings.

In conclusion, opposition to project plans relating to land tenure is most likely to come from the smallest recent settlers, and the areas of the oldest indigenous, fragmented holdings. In both cases, the opposition, if it surfaces, will be from those with the least wealth, and, therefore, least political power.

The proposed demonstrations with closed (tile) drains during Phase II, if successful will offer a means to avoid this potential conflict.

c. The project and land reform -- The settlers have received between 10 and 30 jeribs of land, depending on when and where they were settled and, therefore, are not to be affected by any application of the recent Land Reform Law in the Helmand area. Given the other criteria for the selection of work areas, e.g., no large landowners, it is not expected that this law, if implemented, will affect the Helmand Drainage Project in any way. Generally, it is only in the indigenous Baluch areas, south of the Darweshan Project Area, that extremely large land holdings appear, i.e., stated in thousands of jeribs.

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* 1 jerib = approximately .20 hectares

d. Social structure as a block to development: the role of Khans in project areas -- The khan, or larger landowner, in the Helmand Valley generally is the holder of political power and controls much of the resources (land and water) in a particular area, around which a village is organized. In the central Pashtun Helmand area, the land holdings may range between 100 to several hundred jeribs for such a man. The village will be referred to by the khan's name. The residents, generally, will be the khan's sharecroppers, farm laborers, servants, relatives, or individuals with some other political tie. In some case, the khan will be the administratively recognized village headman or malik. If he does not fill the role himself, one of his political subordinates will. In some cases, the khan will be the mirab or watermaster who controls the irrigation water distribution usually for an area larger than one village. If a khan does not fill the mirab role, he will have a major voice in mirab selection.

Under such a structure, the system of patronage for sharecroppers, farm laborers and other small landowners in the area may be highly developed and complex, being the basis for local political affiliation. The patron has the responsibility to look after the interests of those who work for and politically support him. The ideal qualities of a patron, as landowner or khan, are roughly the same as for a governor, e.g., generous, moral, empathetic, just.

A khan has obligations to those who support him, but he also has broader obligations to the community since he is a man with worldly goods. Ideally, he will be pious and in the name of religion will perform religiously-defined good or pious acts (sawab) for the benefit of the community as a whole or for needy individuals, e.g., build a mosque, fountain, or some other community facility, aid the poor and destitute, support the mosque perhaps with firewood, or pay a lion's share of the expenses for maintaing the community praryer leader, or mullah.

It should be noted that in the Helmand the stereotype of the conservative village leadership (the khan) blocking development does not hold true. The leaders in farm mechanization, in adoption of high-yielding varieties of grain and fertilizer, and in land development have generally been the khans. They can afford to experiment and invest in new developments.

In the Baluch areas south of Darweshan where the khans tend to have much larger landholdings, as noted, the adoption of the modern agriculture package of high-yielding varieties of wheat and fertilizer has been slow because of water scarcity but not as the result of conservative agro-economic orientations/practices. Tractors, trucks and jeeps are

part of a khan's show place. The land in these areas has all been developed using the indigenous systems of hand labor. Diversion structures tend to be small, hand constructed, and canals are small. As much as a third to a half of a man's land may not be planted each year because of the lack of available water on the land. The modern grain varieties with fertilizer require more water than the indigenous varieties to be successful. Hence, they are not adopted.

The patterns of social organization, outlined above, are found mainly in the old, indigenously settled areas predating HAVA development and may not, generally, apply to the more recently settled areas like Nad-i-Ali and Marja in the same form. This is not to suggest in these areas that after 20 years of settlement major differences in status and wealth among the settlers are absent. Since the pattern of settlement was based on group applications with representatives, these group leaders/spokesmen and household heads with numerous grown or nearly grown sons began with some status and power, if not economic advantage. Several of these men who acted as early tribal representatives during settlement no doubt had considerable power before settlement, and later became regional representatives to the Parliament. With land distribution shares limited to 10-30 jeribs per household head (depending on quality of land, area, and rules in effect at the time of settlement), the chance of accumulating large plots under one individual were limited, the exceptions being the head of an extended household where the sons also had been allotted land, or someone with the power to influence or manipulate the settlement system. In short, there will be power figures present in settled areas but, generally, power may be more disbursed or fragmented (depending on settlement pattern) than is the case in the southern Baluch regions of the Helmand, for example.

In areas like Gowargi and Darweshan with recent settlement (since 1973), where the lands surrounding a settlement area may come under the influence of a local indigenous khan, big or little, and where the systems of water distribution also may be influenced, the role of khan should be carefully studies in baseline enquiries and monitored as the project develops. The role expectations vis-a-vis recent settlers, very likely of different tribal or ethnic stock, will not be the same as noted above. In a water distribution system controlled by the local political forces, if any one goes water short it will be the recent settlers. There may be overt or covert hostility toward the newly government-settled "intruders/foreigners" who are to share the valuable, if not scarce, local resources of land and water. In such cases, already noted in the field but not clearly documented, the local social/power structure can act as a barrier to full project success if left unattended. The emphasis should be, therefore, on the constant monitoring of the socio-political context of a project area.

## 2. Characteristics of the Target Population

a. The farmers -- To generalize about the farmer/beneficiaries in the five project areas in an anthropological sense is to be inaccurate. They represent virtually every ethnic group in Afghanistan, indigenous Pashtun tribal populations, long-term established settlers, and recent poverty-stricken settlers.

This variation, at least between settlers, can be seen in the examples of the two areas of Phase I on-farm drain construction: Zargun Kale in Nad-i-Ali and Gowargi in Shamalan.

In Zargun Kale the number of farmers being benefited by the construction of 19 kms of drain on one square kilometer is small, about 20 families, or 150 persons, households averaging 7.8. In Gowargi there are 122 farmers to benefit from 11 kilometers of drains on 2.5 square kilometers. This will involve about 850 persons in households averaging about 7. The differences between the two areas are: Zargun Kale is an area of settlers located 20-23 years ago on 28 jeribs of farm land per household on the desert steppe soils requiring close drain spacing, whereas Gowargi was settled two years ago on 9½ jeribs of farm land per household on the sandy Helmand flood plain where wider drain spacing is sufficient.

Ethnically, the Zargun Kale block is mostly one tribal group (Daftani from the area of Ghazni) of settled nomads, part of a group of 80 families originally settled in the area. The exceptions are five recently settled families of the Kakar tribe from the Kandahar region, where they had been farm labor. These received half an original settler's plot which had been abandoned. In contrast, the Gowargi area settlers represent 25 ethnic or tribal groups including Kharoti (15), Ozbek (18), Tajik (17), Safi (7), Wardaki (5), Barakzai (2), Kakar (2), Nasir (3) and others. They came from as far as Takhar Province (e.g., Ozbek and Tajiks), and as near as Kandahar Province and Girishk. These Kakar came from the Herat area. All but the Kharoti, who were Pashtun nomads from Paktia, Ghazni and Oruzgan were apparently farm laborers before settlement. This pattern of mixed ethnic settlement is a recent innovation and requires study. This does not appear to present any barriers to development plans although unit cooperation has not been required.

Politically, the ethnic homogeneity of Zargun Kale has advantages. The tribal settlement representative at the time of original settlement later became the regional representative to Parliament

and was the organizer of the petition for help with drainage that was the major element in the selection of this particular area for work. Within his immediate extended household and kin group rests the control of at least four of the land parcels in the development area, and the only tractor. Leadership and power are centralized and group action is less complicated. In Gowargi with the multitude of ethnic groups, leadership is fragmented. The village headman, malik, is a Tajik but would likely have difficulty mobilizing his village as a unit. This has not yet been tested in this project area since there was no petition for help and the farmers' first and only knowledge of project plans was gained through discussions with survey crews working in their fields. The farmers indicated that they had major salt problems that could be solved with more irrigation but water was short.

The mirabs (local watermasters) for the two areas enforce the water distribution patterns which reflect the socio-political scene. In Zargun Kale the miral is a young member of the political leader's immediate kin group and there are virtually no complaints of water shortage. In Gowargi, the water for the area arrives via an indigenous mirab-controlled ditch; and local Pashtun farmers do not allow adequate water to reach the new settlers. Combined with unlevel fields which present problems of efficient on-farm water distribution, the water availability, unlike Zargun Kale, could cause some difficulty for the project during the leaching stages.

Household size in both areas was small: 7.8 persons for Zargun Kale and 7.1 for Gowargi. This compares with 8.7 persons recorded for Nad-i-Ali in the 1970 FES and 9.5 for the Helmand region. This translates into a male household labor force of over 12 years old of 1.3 and 1.6 persons respectively. The females available to work in the fields of the same age group are .21 and .52 women per household. Especially among the Pashtun tribal groups, household status is diminished by the involvement of female labor in the fields. The significance of these figures for the project are several. First, as discussed in more detail below, under present agricultural conditions in the Helmand, size of household will generally reflect economic status, with exceptions. The lower the status, the smaller the household. Second, these households do not have a labor surplus and cannot be expected to furnish laborers for project work. Third, as noted below, it results in higher than expected rates of sharecropper and tractor contracts. In Zargun Kale, 26 percent of the households employ sharecroppers to supplement this labor force. During the last crop year, only one small field of alfalfa was plowed with animal power, the rest used tractors, generally contracting plowing, which did not involve household labor. In Gowargi, six plots totaling 27 jeribs, mostly cotton,

were plowed with animals. The rest used contract tractors and did not involve household labor or non-existent oxen.

Farm Mechanization: The use of tractors in agriculture generally suggests a developing agricultural environment, which is correct but not the complete picture. In the two areas studied, the use of tractors reflects a wide range of elements. First, in the case of the Zargun Kale political leader noted above, tractor ownership and use reflects wealth, a modern view of agricultural production, and an investment in a machine that can be contracted out. Second, tractor use through contract plowing reflects a response to a small household labor force. Third, in the case of the recent (since 1973) settlers, it reflects levels of poverty since most do not have oxen to plow. In this case, the other alternative to contract plowing is the 50/50 sharecropper who furnishes the plow power.

In conclusion, the variations in the socio-economic-political structure of the two settler areas in which the Project has been working in Phase I demonstrates the importance of having this sort of information on each of the proposed project areas. The indigenous areas will no doubt offer some different patterns. Most of the patterns are crucial to project implementation and final success in terms of impact on the intended beneficiaries.

b. Sharecroppers -- The presence of sharecroppers connotes the existence of large landowners. This is only partially the case. Sharecropping serves several functions besides being the base arrangement for a large landowner patron system. Sharecropping is a method where small landowners may supplement their income by working others' land under a variety of arrangements. Sharecropping is also a means of supplementing the labor force of a small landowning household.

Basically, there are 5 elements in irrigated agriculture which affect sharecropper contracts: land, labor, plow power, seed and water. With wheat, the traditional crop, each element had nearly equal weight in determining shares. There are two general classes of sharecroppers that have been identified: the buzgar and the Kashtagar.

The buzgar is a sharecropper who generally contributes his labor only, makes no farming decisions about the crop and is supervised by the landowner. He receives one-fifth of the crop produced. For the cotton harvest his share will increase depending on the amounts he picks.

The kashtagar generally contributes his labor, animal power for plowing, and seed, and he is involved in farming decisions on crops. He receives about one-half of the total crop produced. When fertilizer is used, the tenant will generally be involved in a share of the cost.

In recent times with cash crops that require more labor (e.g., melons, cotton, vegetables) and modern agriculture elements like chemical fertilizer and mechanization, the sharecropper agreements become complicated. Relative to the present case of settlers with small households, however, the key element is supplementary labor. For a fifth of a wheat crop a man may have a buzgar who furnishes all the labor from planting to threshing, frequently excluding the actual harvesting or cutting. A landowner may work along with his buzgar and halve the tenant's share. A widow with small children may sharecrop her otherwise idle land providing only land and water supply and receive one-fourth to a fifth of the product. The variation of sharecropper agreements are many, depending on the status and size of the landowning family.

In some cases, the use of buzgars on relatively small holdings may relate to cultural values associated with age, status and leisure time, as opposed to purely economic factors. It would be simple to overstate the case, but the values have to do with being a landowner, reaching an age when leisure time has status considerations, and an economic situation which allows such freedom even though that economic status is extremely low by Western standards.

In Zargun Kale and Gowargi, where on-farm drain construction is being completed in Phase I, the farmers are not heavily dependent on sharecroppers. Twenty percent of the farmers in each of the areas employ sharecroppers, mostly to supplement the small household labor force. A total of perhaps 200-250 persons within the sharecropper households may benefit from Phase I. But the important point to be made is that the payment of sharecroppers is on a percent of the crop basis. An increase in yields resulting from better drainage will, therefore, benefit the sharecropper as well as the landowner.

c. On-farm drain construction workers -- Probably the most immediate beneficiaries of the drainage work are the hand-laborers who, with pick and shovel, are digging the on-farm drains. Over the longer run, farm laborers also stand to benefit directly from increased productivity of drained land as demand for their services expands. An examination of this labor force under Phase I can give some idea of what may be expected in later phases, in terms of its benefits from the project.

The laborers represent a variety of socio-economic groups present in the Helmand. Each group has its own distinct characteristics and is more or less reliable in terms of labor force stability through the seasons. The labor pool should not be considered one homogenous mass reacting to all variables (e.g., harvest season construction work) in the same way.

Most of the hand laborers employed on the project (78 percent) reside in the project area but were born outside the Central Helmand area of government-built irrigation projects. About half were born in Helmand province but in areas watered by traditional irrigation systems. Others migrated from provinces as far as Ghazni, Paktiya and Wardak, and neighboring provinces like Kandahar, Ghor and Farah. The laborers are mostly residents, but migrated from other places, drawn into the area by work in the expanding irrigation systems and the chance to become settlers. A few are residents of other provinces and are seasonal agricultural labor migrants. Some are transhumance nomads. All were in the project area at the time of recruitment and heard about the drainage construction work in Lashkar Gah, Chah-i-Anjir or one of the nearby villages. This seasonal agricultural labor migrant element could be expanded through a more energetic recruitment scheme.

It is significant that only 11.7 percent of the laborers were settlers, according to the FES, and only one could be associated with a plot of land in the area of project construction. This lack is associated with the small labor force in most of the settler households in the work area. All but two of these settler laborers stated that they were also sharecroppers, which suggests labor surplus households plus a need for supplementary income. These settler/laborer households average larger than the other labor force households, i.e., 9.6 persons versus 7.1. The labor obligations associated with sharecropping land ownership limit this settler group's participation as laborers except during the off-season of winter. Most of the settler laborers made references to this limitation.

On 13 percent of the other laborers were landowners, and a third of these had their land in "grau"; that is, they had borrowed money on it and lost its use until the loan would be repaid. These men, for all practical purposes, were landless. The rest of the landowners averaged 5 jeribs each. The labor force, aside from the settlers, is landless, or near landless.

The labor force is relatively young--a third are less than 20 years old, 85 percent are less than 40. Half are married and came from households averaging 7.1 persons. This small household size (average household size for rural Helmand in the 1970 FES was 9.5) likely reflects a lower socio-economic status.

The rural household tends to be an extended family unit (i.e., includes more than two generations) and commonly breaks up or never materializes among the lower socio-economic status groups, e.g., the landless. The larger units stay together for security, in this case economic

security. Without an economic base--land or animals--the larger unit is not functional. And household heads will be younger and the unit smaller. Thirty-four percent of the laborers stated that they were presently engaged as sharecroppers. Sharecroppers, like landowners, had established labor obligations and were prepared to work only during the slack winter work season. But 37 percent said they were day laborers and 10 percent said "unemployed." These represent a force with no long-term obligations, the poorer elements in the community and should be the focus of future recruitment.

In conclusion, it would appear that with the project expanded labor force necessary for Phase II (i.e. 3,800 men), these hand laborers will be one of the major groups of beneficiaries and the results for them will be immediate in the form of wages. They will come from the poorer elements of the society both in the Helmand and as migrants from outside. Their payment will require close monitoring if the proposed labor contractor system comes into being.

d. Women -- In this region of the country--Helmand, Pashtun, the social value of women working in the home is emphasized; farm work, except as supplementary to the threshing (some cleaning and sifting of wheat) is not considered as an acceptable occupation for women from households of any status. In the 88 households interviewed during the 1976 Farm Economic Survey in the on-farm drain construction areas of Gowargi, Shamalan and the 19 households in Zargun Kale, Nad-i-Ali, there were 46 of 160 and 4 of 38 women, respectively, over the age of 12 who were said to work in the fields (28.7 and 10.5 percent). The variation in area statistics can be explained in terms of the socio-economic conditions.

The Zargun Kale, Nad-i-Ali area, with the low 10.5 percent female farm labor figure, is Pashtun with the strict set of expectations about the role of women noted above, and are generally long-term settlers (15-20 years) with 30 jeribs of land and and established economic status. This combination of social role orientation and the lack of an economic necessity for women to do farm labor allows the traditional pattern described to persist.

The Gowargi, Shamalan area is culturally mixed Pashtun, Tajik, Ozbek, and Arab--recent settlers from various parts of the country with a variety of socio-cultural orientations, and economically not yet established. This was their second crop year on 10 jeribs of land, much of which had not been previously farmed and the first year was a near failure. This combination of varying ethnic social role orientations plus the social flexibility that commonly comes with migration, and the economic necessity for women to work in the fields likely results in the higher rates noted.

Since status, and thus household honor, is being reflected in these numbers, there is likely some under-reporting. The point is, however, that few women are directly involved in agricultural activities and, except for a few widows who may head their own households, are generally not involved in the sale of agricultural products. Accordingly, few women will be involved with or directly benefit from the drainage project. Moreover, given the strongly ingrained cultural bias against women's participation in farm labor, there appears little opportunity for enhancing women's participation in the Helmand's development through this project during Phase II, at least.

This project is designed to increase agricultural production through the reduction in soil salt levels and waterlogging. It will improve the economic conditions of the households in the project and thus, in a general sense, benefit the women in these households. In the case of the poorest families, an increase in income could allow the women who are presently working in the fields, probably at the expense of an efficiently run household, to turn their full attention on their homes and children. Furthermore, increased farm incomes will improve the lives of all members of the households.

3. Phase I Experience

a. Area Selection Criteria

(1) Availability of an outlet: Given the poor condition of most of the main drains, there were few places available for farm-drain construction. As main drain work planned for completion in Phase I is realized, more areas are opened for on-farm drain work. The other criteria can then be more carefully considered.

(2) Need: Areas selected for work either had high salt levels, high water tables or some other drainage problems. This need has been defined primarily in technical terms.

In Phase I, there was no programmed system for the collection of socio-economic data about the beneficiaries. This was done on the two areas in which on-farm drain construction is being accomplished as a side activity of the 1976 Farm Economic Survey, and after the areas were already selected for work. The involvement of HAVA as the collecting agent for the 1976 FES and the other project survey work has sparked an interest in establishing a research unit to routinely survey proposed sites before final selection.

(3) Politics: Farmers in an area have either submitted a petition for help in drainage, been agreeable to the project plans for their land or, at least, have not opposed the plan.

Early in Phase I, HAVA apparently used farmer petitions as the first step in site selection. There were many petitions but it soon became clear that the "availability of drain outlet" criterion would be the dominant decision factor. Many of these petitions came from indigenous communities, as opposed to settlers, that had leadership aware of the advantages to be gained through government aid, the processes by which this aid could be tapped, and enough political influence (power) to be heard. In cases where recent settlers are not politically organized to catch the attention of HAVA relative to drainage problems, and in problem areas of proposed settlement, the system of petitions is not adequate as a selection criteria with its inherent biases. The use of the data to be generated through the proposed socio-economic surveys will be more meaningful in selection of work areas.

b. Information, Impact and Diffusion

While the project in one of the two areas studies was in response to local petitions for help in drainage, none of the farmers had a clear idea of how it would affect them or their land holdings, until long after construction started. It is fairly clear that most farmers do not clearly understand the mechanics of on-farm drainage nor the relationship between water use, salting and waterlogging. While generally agreeing with the construction plan, once they understood what was to be done, there was a common farmer reaction that the total drainage system was not necessary. The dissatisfied farmer responses combine this idea with the amount of land to be lost to the drains. In areas of recent settlers, where land holdings are small and household economics are very marginal, the potential for conflict is greatest. The potential for dramatic increase in production resulting from the project is also greatest.

The ethnic/political diversity of the recently settled groups fragments the farmers' power sources. They would likely have difficulty presenting a solid front in opposition to the project. Their status as recent settlers with limited economic resources and marginal tenure would further make individual farmers hesitant to object strongly. Thus, open communication between project and farmer via HAVA officials may present some problem.

For maximum benefits to occur from the drainage project in the shortest time, the farmers will need to be involved from the start, which would undercut the potential of misunderstanding and covert hostility. The farmers must know how the project is to affect their land (right-of-way for drains), what benefits can be expected over what time period, and the technical processes necessary to realize these benefits (e.g., leaching and improved water use). The proposed farmer information and training program will go far to solve these problems but it will be necessary to have strong USAID/SCS involvement in the activity and careful independent monitoring to ensure implementation. These sorts of activities are unfamiliar to HAVA. While this activity can be viewed as an institutional building activity, perhaps even more important is the need to sell the concept of on-farm drains to the first farmers affected by the project with the least delay in benefits and less bureaucratic hassle. The image of the project will be established early vis-a-vis the farmers as a whole who are watching project activities carefully. Their early precepts of project progress and results will affect future project relations and the potential diffusion of project results.

4. Phase II Beneficiaries. For Phase II, the project is directed at 2,580 farm families in the five project areas of Marja, Nad-i-Ali, Upper Boghra, Darweshan and Shamalan. These families include 2,580 owner-operators with a total of 20,000 household members. These owner-operators utilized 1,175 bazgars in 1975 and 129,000 man-days of the services of farm laborers. All, or practically all, of the owner-operators in Marja, Nad-i-Ali and Upper Boghra are settlers. Most of the owner-operators of the Shamalan and Darweshan project areas are not settlers although the target farms, especially in the latter area, contain a number of very recent settlers. The characteristics of these groups of owner-operators and sharecroppers fall into the general patterns described in 2 above. The target group's socio-economic status is best summarized by the following (1975) income data.

| | Net Farm Income, Average Per Household ($) | Average Household Size (No.) |
|---|---|---|
| Marja | 80 | 7.9 |
| Nad-i-Ali/Upper Boghra | 72 | 7.0 |
| Darweshan (excluding new settlers) | 800 | 9.8 |
| Shamalan | 635 | 7.7 |

Bazgar's incomes ranged from an average of $101 in Nad-i-Ali/Upper Boghra to a high of $192 in Darweshan. In 1975, the newly settled sharecroppers in Darweshan produced no crops. Due to the project, the net farm income of these owner-operators in Marja/Nad-i-Ali/Upper Boghra is expected to rise to around afs 40,000 per farm by 1983. There are 8,350 members in these households. The net income of afs 40,000 per farm would provide a per capita income of slightly over $100 each. Average per household member income is expected to increase up to $115-$125 by 1983 for both the Shamalan and Darweshan (exclusive of new settlers) target farms.

Thus, the project will not only increase the income of the owner-operators and their families, it will also substantially improve the income distribution of all households. The net incomes of the new settlers which have 12 jeribs (2.32 hectares) of land is, however, likely to be substantially less than $100 per family member.

The bazgar probably has more security than the farm laborer but also,it seems, a smaller income. Bazgars fare better on the more productive farms and as the output of the target farms rise, one can expect the income of the bazgar to grow also. If, as is assumed will be the case, the target farms take on the practices of the control farms, the number of bazgars utilized by the target farms should increase by almost 75 percent with there being three-fourths as many bazgars as farms. Incomes should grow from their average 1975 level of $134 per bazgar to $165 by 1983. Also, if the practices of the control farms are adopted, the target farms will utilize substantially more labor--double their 1975 average of 50 man-days per farm by 1983. The other direct beneficiaries, also among the most deprived social groups, will be the laborers who will dig farm and pick-up drains by hand. It is now estimated that this task will require more than 8000 man-years of labor.

## C. Financial Analysis

### 1. The Financial Viability of HAVA

In the past years HAVA has relied solely upon the central government for operating funds. HAVA has been unable to obtain an independent source of revenue to finance the needed operations and maintenance of the irrigation system. While the problem of an inadequate budget has not been unique to HAVA in this country, the lack of sufficient funds has prevented HAVA from implementing measures to lessen the deterioration of the irrigation system and equipment. Thus, the financial condition of HAVA has been directly related to the GOA's ability to finance development projects and the political priority on allocating funds to the Helmand Valley vis-a-vis other provinces.

Until the last few years the GOA did not demonstrate sound fiscal responsibility. Growth in domestically generated revenue had decreased to the point where revenue was barely sufficient to finance ordinary expenditures. Consequently, the GOA's ability to finance a development program, including the matching of funds required of foreign assistance, was severely hampered. Recognizing that inadequate domestic revenue was a major constraint to the country's development, the government instituted a fiscal effort which is continuing. A high priority has been placed on increased domestic revenues in support of an accelerated development program. Improved tax collection, altered tax rates and increased prices and quantities of exports of state enterprises have resulted in increased revenues[1/] and growing government savings. The recently formulated Seven-Year states that land taxes will be increased through the implementation of progressive taxation. The plan also provides that comprehensive regulations will be made, after necessary studies, to establish procedures for the just distribution of water in order to prevent wastage of the resource. Although the GOA has recognized that water use charges are desirable, it is highly unlikely considering farmer attitudes and practices that any significant revenues will be generated from water use charges in the next decade.

Foreign donor assistance commitments have also been rising. New donors, mainly OPEC countries, and traditional donors have pledged unprecedented funds. Donors are also willing to finance a larger share of total project costs; and in recognition of Afghanistan's status as one of the world's

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1/ With 1972/73 = 100, the indexes of domestic revenue, 1972/73 - 1976/77 are 100, 128, 168, 199 and 220 respectively.

25 least developed countries, the grant element of the assistance being provided by a number of donors is becoming relatively larger. However, disbursements from both the new foreign and domestic commitments remain limited because of the difficulty of identifying and planning projects which can be implemented within the Afghan context.

The net foreign reserves of the banking system have also grown.[1/] The free exchange rate of the afghani/dollar moved from afs 55/$ during March/April 1976 (the first month of the current Afghan year) to about afs 40/$ by mid-October. The present rate is afs 47/$.[2/]

In the past, the GOA was burdened with the servicing of a sizable external debt. Two occurrences in the last few years have eased this burden: export earnings have risen sharply; and the country's largest creditor, the USSR, has granted debt servicing relief (almost $135 million) spread approximately equally over a six-year period beginning in CY 1975. Consequently, the debt servicing ratio in 1975/76 was approximately 12 percent and will be about the same in 1976/77.

Currently, it appears that HAVA will remain dependent upon the GOA for all of its funds. With the increase in resources available to the GOA for development efforts, it appears reasonable that HAVA will be provided sufficient resources to implement the project on schedule. According to GOA officials, the Seven-Year Plan provides adequate funds for the Helmand Valley programs. Adequate local financial support for drainage projects is specified. In addition, the recent inclusion of HAVA as a line organization within the Water and Power Authority (WAPA), and the elevation of WAPA to ministerial level (Ministry of Water and Power - MWP) further suggest the commitment of the GOA to this project.

While GOA development targets are more ambitious than in the recent past, the domestic and anticipated foreign resources are likely to be sufficient to support the development program that the GOA can achieve in the next several years. The critical constraint rather than financing will be that of identifying viable projects and their planning and implementation.

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1/ Mid-March net reserves (millions):

| | 1973 | 1974 | 1975 | 1976 |
|---|---|---|---|---|
| $ | 56 | 70 | 83 | 140 |

2/ The average annual free market (bazaar selling) exchange rates, 1971/72 - 1975/76 were: 84.73, 80.00, 60.98, 56.86, and 55.30 afs/dollar respectively.

2. Financial Effects on Farmers

In the late winter/early spring of 1976, a farm socio-economic survey (FES) was conducted in Helmand province. A 5 percent sample (geographically stratified; random within strata) was drawn and these farmers were interviewed. A substantial amount of information was collected which, on the checks that we have been able to make, appears to be of fair quality. While this data has not yet been processed, it has been coded and the coded data for the project areas (Marja, Nad-i-Ali, Upper Boghra, Darweshan and Shamalan) were used to obtain the characteristics of those farms, the target farms, which are scheduled to be drained during Phase II. The data were also used to obtain estimates of what the characteristics of the target farms would be after being drained. This was done by selecting schedules of farms located in areas similar to the target farm areas but whose owners said that they did not have salinity/high water table problems. We refer to this group of farms as "control" farms and assume that the target farms will take on the characteristics -- e.g., yields, cropping patterns, production costs, utilization of sharecroppers — of the control farms. It is assumed that these changes will be completed within four years after drainage.1/ The tables in Annex H.2 show the land use/cropping patterns of the target farms by area, the same for their respective control farms, as well as farm costs, the distribution of costs and income as between owner-operators and sharecroppers, and estimates of changes in incomes and costs, attributable to drainage, for both owner-operators and sharecroppers. However, because the number of keshtagars (but not bazgars) appearing in the sample was very small and information on those that appeared was sketchy, the income received and the cost borne by them (as indicated in the sample data ) were assumed to be constant.

Farmgate prices, generally those at harvest time, were used for valuing both inputs and outputs.2/ Prices were assumed to be constant and projected increases in input costs are accordingly in real terms. Constancy was also assumed with respect to the future conditions of the target farms without the

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1/ The differences in yields, production and costs between the target and its respective control are assumed to be eliminated to the extent of 40 percent in the first year, 30 percent in the second, 20 in the third and 10 in the fourth. For livestock, the reverse order is assumed. According to HAVA officials, salted land can, with a good leaching program, reach 80 percent or better of its production potential in the first year of drainage. In some specific cases, e.g., new settlers, these assumptions were altered.

2/ See Annex H.1 for prices used.

project. There are a total of 2,580 target farms, 271 of which are newly settled and of very small size. The distribution of the number of target farms (which average 5 hectares in size) among the project areas is 515, 612, 646 and 807 respectively in Marja, Nad-i-Ali/Upper Boghra, Darweshan and Shamalan.

The soils of Nad-i-Ali/Upper Boghra are the poorest; those of Marja are some better. The soils of Darweshan/Shamalan, while varying considerably in quality, are substantially better than those of Marja. This pattern of soil fertility is reflected in the use of fertilizer (per hectare of land cultivated) and in the proportion that production expense is of the gross value of crop output. Both of these ratios are substantially higher in Marja and Nad-i-Ali than they are in Darweshan and Shamalan.

Wheat is the dominant crop. It occupies over 60 percent of the cropped land. Cotton is the next most important and these two crops together account for the great bulk of the value of crop output and are produced by almost all farmers.

Marja

The average size of the Marja target farm is 4.66 hectares, 3.86 hectares of which are cultivated. In 1975, 70 percent of the cropped land was in wheat and 31 in cotton, with a third of the cotton being double cropped. These two crops accounted for 90 percent of the gross value of crop production and corn accounted for another five. The control farm had slightly less cropped land but much more land was double cropped. The control farm also had less land in wheat and more in cotton and corn. Crop production costs amounted to 95 percent of the farmgate value of crops for the target farms but to 53 percent for the control farms. Almost all wheat and cotton was fertilized and fertilizer was by far the largest production cost.

Share in Output, Owners and Sharecroppers. In 1975, the farmgate value of the crops produced on target farms averaged afs 33,705 ($675 at current free exchange rate of approximately afs 50/$). Production costs amounted to afs 32,124. Livestock produced net income of afs 5,105, for an average per farm net income of afs 6,686. The control farms, with much better yields and more livestock, did substantially better:

| | Target Farm (afs) | Control Farm (afs) |
|---|---|---|
| Crops, Gross Value | 33,705 | 87,983 |
| Crops, Cost | 32,124 | 46,185 |
| Crops, Net Value | 1,581 | 41,798 |
| Livestock, Net | 5,105 | 9,120 |
| Farm, Net | 6,686 | 50,918 |

The control farm utilized almost three-fourths again as much hired labor as did the target farm. It also utilized 33 percent more sharecroppers[1/] (bazgars in this case since no keshtegars appeared in the sub-samples). Sharecroppers' net income are typically higher on the more productive farms than on the less productive. Thus, although neither the target nor control farms provided very lucrative incomes to bazgars, the afs 7,450 ($150) share of the control farm bazgar was almost a fourth again as much as the afs 6,045 share of the target farm. There was not much left for target farm owner-operators — an average of afs 3,965 ($80) or afs 500 ($10) per farm family member for the 7.9 member household. The control farm owner-operators did much better -- afs 46,450 ($930) per household or afs 5,665 for each of its 8.2 members.

Land Lost in Drains. Land lost in drains will average an estimated 10.2 percent of the area drained, or 0.47 ha/farm. Survey data indicate an average of 0.16 hectares per farm is now left idle because of excessive salinity and/or high water tables. It is assumed that this land will be brought under cultivation when drained. It is also assumed that none of the 0.17 hectares in "other uses" will be lost to drains. Under these conditions, after drainage, cropped land would average 3.60 ha/farm; idle land, 0.42 ha; land in drains, 0.47 ha; and 0.17 ha in other uses.

Projections. As noted, we assume the target farms will take on the characteristics of the control farms; that over a four year period after drainage , thr cropping, cost and yield pattern of the target farms will become similar to the current patterns of the control farms. On these assumptions, the gross farmgate value of the target farm crops would average afs 83,760 four years after the farm is drained.[2/] Production costs would be afs 43,970 but increased to afs 44,970 due to an assumed increase in drain maintenance costs of afs 500 in the third year following constructio and a further afs 500 increase in the fourth year. Net farm income would be afs 47,474 (afs 8,682 from livestock and afs 38,792 from crops). The sharecropper's share in the net output would be afs 4,255 and his average net income would be afs 7,450 annually.[3/] The net income of the owner-operator would be afs 43,220.

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1/ 0.6 per farm vs 0.45 per farm.

2/ Or 95.2 percent of that of the control farm, i.e., cropped land of the target farm would be 3.60 ha and of the control farm, 3.78 ha.

3/ The average number of bazgars per target farm would be 0.952 x 0.6 = 0.57 increasing from 0.45.

Discounted at 10 percent, the present value of the net income stream generated by the project and accruing to the owner-operator averages afs 298,375 for those owners whose farms will be drained in the first year of the project. The corresponding amounts for drainage completed in the second and third years are afs 271,250 and afs 246,590 respectively.

The labor bill of the target farm averaged afs 5,580;that of the control farm, afs 9,916 or afs 2,623 per hectare of cropped land. Using this figure to estimate the labor bill of the target farm after it is drained gives an estimate of afs 9,445 per farm (i.e., 3.60 hectares of cropped land per farm times afs 2,623 per hectare).

Some of the more important projected changes are shown below.

| | Average/ Target Farm | | Total all 515 Target Farms | |
|---|---|---|---|---|
| | 1975 | 1983 | 1975 | 1983 |
| Net Farm Income (afs) | 6,686 | 47,474 | 3,443,000 | 24,449,000 |
| Owner-Operators (afs) | 3,966 | 43,220 | 2,042,000 | 22,258,000 |
| Bazgars (afs) | 2,720 | 4,255 | 1,401,000 | 2,191,000 |
| Bazgars Utilized (number) | 0.45 | 0.57 | 232 | 294 |
| Wage Bill (afs) | 5,580 | 9,440 | 2,874,000 | 4,864,000 |
| Wheat Production (MT) | 3.25 | 7.04 | 1,674 | 3,626 |
| Cotton Production (MT) | 0.75 | 1.64 | 386 | 845 |
| Corn Production (MT) | 0.28 | 0.90 | 144 | 464 |

Nad-i-Ali/Upper Boghra

The target farm of Nad-i-Ali/Upper Boghra averages 5.56 hectares in size and contains 5.12 hectares of cropland. There is little waste land on these farms and double cropping is rather limited. In 1975, 97 percent of the cropped land was in wheat and cotton and accounted for almost 80 percent of the gross value of crop production. Fruits accounted for a further 15 percent.

Share in Output, Owners and Sharecroppers. While the average size of the Nad-i-Ali/Upper Boghra target farms is larger than that of Marja, the owner-operators fared even worse. The farmgate value of the crop output of target farms averaged afs 33,190. Production costs were almost as much -- afs 32,450. Net income from livestock averaged afs 4,545, giving a net farm income of afs 5,285. Afs 1,675 of

this was the sharecroppers' share, leaving afs 3,610 for the owner-operator. As was the case in Marja, the control farm owner-operator's income was much better -- an average of afs 41,820 after the sharecropper's share of afs 7,025.

Control farms utilized an average of 0.87 sharecroppers per farm whereas the target farms averaged a third. Furthermore, the net income of the control farm bazgar was 60 percent greater than was that of the target bazgar -- afs 8,100 vs 5,020.

Land Lost to Drains. Land lost in drain construction in Nad-i-Ali/Upper Boghra attributable to Phase II drain construction will average an estimated 8.3 percent of the area drained, or 0.46 ha/farm.1/ Based on survey data, an average of 0.11 hectares of land per target farm are now idle because of excessive salinity and/or high water tables. On the assumption that this land would be cropped if drained, this would increase cropped land from an average of 5.12 ha/target farm to 5.23 (before loss to drains). We assume that the 0.23 hectares/farm of land in "other uses" will not be reduced due to drain construction. Consequently, the land lost to drains (0.46 ha/farm) will amount to 8.6 percent of remaining land and will reduce cropped land from the present average of 5.12 ha/farm to 4.78.

Projections. We assume again that the target farms will take on the cropping, cost and yield patterns of the control farms and will be the same four years after the target farms are drained. On these assumptions, the gross farmgate value of crops would reach an average of afs 82,046 by the fourth year after drainage; production costs would reach afs 46,032; and net income per farm, afs 43,227 (afs 36,014 from crops and afs 7,213 from livestock).2/ Of this per farm net total of afs 43,227, the share going to sharecroppers (bazgars) would be afs 6,215 and to the owner-operator, afs 37,012. This latter figure is reduced to afs 35,812 by an assumed increase of afs 1,200 per year in the cost of maintaining drains, afs 600 in the third year and an additional afs 600 in the fourth. The labor bill for the target farm would increase from the current level of afs 4,300/farm to afs 7,330/farm and the number of sharecroppers from 0.33 to 0.77 per farm. For the owner-operator, the discounted (at 10 percent) value of the flow of net income generated by the project averages afs 245,465 for those farms on which drains will be constructed in the first year of the project and afs 222,155 and afs 202,865

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1/ 24km$^2$ to be drained in Nad-i-Ali with land losses of 10.04 percent and 10 km$^2$ in Upper Boghra with losses of 4.10 percent.

2/ The figure of Tables 2.2 and 2.4, Annex H.2 are multiplied by 0.885 since the 4.78 ha/farm of cropland of the target farms would be 88.5 percent of the 5.40 ha/farm croppland of the control farms.

respectively for those owner operators for which drain construction will occur in the second and third years.

The foregoing yields the following estimates for 1983:

| | Average per Target Farm | | Total, All 612 Target Farms | |
|---|---|---|---|---|
| | 1975 | 1983 | 1975 | 1983 |
| Net Farm Income (afs) | 5,284 | 42,027 | 3,234,000 | 25,721,000 |
| Owner-Operator (afs) | 3,610 | 35,812 | 2,209,000 | 21,917,000 |
| Bazgars (afs) | 1,674 | 6,215 | 1,024,000 | 3,804,000 |
| Bazgars Utilized (number) | 0.33 | 0.77 | 202 | 471 |
| Wage Bill (afs) | 4,301 | 7,330 | 2,632,000 | 4,486,000 |
| Wheat Production (MT) | 2.30 | 6.66 | 1,408 | 4,076 |
| Cotton Production (MT) | 0.89 | 2.02 | 545 | 1,236 |
| Corn Production (MT) | 0.10 | 0.35 | 61 | 214 |

Darweshan

About 17 percent of the area to drained in Darweshan is land on which settlers have been placed recently and most of whom had no, or negligible, crops in 1975. We will discuss the two groups separately, the older group of farms first, which are, on average, the largest when compared with groups in the other project areas and the most productive. The net farm income of the target farm owner-operators in Darweshan in higher without drains than the Nad-i-Ali target farms are projected to be with drains. The control farms, which are larger than the target farms, have 70 percent of their cropped land in wheat.

Share in Output. Per hectare of cropped land, the target farms spent 29 percent more for labor than did the control farms.[1/] The former also shared-out more land. The control farms did use more bazgars per hectare of cropped land than did the target farms (0.152 vs 0.135) and the net income of the control farm bazgar was 22 percent higher than that of the target farm (afs 11,700 vs afs 9,575). The net income of the target farm owner-operator was afs 40,090 in 1975 and that of the

1/ Relatively more of the labor intensive crop, cotton, was grown on the target farms.

control farm owner-operator, afs 97,470.[1/] The average household size of the former was 9.8 members; of the latter, 10.8, for average per capita household incomes of afs 9,025 and afs 4,090 respectively.

Land Lost to Drains. Land lost from drain construction is estimated to be about 6.12 percent of the area drained, or an average of 0.49 hectare per farm. Data gathered during the FES survey indicates that there is an average of 0.58 hectares of land per target farm that is left idle because of excessive salinity and high water tables. It is assumed that this land will be placed in production when drained. It is assumed also that land currently in "other uses" will remain unchanged. On these assumptions, drainage would increase the land under cultivation from the current level of 6.17 hectares per farm to 6.33 hectares.

Projections. The control farms have a higher proportion of land in wheat and a lower proportion in cotton than the target farms. Given the national program to promote cotton production in areas with processing facilities and adequate water, it is not realistic to assume that the target farms will take on the cropping pattern of the control farms. In projecting, we assume the cropping pattern of the target farms will remain unchanged but the costs and yields of the target farms will become similar to the present costs and yields of the control farms. We also assume that no change will occur in net income from livestock[2/] or in hired labor utilization; that the utilization of bazgars will increase from the current level of 0.83 per farm to 0.94[3/]; that the average net annual income of the bazgar will increase from afs 9,575 to afs 11,700[4/]; and that drain maintenance cost will increase by afs 700 in both the third and fourth years. On these assumptions, the net income of the target farm would increase from the current level of afs 49,075

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1/ Per farm, the division was afs 40,088, afs 7,975 and afs 1,010 respectively for the owner-operator, bazgar and keshtagar for target farms. The corresponding figures for control farms were afs 97,470, afs 15,095 and afs 384.

2/ The target farms now produce afs 1,605 net livestock income per hectare of cropland whereas the control farms produce afs 1,460.

3/ The utilization rate of the control farms.

4/ From the current level of the target farm bazgar to the current level of the controlfarm bazgar.

(of which afs 9,904 is from livestock) to afs 70,090. Of this, the owner-operator's share would be afs 57,535 and the bazgar's, afs 12,445.1/ For the owner-operator, the discounted (at 10 percent) value of the flow of net income generated by the project averages afs 135,115 for those farms on which drains will be constructed in the first year of the project and afs 122,830 and afs 111,665 respectively for those owner-operators for which drain construction will occur in the second and third years.

The foregoing yields the following estimates for 1983:

| | Average per Target Farm | | Total, All 375 Target Farms | |
|---|---|---|---|---|
| | 1975 | 1983 | 1975 | 1983 |
| Net Farm Income (afs) | 49,073 | 70,991 | 18,402,000 | 26,622,000 |
| Owner-Operators (afs) | 40,088 | 57,534 | 15,033,000 | 21,575,000 |
| Bazgars (afs) | 7,975 | 12,447 | 2,991,000 | 4,668,000 |
| Bazgars Utilized (number) | 0.83 | 0.94 | 311 | 353 |
| Wage Bill (afs) | 6,843 | 6,843 | 2,566,000 | 2,566,000 |
| Wheat Production (MT) | 4.81 | 6.50 | 1,804 | 2,438 |
| Cotton Production (MT) | 2.07 | 3.08 | 776 | 1,155 |
| Corn Production (MT) | 0.39 | 0.73 | 146 | 274 |

Shamalan

The average size of the Shamalan target farm is 4.66 hectares, 3.80 of which are cultivated. Over 40 percent of the land under cultivation was cropped to cotton in 1975 and 55 percent to wheat. The control farm, while smaller, had more double cropped land and a larger proportion of the cropped land in cotton. Crop production expenses amounted to only 40 percent of the gross value of crop output for the target farms and to slightly more than the 38 percent of the control farms.

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1/ There was an average of afs 1,010 net income per farm accruing to keshtagars in 1975. There are very few keshtagars and information on them is very limited. Consequently, it was assumed that this afs 1,010 wouls stay constant.

Share in Output. The farmgate value of the crops produced on Shamalan target farms averaged afs 45,540. Net income from livestock averaged afs 9,065 per farm, giving a net farm income of afs 36,260. The latter figure for the control farm was 32 percent higher (afs 47,830) on 23 percent less cropped land. The control farm utilized 58 percent more bazgars per farm (0.84 vs 0.53) than did the target farm. Control farm bazgars also received slightly higher incomes -- afs 6,730 vs afs 6,075. Of the farm income of the target farm, the owner-operator's share was afs 31,800 and the bazgar's (of which there were 0.53 per farm) afs 3,220.

Land Lost to Drains. Land lost in drain construction is estimated at 6.28 percent of the area drained, or an average of 0.28 hectare per target farm. Survey data shows that an average of 0.39 hectare of land per target farm is now left idle because of excessive salinity and/or high water tables. We assume that this land will be brought into production when drained and that land in "other uses", a small 0.02 hectares per farm, will remain unchanged. Under these conditions, cropped land per farm will be larger after drainage than before, increasing from an average of 3.80 ha/farm to 3.93.

Projections. We make the standard assumption here that the target farms once drained will take on the cropping, cost and yield patterns of the control farms. On these assumptions, the gross farmgate value of the target farm crops would average afs 102,765 four years after the farm were drained.1/ Crop production costs would be afs 62,520 and net income from livestock, afs 16,580. Net farm income would be afs 56,825 of which afs 48,010 would be the owner-operator's share and afs 7,575 the bazgar's share.2/ Discounted at 10 percent, the present value of the net income stream generated by the project and accruing to the owner-operator averages afs 119,555 for those owners whose farms will be drained in the first year of the project and afs 108,685 and afs 98,805 respectively for those constructed in, the second and third years. The labor bill would increase to afs 9,510 per farm. Selected projected changes are shown below.

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1/ Or 1.34 times that of the control farm, i.e., cropped land of the target farm would be 3.93 and of the control farm 2.93 ha.

2/ Afs 1,240 is keshtagar's share.

| | Average per Target Farm | | Total, All 807 Target Farms | |
|---|---|---|---|---|
| | 1975 | 1983 | 1975 | 1983 |
| Net Farm Income (afs) | 36,260 | 56,822 | 29,262,000 | 45,855,000 |
| Owner-Operator (afs) | 31,801 | 48,010 | 25,663,000 | 38,744,000 |
| Bazgars (afs) | 3,221 | 7,574 | 2,599,000 | 6,112,000 |
| Bazgars utilized (number) | 0.53 | 1.13 | 428 | 912 |
| Wage Bill (afs) | 2,115 | 9,500 | 1,707,000 | 7,675,000 |
| Wheat Production (MT) | 2.89 | 7.06 | 2,332 | 5,697 |
| Cotton Production (MT) | 1.14 | 2.53 | 920 | 2,042 |
| Corn Production (MT) | 0.59 | 0.86 | 476 | 694 |

All Target Farms Combined

There are an estimated 271 new settlers in Darweshan whose farms are scheduled to be drained in Phase II. The average farm size is slightly more than 2.32 hectares (12 jeribs). Drain construction and other uses of the land will leave 2.09 hectares of cropland per farm. Cropped land of all new settlers will account for 5.2 percent of all cropped land of all target farms after drain construction. These new settlers produced little or nothing in 1975 although many of them had begun tilling their land and they did produce some crops in 1976. We assume the performance of these farms with the project will be similar (on a per hectare of cropped land basis) to that of the other Darweshan target frcup for which there are data; and that the perfromances of the two groups would also be similar without the project. It is on this basis that the project benefits and costs accruing to the new settlers are allocated and are included in the combined statements that follow. We did assume that the new settlers with their small farms will utilize few if any bazgars but will hire labor to harvest crops.

Projected Impact. The project is expected to have the following impact on the target farms:

- The project will result in a net loss to drains of 214 hectares of cropped land (11,105 hectares vs 10,890). The loss is relatively small since land now idle because of excessive salinity and high water tables will be cropped when drained.

- Double cropping will increase from a current ratio of 1.21 to 1.31 and the area of single plus double cropped land will be some 6.1 percent higher.

- The area planted to the dominant crop, wheat will decline from 6,800 hectares to 6,450 hectares while the area planted to cotton and corn will both increase

by approximately 15 percent. The area in clovers, vegetables and fruits will also increase while plantings of mung beans and miscellaneous crops will fall.

- Production costs of farms will increase substantially. Fertilizer costs alone will more than double --from an average of Afs. 9,040 per farm (Afs. 1,740 per hectare of crops) to Afs. 18,665 (Afs. 3,382 per hectare of crops). Labor costs will also more than double, moving from a per farm average of Afs. 3,790 to over Afs. 9,560. Equipment[1/] and interest costs will rise, the former from an average of Afs. 970/farm to Afs. 1,980; the latter from Afs. 1,150 to Afs. 1,980. Cultivation costs will change insignificantly. The increase in production costs (for crops) will average Afs. 17,380 per target farm.

- The change in the farmgate value of crop output will increase by an average of Afs. 46,600 per target farm, substantially more than the change in costs.

- The change in net income from livestock will average Afs. 3,700 per farm.

Including the 271 newly settled farms in Darweshan, the average net farm income of the target farm owner-operator was around Afs. 17,500 in 1975. This average is projected to increase to almost Afs. 47,000 (about $940) by 1983. The average household size of the target farm is 7.8 members. This will mean then an average per capita income of Afs. 6025 ($120). The number of bazgars utilized will increase from a total of 1173 to 2030; their average net income will increase from Afs. 6835 to Afs. 8265.

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1/ Excludes tractors and tractor drawn equipment which are subsumed under cultivation costs.

## D. Economic Analysis

The Pricing of Farm Inputs and Outputs (Foreign Exchange Valued at afs 50/$)

Output Prices. World market prices are used as the basis for valuing wheat and cotton. Exports of the former are not permitted and practically all imports are made by the Government. Substantial amounts of wheat have been imported in the past and the probability of the country importing wheat in the future is much higher than of it exporting the cereal. Wheat is valued at $200/MT for our computations (commodity cost, $110; ocean freight, $55; and inland transportation, $35). The price paid farmers for seed cotton is set by the Government. Most domestic production is exported. An f.o.b. export price of $1300/MT is used to value lint and a farmgate price of $462/MT (afs 23,100 at afs 50/$) to value seed cotton (see Annex H.3 for computations and Annex H.4 for a comparison of output values used by a recent study).

All other outputs are valued at their internal prices. Corn and mung beans are neither imported nor exported. Their internal supply prices appear to be higher than their respective export prices and lower than import prices. Most vegetables are produced for home and local consumption. The internal price of fruits, especially grapes, is largely determined by prices in accessible foreign markets. While the infrastructure which would give fruit producers in the project area access to non-local markets is now largely absent, perhaps fruits should be considered an earner of foreign exchange along with wheat ( a foreign exchange saver) and cotton. We note that most of the vines on most of the target farms were not yet producing in 1975.

Input Prices. Afghanistan manufactures its own urea. Production is greater than domestic consumption and the excess is exported. Additional manufacutring capacity is supposed to be built during the Seven Year Plan, giving the country production capacity again in excess of domestic use. Currently, the f.o.b. (border port on Amu Darya River) export price is slightly over $100/MT. The cost of delivering the fertilizer from the manufacturing site (Mazar) over the Hindu Kush to the Lashkar Gah area is substantially greater than moving it to the border port, however. There are also additional overhead costs. These additional costs (in economic terms but at an exchange rate of

afs 50/$) are estimated at $50 -$55 per ton greater than those required to deliver urea to the border port for export. Urea for project farmers accordingly priced at $155 per ton. The foreign exchange component was computed to be 21 percent. Phosphatic fertilizers are imported. Diammonium phosphate (DAP) is preferred over other sources of phosphates and almost all imported phosphatic fertilizer is DAP. The delivered cost to farmers in the project area is estimated at $265/MT (commodity cost, $120; ocean freight, $75; inland freight, $35; overhead, $35) with the foreign exchange component being 88 percent. A use ratio of 2 urea to 1 DAP would give an average cost of $192/MT and a foreign exchange component of 52 percent; the corresponding values for a use ratio of 3 to 1 are $183 and 45 percent. The latter two values are the ones used in out computations.

Most hired labor is used to harvest wheat and cotton at which time the wage rates for farm laborers are the season's highest. Based on wages being paid in 1976 and the relative utilization of labor by control farms (from survey data) for different purposes, an average wage rate of afs 80 per day is used for farm workers for the first year of the project in our computations. The bazgar rates used are those shown in the earlier financial section.1/

Because of the project, the area of land under cultivation will decrease although the amount of land double cropped will increase. Land preparation by tractors for second crops is done with field cultivators at less than half the custom rate for plowing, as land for wheat and other single crops is prepared. If anything, one can expect cultivation costs to fall. The change will be small enough to ignore, however.

Farm equipment other than tractors and tractor equipment is primative, locally produced and almost altogether a local currency expense.

The reduction in the area to be seeded to wheat and the consequent reduction in the cost of wheat seed will, at a minimum, off-set the increase in the cost of other seeds, including cotton, due to their increased plantings. This item can thus also be ignored.

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1/ In the financial section where the analysis attempted to determine the impact of the project upon sharecroppers, bazgars' share of the net output was not treared as a "production cost."

Shadow Pricing of Wages and Foreign Exchange

Wage Rates. After at least a decade of practically constant rates[1/] for common labor in Afghanistan, the price of such labor has risen very sharply over the past two years. Apparently, the main reason for the rise has been the development of a labor market for Afghans in Iran where wage rates are substantially higher than in Afghanistan. The differential is less than it was: Domestic wages have risen while the rial rate paid Afghan workers in Iran has been about constant. Furthermore, the afghani has appreciated sharply against the rial in the free market. Thus, the pecuniary attraction of jobs in Iran is not as great as it once was. At the same time, however, Afghan knowledge of the job market in Iran is now widespread and reports from provincial centers indicate that some workers from all the country's provinces have jobs in Iran.

It is assumed that this unofficial movement of Afghan labor into Iran will continue. It is furthermore realistic to assume that the country's Seven Year Plan will place significant additional demands upon the nation's labor force. Consequently, we are inclined to shadow price common labor at the market rate rather than (substantially) below the market rate as we would have done a year and a half past. Market prices are more likely to overstate, than to understate, the economic costs of using laborers for the project in the winter months.

Given the sharp increase in wage rates over the past year or so, constant relative wage rates for laborers constructing farm drains will be assumed.[2/] Government employees will be priced at their official pay scale plus fringe benefits. It now appears that part time participation of farmers in excavating drains will be small enough that the opportunity cost of their labor will not merit separate consideration, apart from that of laborers.

Foreign Exchange. Export taxes are now insignificant. A number of domestically manufactured commodities are taxed but generally at low rates. Tariffs appear to be the dominant constraint on imports although uncertainty on the part of businessmen with respect to GOA policy and

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1/ Nominal wage rate of afs 30/day.

2/ It is expected that most of the labor for hand excavation will be used so as not to compete with labor needed for harvesting.

practice does deter private sector imports. The internal price of import items may consequently be higher than in the absence of this uncertainty. Recently, the GOA has been subsidizing exporters by purchasing their (properly documented) export proceeds at a higher rate than the free market rate.

Using a short-cut approach to convert the free rate into a shadow price by simply calculating import duties as a percent of imports[1/] gives a 3-year average shadow price of about 1.25 times the free rate.[2/] The shadow price averages about 30 percent greater than the free rate[3/]

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1/ In an economy where there is competition among importers, the marginal utility of consumption is correctly measured by price. If tariffs are the dominant constraint to imports, tariffs will represent the adjustment necessary to convert an official exchange rate into the shadow price. If there are differentiated tariff rates, it is necessary to weight the prices plus tariffs for different commodities by their share in marginal imports. A short-cut approach is to simply calculate import duties as a percent of imports, though "this approach understates the price differential due to tariffs." John C. Beyer, "Estimating the Shadow Price of Foreign Exchange: An Illustration from India, Journal of Development Studies, July 1975.

2/ For the past three years -- 1973/74 - 1975/76 -- import duties were 22.4, 28.0 and 29 percent of c.i.f. imports.

3/ Twenty-six, 33 and 34 percent respectively, 1973/74 - 1975/76.

when using the approach suggested in the Guidelines.[1/] In both cases the shadow price for the latest year (1975/76) is a larger multiple of the free rate that it is for the prior two years. A third approach gives a substantially lower estimate, one which is about 1.16 times the free rate.[2/] While this approach requires estimating a number of elasticities, it is rather insensitive to relative large changes in the elasticities; and those changes that seems likely to take place in the future change the multiple only marginally, to 1.17.[3/] A range of from 1.17 to 1.33 will be used as our estimates of the shadow exchange rate in converting c.i.f. and f.o.b. foreign exchange prices into afghani values, and 1.25 as a "best" estimate.

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1/ The approach is modified by using average rather than marginal rates. Dasgupta, Sen and Marglin, Guidelines for Project Evaluation, United Nations Industrial Development Organization, United Nations, New York, 1972, pp. 213 - 231. The shadow price of foreign exchange "can be calculated by the weighted average of the ratios of domestic market-clearing prices to c.i.f. prices calculated at the official rate of exchange. The appropriate weights are the fractions of foreign exchange allocated at the margin to the various imports." We do not know what the marginal charges in imports induced by the project will be or how the marginal import bill will be allocated over the individual imports. In approximating the shadow rate it is assumed that the composition of the imports will be roughly the same as it now is for aggregate imports. The shadow rate is estimated under the assumption that existing trade distortions will continue. As recommended by the authors, capital goods are excluded from the import bill. It is assumed, as the authors believe is typically the case, that foreign exchange earnings induced by the project will affect export earnings but little, if at all.

2/ Bela Balassa, "Estimating the Shadow Price of Foreign Exchange in Project Appraisal," Economic Staff Working Paper No. 142, IBRD and IDA, February 1, 1973. The assumption is made that trade distortions will be maintained during life of project. The 1.16 figure is based on the assuption of initial equilibrium in the balance of payments, i.e., that under the present system of trade distortions there are no unintended reserve losses or gains or temporary capital movements. In 1354 (1975/76) this presumably was not the case.

3/ See Annex H.5.

Net Value of Increased Farm Output Excluding Construction Costs

On the foregoing, prior to construction costs, the net financial benefits (inputs and outputs valued at farmgate prices) are substantially less than the net economic benefits with foreign exchange valued at the free rate. The financial benefits accrue to the farm owner-operators; the economic benefits to society at large. When foreign exchange is shadow priced at afs 62.5/$, the net economic benefits are higher yet, a consequence of the fact that the foreign exchange component of the inputs is relatively smaller than the foreign exchange component of the outputs. These estimates, which are prior to construction costs are shown below. They are shown in afghanis since the afghani value of a unit of foreign exchange is, when shadow priced, 25 percent greater than the free rate indicates.

Net Value of Farm Output Attributable to Phase II, Financial and Economic, Exclusive of Construction Costs*
(afs millions)

| Year | Financial | Economic, With FX Valued at: (afs 50/$) | (afs 62.5/$) |
|---|---|---|---|
| 1 | 4.75 | 9.10 | 11.76 |
| 2 | 17.31 | 32.47 | 41.83 |
| 3 | 41.72 | 78.21 | 101.07 |
| 4 | 59.62 | 110.97 | 137.79 |
| 5 | 71.07 | 131.06 | 168.05 |
| 6 | 76.48 | 139.89 | 179.00 |

* Assumes that wage rates of farm laborers increase by 5, 5, 5, 3 and 2 percent respectively in years 2 through 6. This increased the wage bill, in millions of afghanis, by 0.16, 0.77, 1.66, 2.37 and 2.81 in years 2 through 6 respectively over what the bill would be if rates were constant. It is assumed also that the increased fruit production would earn foreign exchange which when shadow priced at afs 62.5 added 0.15, 1.61, 1.80, 2.10 and 2.22 million afghanis respectively to years 1 through 6 over the values if priced at afs 50/$. No costs are assigned to the owner-operator's labor or that of his family.

Construction Costs

For the economic analysis it is assumed that the US (grant) assistance would be available for some other project in Afghanistan if not utilized for the drainage project. On this assumption, the cost of the assistance to Afghanistan is the amount of the assistance. The assistance cannot, of course, all be charged against Phase II. Neither can all Phase II construction costs. The weighted average ratio of (a) the main/sub-main drain capacity needed for the farms to be drained in Phase II to (b) the designed capacity of the mains/sub-mains (to be constructed during Phase II) is 0.4676. This is the proportion of the costs of main/sub-main drain construction that is chargeable against the increased production of the project farms. The remaining costs, appropriately valued, should be charged against the benefits of farms drained in later phases which farms utilize the main drains constructed in Phase II as outlets.

Neither can all the equipment costs be charged against Phase II. We assume that the actual expenditures for the new equipment will be made during the early part of the second year of the project and that the equipment will arrive so as to be available for use one full year during Phase II. This will account for approximately one-tenth of its useful life. Thus, at the project's end, a negative cost, reflecting the remaining value of the equipment, will be entered in the cost schedule. This will not be for all equipment, however, since not all the new equipment cost will be charged to Phase II and some new equipment will be purchased for maintaining the new main drains.

Support equipment is allocated between that for construction and maintenance in the proportion that maintenance equipment cost is to construction equipment cost. However, all the commodities for HAVA will be charged fully against the project with the vehicles being replaced after seven years of use. The other HAVA equipment (desks, filing cabinets) is assumed to last 25 years.

The increase in HAVA administrative, planning, other costs attributable solely to Phase II are difficult to estimate and the estimates used (shown in the following table) have to be considered "soft."

There is finally the problem of a realistic allocation of the costs of US technical assistance. Logically, this cost cannot all be charged against the increased agricultural output. The useful life of the technical assistance does not end at the end of year three. We will treat technical assistance as

a "stock" which will be utilized over the next fifteen years (by which time all drains should be completed) in later phases with utilization being more rapid in the early years. A triple declining balance is assumed with 20 percent of the stock being utilized in the first year; 20 percent of the remaining in the second, etc. On this basis there is a negative cost entered in the cost column in the following table, reflecting the unused stock of technical assistance by the end of year three. As an alternative, all technical assistance is charged against the increased farm output in the three years of the project life.

To summarize, all farm drain construction costs, all land leveling costs, 47 percent of the construction costs of mains and sub-mains (including structures) and 47 percent the cost of the new equipment used for the construction of mains and sub-mains is charged against the increased farm output (The residual value of the equipment is entered as a negative cost, however). The costs include overhead costs but exclude depreciation, taxes and internal interest. Also 47 percent of the projected costs of maintaining the mains/sub-mains is charged against the increased agricultural output as is the same percent of the new equipment to be purchased for such maintenance. The additional costs to HAVA, directly attributable to Phase II were estimated. Technical assistance was treated as a "stock." Most of the benefits and costs from participant training were assigned to later phases. The following table summarizes the changes in farm incomes and costs and the construction and maintenance costs attributable to Phase II.

Economic Benefits

On the estimates/assumptions made, the internal rate of return is 31 percent when foreign exchange is not shadow priced. Estimates were made of the foreign exchange component of the construction costs (as well as for farm inputs and outputs) and the shadow pricing of foreign exchange at afs 62.5/$ gives a higher rate of return of 37 percent.

Lagging the schedules of farm income and costs by one year reduces the rate to 25 percent (with foreign exchange valued at afs 50/$). And reducing (the schedule of) net farm income by 20 percent and increasing construction costs by 20 percent causes the rate to fall to 22 percent (again with foreign exchange valued at afs 50/$). Charging all technical assistance against the project reduces the rate of return to 27 percent. And finally . . the assumption that the US assistance is available for this project but not for any other Afghan project increases the rate of return to 50 percent.

Summary of Economic Costs and Benefits, Phase II, Central Helmand Drainage Project
($ 1000)

| | Farm | | | | | | | | Drain Construction | | | | | Net Benefits | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Value | | | Total Cost | | | Net Income from | Net Farm | | Const. & | HAVA | Tech. | Total Const. | Undis- | Discounted |
| FY | Wheat | Cotton | Other | Fert. | Labor | Equip. | Livestock | Income | Equip. | Maint. | Admin. | Ass't | Costs | counted | at 31 % |
| 1978 | 119 | 86 | 37 | 31 | 29 | 3 | 3 | 182 | - | 882 | 120 | 293 | 1295 | -1113 | - 850 |
| 1979 | 419 | 303 | 129 | 99 | 107 | 10 | 15 | 650 | 4485 | 1368 | 168 | 1026 | 7047 | -6397 | - 3728 |
| 1980 | 1009 | 728 | 310 | 239 | 265 | 25 | 47 | 1565 | -3350 | 2587 | 320 | -627 | -1070 | 2635 | 1172 |
| 1981 | 1421 | 1023 | 436 | 337 | 386 | 35 | 97 | 2219 | - | 6 | 248 | 0 | 254 | 1965 | 667 |
| 1982 | 1660 | 1195 | 509 | 394 | 459 | 41 | 151 | 2621 | - | 19 | 168 | | 187 | 2434 | 631 |
| 1983 | 1754 | 1264 | 538 | 416 | 491 | 43 | 191 | 2797 | - | 46 | 150 | | 196 | 2601 | 515 |
| 1984 | | | | | | | | | - | 67 | 150 | | 217 | 2580 | 390 |
| 1985 | | | | | | | | | - | | | | 217 | 2580 | 297 |
| . | | | | | | | | | - | | | | 217 | 2580 | 227 |
| . | | | | | | | | | - | | | | 217 | 2580 | 173 |
| . | | | | | | | | | 270 | | | | 487 | 2310 | 118 |
| . | | | | | | | | | - | | | | 217 | 2580 | 101 |
| . | | | | | | | | | 300 | | | | 517 | 2280 | 68 |
| . | | | | | | | | | - | | | | 217 | 2580 | 59 |
| . | | | | | | | | | - | | | | 217 | 2580 | 45 |
| . | | | | | | | | | - | | | | 217 | 2580 | 34 |
| . | | | | | | | | | - | | | | 217 | 2580 | 2[illegible] |
| . | | | | | | | | | - | | | | 217 | 2580 | 20 |
| . | | | | | | | | | 270 | | | | 487 | 2310 | 13 |
| . | | | | | | | | | - | | | | 217 | 2580 | 12 |
| . | | | | | | | | | - | | | | 217 | 2580 | 9 |
| . | | | | | | | | | - | | | | 217 | 2580 | 7 |
| . | | | | | | | | | 300 | | | | 517 | 2280 | 4 |
| . | | | | | | | | | - | | | | 217 | 2580 | 4 |
| 2002 | 1754 | 1264 | 538 | 416 | 491 | 43 | 191 | 2797 | -244 | 67 | 150 | 0 | - 27 | 2824 | 3 |
| | | | | | | | | | | | | | | 50,249 | 17 |

The expected impact of the project has been discussed in substantial detail in a number of places in this paper and will merely be summarized here. Farm owner-operators are not the only project beneficiaries. In construction work, the project will employ substantial number of laborers. So will the target farms as production rises. The number of bazgars is projected to increase sharply. These people are among the country's poorest and as their incomes rise, much of the additional income will likely be spent for food. However, their increased purchasing power will represent an increase in demand for simple manufactures which demand can be met through production under cottage or home industry conditions. We would rather guess, however, that the purchasing power of these groups will be diffused over too large an area to have a noticeable impact in this regard. But combined with the increased purchasing power of the target farmers, this should impact to stimulate small industries and commerce especially in the larger cities (villages) in the area. The project will intensify the use of land and result in substantial increases in both food and fiber crops.

We assume that "before and after" and "with and without" are essentially the same in the project area. Without the project, the target farms would likely become even less productive. But there are a substantial number of farms whose current net output is negative and without the project, these farms would be abandoned which would increase the country's net output. Many of the target farmers continue to stay on their farms and accept an income less than that of bazgars and hired laborers in the expectation that their drainage problems will be addressed.

# V. IMPLEMENTATION PLANS

## A. General Activities

The following activities will be required of HAVA and USAID/SCS to produce the desired outputs:

1. Related to upgrading HAVA capabilities:

a. USAID/SCS advise HAVA staff on planning, design, field data collection and analysis, construction, socio-economic evaluation, administration on a continuing basis;

b. Recruit additional HAVA staff;

c. Develop in-service training program relying on U.S. consultants;

d. Select and train candidates in third-country and U.S.;

e. Evaluate and redesign in-service training program.

2. Related to drain construction:

a. collect and analyze field data (socio-economic and technical);

b. prepare designs;

c. prepare cost estimates;

d. negotiate Project Implementation Letters (PILs);

e. negotiate construction and labor contracts;

f. undertake and supervise field construction;

g. administer hand-labor force;

h. compensate non-benefiting farmers for right of way (HAVA);

i. certify completion and make reimbursement (USAID).

3. Related to updating Master Drainage Plan:

a. update data base for Master Drainage Plan;

b. revise drain design criteria as appropriate.

4. Related to Phase III construction plan:

a. determine areas to be worked and develop conceptual designs;

b. specify labor and equipment needs and cost estimates and production rates;

c. develop implementation schedule (e.g., bar chart)

5. Related to farmer information and education programs:

a. develop drainage information suitable for farmer presentation using extension service within HAVA;

b. test various methods for delivery to farmers;

c. evaluate and identify best method(s);

d. use this method in explaining drainage to farmers in areas where drains are being installed;

e. identify additional information needs on priority basis (e.g., cultural practices, water management, crop selection)

f. design a farmer education program for Phase III, including requisite resources, information packages, and implementation schedule.

6. Related to leaching program:

a. organize a system within HAVA (using consultants) to supervise leaching by farmers of newly drained lands;

b. set up an orientation program to train extension agents to run program;

c. extension agents guide Mirabs and farmers in leaching process;

d. extension agents guide farmers toward efficient water use practices following leaching.

7. Related to Soils Map:

a. review existing data;

b. collect and analyze additional data;

c. develop soils maps using taxonomy methodology;

d. develop a soils handbook.

8. Related to maintenance program:

a. identify respective maintenance responsibilities among HAVA, HCC and farmer;s

b. obtain farmer agreements before starting farm drain work;

c. set up maintenance schedules for drains;

d. monitor implementation.

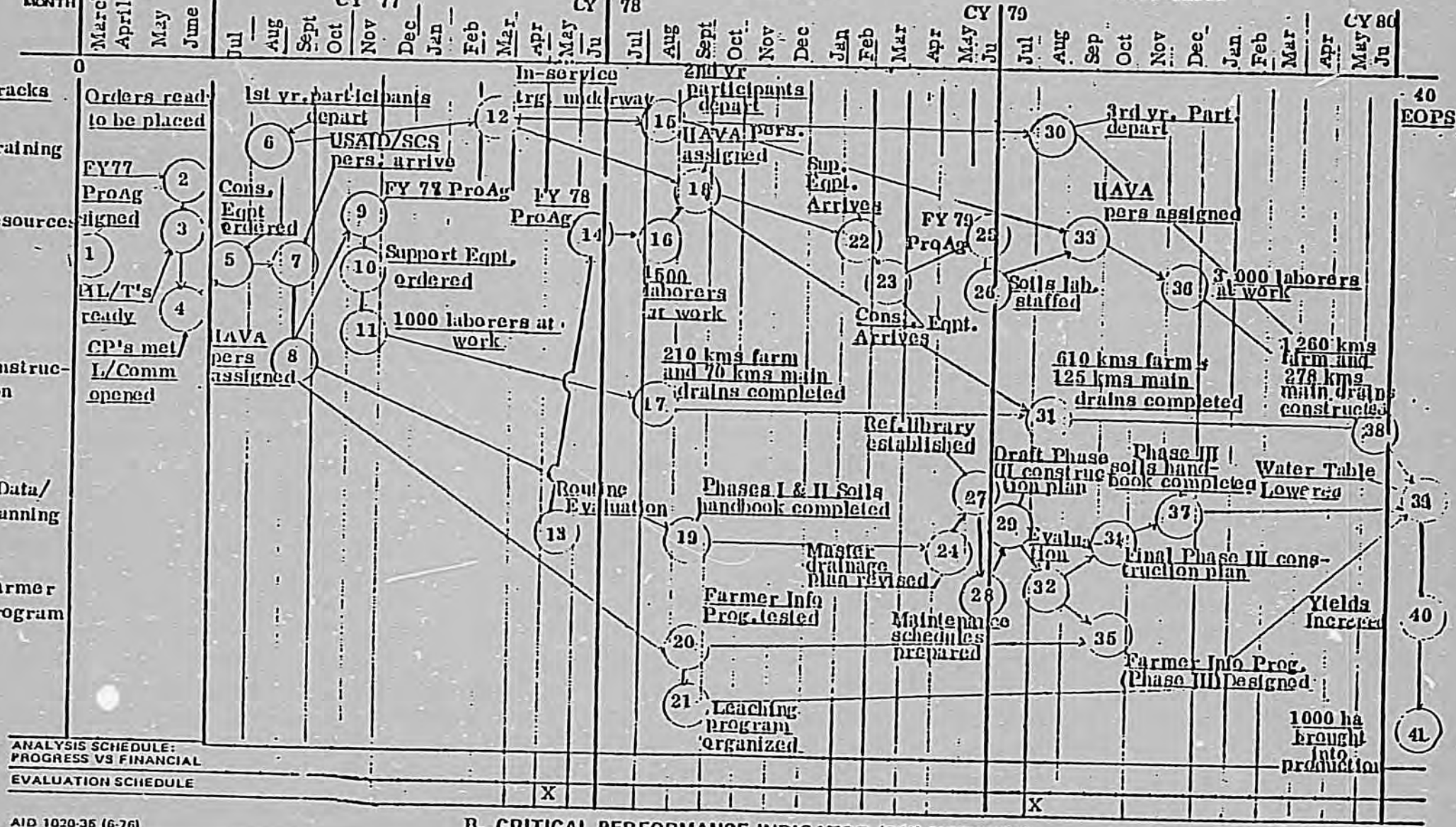
9. Related to equipment maintenance:

a. finalize an inventory control and procurement system;

b. transfer inventory and procurement responsibility to Afghan counterpart;

c. observe regular servicing schedule for all equipment.

| COUNTRY | PROJECT NO. | PROJECT TITLE | DATE | ORIGINAL / REVISION # | APPROVED |
|---|---|---|---|---|---|
| Afghanistan | 306-0149 | Central Helmand Drainage (Phase II) | 11/29/76 | X ORIGINAL | 70 |




AID 1020-35 (6-76)

B. CRITICAL PERFORMANCE INDICATOR (CPI) NETWORK

| COUNTRY | PROJECT NO. | PROJECT TITLE | DATE | | APPROVED |
|---|---|---|---|---|---|
| Afghanistan | 306-0149 | Central Helmand Drainage (Phase II) | 11/27/76 | [X] ORIGINAL [ ] REVISION # ____ | |

PROJECT PURPOSE (FROM PRP FACESHEET)

Waterlogging and salinity reduced to desired levels throughout areas drained during Phases I and II. (135 $km^2$)

| Prior Actions | Date | Responsibilties |
|---|---|---|
| 1. HAVA assigns 4th planner and one preliminary design engineer | 2/77 | HAVA |
| 2. TDY Procurement Specialist arrives to review draft technical specifications (prepared by USAID/HCC ) | 2/77 | AID/W |

Year One (3/77-6/78 )

| | | |
|---|---|---|
| 1. Project Agreement signed | 3/77 | GOA/USAID |
| 2. Pre-implementation procurement steps completed and orders ready to be placed | 6/77 | USAID/HCC |
| 3. Early recruitment steps completed and PIO/T's and PASA agreements ready for signature | 6/77 | USAID-AID/W |
| 4. CP's met and inssuance of L/Comm requested | 6/77 | GOA |
| 5. Construction Eqpt. orders placed | 7/77 | HCC |
| 6. First year participants depart | 8/77 | HAVA/USAID |
| 7. Full SCS Team and USAID project administration advisor on board | 9/77 | AID/W |
| 8. Full HAVA first year staff on board | 9/77 | MWP |
| 9. FY 78 Project Agreement signed | 11/77 | GOA/USAID |
| 10. Support Eqpt. orders placed | 11/77 | HCC |
| 11. At least 1000 farm laborers working on farm drains | 11/77 | HAVA |
| 12. In service training developed and underway | 3/78 | HAVA/SCS |
| 13. Evaluation | 5/78 | HAVA/USAID |
| 14. FY 78 Project Agreement Amendment signed | 6/78 | GOA/USAID |

| COUNTRY | PROJECT NO. | PROJECT TITLE | DATE | | APPROVED |
|---|---|---|---|---|---|
| Afghanistan | 306-0149 | Central Helmand Drainage (Phase II) | Nov. 27, 1976 | [X] ORIGINAL REVISION # ____ | |

PROJECT PURPOSE (FROM PRP FACESHEET)

| CPI DESCRIPTION | Date | Responsibilities |
|---|---|---|
| Year Two (7/78 - 6/79) | | |
| 15. Second year participants depart | 8/78 | HAVA/USAID |
| 16. At least 1500 laborers working on farm drains | 8/78 | HAVA |
| 17. 210 Kms of farm drains and 70 Kms of main drains completed | 8/78 | HAVA/HCC |
| 18. Full HAVA second year staff on board | 9/78 | MWP |
| 19. Soils handbook and maps for Phases I and II completed | 9/78 | HAVA/SCS |
| 20. Farmer information program tested and in operation | 9/78 | HAVA/SCS |
| 21. Leaching program organized and underway | 9/78 | HAVA/SCS |
| 22. Support eqpt. arrives at Lashkar Gah | 2/79 | HCC |
| 23. Construction eqpt. arrives at at Lashkar Gah | 3/79 | HCC |
| 24. Master Drainage Plan revised | 5/79 | HAVA/SCS |
| 25. FY 79 Project Agreement signed | 6/79 | GOA/USAID |
| 26. Soils laboratory staffed and equiped for Phase III needs | 6/79 | HAVA |
| 27. Reference library established | 6/79 | HAVA |
| 28. Drain maintenances schedules established | 6/79 | HAVA |
| Year Three (7/79-6/80) | | |
| 29. Draft Phase III construction plan completed | 7/79 | HAVA/SCS/ USAID |
| 30. 3rd year participants depart | 8/79 | HAVA/USAID |
| 31. Cumulative 610 Kms farm drains and 125 Kms main drains completed | 8/79 | HAVA/HCC |
| 32. Evaluation (Phase III go-No go determination) | 8/79 | USAID/HAVA |
| 33. Full HAVA third year staff on board | 9/79 | MWP |
| 34. Final Phase III construction plan completed and reviewed | 10/79 | HAVA/SCS/ MWP/USAID |



CRITICAL PERFORMANCE INDICATOR (CPI) DESCRIPTION

| COUNTRY | PROJECT NO. | PROJECT TITLE | DATE | | APPROVED |
|---|---|---|---|---|---|
| Afghanistan | 306-0149 | Central Helmand Drainage (Phase II) | Nov. 27, 1976 | [X] ORIGINAL [ ] REVISION # ____ | |

PROJECT PURPOSE (FROM PRP FACESHEET)

| CPI DESCRIPTION | Date | Responsibilities |
|---|---|---|
| 35. Farmer information program for Phase III designed | 11/79 | HAVA/SCS |
| 36. At least 3,000 laborers working on farm drains | 12/79 | HAVA |
| 37. Soils handbook and maps for Phase III completed | 12/79 | HAVA/SCS |
| 38. Total 1,260 Kms farm drains and 278 Kms main drains completed | 6/80 | HAVA/HCC |
| 39. Water table lowered and salinity levels reduced in areas drained in Phase I and first year of Phase II (EOP) | 6/80 | HAVA/HCC |
| 40. Average yields in this areas increased by at least 20% (EOP) | 6/80 | HAVA/HCC |
| 41. At least 1,000 Ha. brought into production (EOP) | 6/80 | HAVA/HCC |

Post Completion Actions

| | Date | Responsibilities |
|---|---|---|
| 1. Certification and reimbursement of last work segments | 9/80 | USAID |
| 2. 1976 Farm Economic Survey updated | 6/81 | HAVA |
| 3. Post evaluation of purpose achievement and impact on goal. | 9/81 | HAVA/USAID |

## C. PROJECT FINANCIAL IMPLEMENTATION PLAN

Title: Central Helmand Drainage (Phase II)

Project No: 306-51-120-149

| | Prior Years' Actual Expenditures | PROJECTED EXPENDITURES ($000) FISCAL YEAR 1977 1st Qtr. | 2nd Qtr. | 3rd Qtr. | 4th Qtr. | FY 1978 | FY 1979 | All Future Years | Total All Years |
|---|---|---|---|---|---|---|---|---|---|
| Project Specific Inputs: | | | | | | | | | |
| 1. Technicians | | | | | 293 | 976 | 887 | 842 | 2,998 |
| 2. Participant Training | | | | | | 110 | 151 | 207 | 468 |
| 3. Capital Commodities: | | | | | | | | | |
| Equipment | | | | | | | 6,335 | | 6,335 |
| Supplies | | | | | | 3 | 332 | | 335 |
| 4. Actual Cost Reimbursement (75%) | | | | | | 1,145 | 1,750 | 4,305 | 7,200 |
| Total PFIP | | | | | 293 | 2,234 | 9,455 | 5,354 | 17,336 |

## D. Evaluation Plan

In addition to the continual monitoring and data analysis required to implement successfully Phase II, this plan envisages three evaluations during the course of the project.

First, a routine evaluation will be completed no later than May 1978, primarily to assess the progress in producing the scheduled outputs and to determine the validity of a number of critical input to output assumptions during the first ten months of project implementation. This evaluation, to be conducted jointly among representatives of the Ministry of Water and Power, HAVA, USAID/Lashkar Gah and USAID/Kabul, should identify and recommend specific actions to overcome any deficiencies in project design or implementation plans. The evaluation findings and recommendations should be reflected in the FY 1979 Project Agreement Amendment.

Second, an in-depth, special evaluation will be conducted no later than August 1979 to measure: 1) progress toward output and purpose targets; 2) the validity of critical assumptions at the output and purpose levels, as well as at the goal level where possible; and 3) GOA capabilities for an expanded Phase III.

The main purpose of this evaluation 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 III effort and to make recommendations, if appropriate, on the steps required before a Phase III can begin. This evaluation should be performed jointly by the parties, with or without outside assistance as deemed appropriate at the time. This evaluation might be patterned after the evaluation methodology used in the Phase I Evaluation, which proved so helpful in paving the way for this Phase II.

Third, an ex-post facto evaluation will be carried out no later than September 1981 to measure purpose achievement and project impact at the goal level. This evaluation should compare the relevant data from the Farm Economic Survey of 1976, used in identifying the beginning of project status, against the data generated from the 1980 or 1981 Farm Economic Survey. If a Phase III is being implemented, this evaluation should be jointly handled by the project participants. Otherwise, the Socio-Economic Evaluation Unit of HAVA in cooperation with USAID should perform this important evaluation in order to validate or disprove the purpose-goal hypothesis.

E. Modalities of Loan/Grant Implementation Procedures

1. Borrower/Grantee. The Borrower/Grantee would be the Republic of Afghanistan acting through the Ministry of Water and Power (MWP) as the responsible agency of the Government for the project.

2. Implementation Agencies. The Helmand-Arghandab Valley Authority (HAVA) an autonomous government entity was established March 21, 1966, by the previous Royal Government of Afghanistan. At the same time, the Government created the Helmand-Arghandab Construction Unit (HACU), a Government enterprise reporting through the General President of the HAVA with the single responsibility for all construction and in support of HAVA.

The Charter of the HAVA (Annex I) provided the Authority responsibility for an integrated development of the land, water, electric power and industrial potential of the Arghandab and Helmand River systems. It is this agency (HAVA) that is implementing Phase I of the Central Helmand Drainage Project. The change of Government from a Monarchy to a Republic in 1973 did not change the role or function of HAVA; although the Charter of HAVA expired March 20, 1976, the authority continues to operate and function in a de-facto status as part of the newly formed Ministry of Water and Power. Discussions with Ministry of Water and Power officials indicate that the Charter of HAVA in its present form, in all probability, will not be extended and that the Government is contemplating a reorganization of the authority. It is, therefore, considered appropriate that the MWP be designated the responsible agency for the project, which in turn will designate a "Project Directorate" as the implementing organization for the project. For the foreseeable future, HAVA shall be the designated Project Directorate for the project.

On January 6, 1976, by Government of Afghanistan Cabinet action, HACU was reorganized into the Helmand Construction Corporation (HCC), an autonomous Government construction corporation. The Charter of HCC (Annex J) provides, in part, for its continued involvement in the construction of irrigation and drainage systems. It is this organization (HCC) which shall under contractural relation with HAVA, undertake and perform the machine excavation and construction of structures in Phase II of the project.

3. Implementation Procedures.

a. The Development Grant portion of the project would be used to finance the (1) reimbursement, on a percentage of actual cost basis, for the construction and rehabilitation of drains and structures; (2) technical assistance services of direct-hire, PASA and contract personnel;

(3) training of GOA personnel and participants; (4) related ancillary supplies and equipment; and (5) short-term consultancy services and studies.

b. The Capital Grant portion of the project would be used to finance the purchase of machinery, equipment and supplies needed in the excavation and construction phase of the project.

All such purchases would be of U.S. source and origin; a provision to this effect will be included in the Agreement. All machinery and equipment will be titled to the Government, which, in turn, shall make it available to HCC for its operation and maintenance on the project. A covenant will assure that AID-financed machinery and equipment is used for the project. A condition precedent shall be included in the Agreement which requires AID approval of the basic protocol between MWP and HCC covering performance of the work, and subsequent contracts for drain construction work will likewise be subject to AID approval.

4. Analysis of Borrower/Grantee and AID's Administrative Arrangements

a. Borrower/Grantee -- The Government of Afghanistan has assigned overall coordination and program responsibility for the project to its Ministry of Water and Power (MWP). The President of Planning of the MWP is the designated liaison officer for the project, and it is this individual who has reviewed the Project Paper and participated with USAID staff in designing the project. As discussed previously, MWP will designate the Project Directorate, and will also furnish to it overall policy guidance and administrative direction.

The need for additional staffing and training of Project Directorate personnel is seen as a crucial feature of the project design. The need for sufficient resources for this purpose is recognized and discussed in detail in other portions of the Project Paper.

b. AID -- The monitoring role for the AID mission shall include close liaison and coordination at the Ministry of Water and Power level in Kabul and, similarily, at the implementation level at the project site in Lashkar Gah.

There will be several aspects to the monitoring. Among these will be:

(1) Technical Advice: The Project Directorate will require AID-provided management advice--on organizational matters, training,

farmer education, publicity, farmer motivation as well as the more technical areas of planning, engineering, design, soil and water technology and construction management.

To be responsive to this need, the services, under a PASA agreement, of the U.S. Soil Conservation Service advisors, who have provided advice under Phase I of the project, will be augmented and the services continued for Phase II of the project.

Project-funded AID direct-hire staff, consisting of a Project Administration Advisor, an Engineering Advisor, and Maintenance and Supply Management Advisors in Lashkar Gah, will also be called upon for field assistance in implementing the project.

(2) Overall Project Monitoring: The overall monitoring responsibility for the project will rest with the Project Officer assisted by the staff resources of USAID.

5. Methods of Financing Reimbursement for Contract Construction Costs. The FAR procedure used for construction costs in Phase I of the project proved inefficient in application. The major difficulty encountered was in accurate cost estimating for machine construction of main drains given varying soil conditions from one section to the next. HAVA repeatedly complained that actual costs billed by the construction contractor were greater than estimated costs because of unanticipated excavation of rock, conglomerate or other soils for which actual costs exceeded estimates. The President of Planning of MWP has requested AID financing of actual costs in Phase II. Inasmuch as drainage construction is not accomplished through replication of common structures and does, in fact, require excavation of varying types of soils, USAID supports actual cost reimbursement for drainage construction utilizing the following procedures:

a. Main drains -- It is anticated that main drains will be constructed by HCC under contracts with HAVA. All such contracts will be submitted to USAID for review and approval before construction of the applicable section of main drains is undertaken. These contracts will include unit costs for excavation of various types of soils, unit costs of structures, and estimated quantities based on designs and specifications included in the contract. USAID will review the provisions of these contracts and determine the reasonableness of unit costs before indicating approval through project implementation letters. Contractor performance will be monitored by USAID engineers who will ascertain if excavation and construction

is accomplished in accordance with approved designs and specifications. Invoices submitted to HAVA by HCC will be reviewed by the USAID engineers to determine if quantities billed agree with actual construction and the approved designs. The USAID engineer will then approve the contractor's invoice. On receipt by USAID/Kabul of the invoice, the USAID Chief Engineer's certification, and a request from HAVA for payment, the USAID Controller will reimburse 75% of the invoice amount.

b. Farm drains -- It is expected that HAVA will enter into contracts with various labor contractors for the hand construction of farm drains. USAID will review and approve a standard contract which will include a fixed Afghani amount based on cubic meters of excavation and an agreed to amount per cubic meter. It is expected that rate changes will be proposed by HAVA and approved by USAID during the course of project implementation.

c. USAID approval -- All drain designs will be reviewed and approved by USAID before construction begins under standard contracts. As a precaution, USAID will reserve the right to review and approve individual contracts. USAID engineers will review and approve invoices submitted by contractors before payment is made by USAID. Reimbursement will be limited to 75% of contractor invoice costs.

6. Financing of Equipment, Training and Technical Services. It is expected that equipment will be procured by an agent for the Grantee, utilizing standard letter of commitment and letter of credit procedures. It is anticipated that HCC will be the designated agent. The financing of all other eligible foreign exchange and local currency costs other than the costs of drainage construction will be accomplished through the standard methods of disbursement under project implementation letters (as described in Article 7 of the new project grant agreement) and direct conversion of dollars to Afghanis.

7. Depreciation as a Component of Contract Costs. Equipment depreciation is a major component of unit costs charged by HCC. At present, the depreciation component is based on guidelines established by U.S. equipment users for renovated equipment. As Phase II implementation proceeds, equipment financed by AID under the project agreement will be used by HCC in lieu of the equipment presently in use. As a consequence, the depreciation component of unit costs charged by HCC will be attributable in part to the new equipment. AID financing of construction costs charged by HCC raises an issue of double financing of equipment. It would be impractical to identify depreciation attributable to AID-financed and non-AID-financed

equipment utilized on the project and to exclude the depreciation applicable to AID equipment from the contractor's unit costs. Accordingly, AID reimbursement for main drain construction costs will be limited to 75% of such costs and depreciation on equipment will be attributed to the Grantee's 25% payments. Similarly, AID reimbursements for farm drain construction costs will be limited to 75% of such costs to assure that the Grantee accepts a financial commitment for such construction. Additionally, the Grantee's acceptance of a 25% payment requirement provides a shared risk for cost overruns.

F. 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. Although it is understood that the Government is generally in accord with these, the final text of the CPs and covenants cannot be determined until the Project Agreement is firmly negotiated after authorization of the Assistance.

CONDITIONS PRECEDENT

Conditions Precedent to Initial Disbursement of the Capital Grant (CG)

Prior to the initial disbursement of the Capital Grant, the Government shall, except as AID may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) Legal opinion.
(2) Designation of Government's authorized representative(s).
(3) Detailed procurement plan indicating commodities to be procured, the procuring agency, and the proposed arrangements for carrying out the procurement.

Conditions Precedent to Initial Disbursement of the Development Grant (DG)

Prior to the initial disbursement of the Development Grant, the Government shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) A written protocol between the Government and the Helmand Construction Corporation ("HCC") which will establish the overall terms and conditions governing the specific contracts to be subsequently negotiated for construction and/or related services for the project.

(2) Contracting procedures that the Government will follow in the constructio of farm drains utilizing hand-labor methods, as well as the contract form that the Government will utilize in carrying out farm drain construction.

(3) Designation of the Government agency to serve as the Project Directorate

(4) Evidence that the Project Directorate shall have adequate staff assigned to it to carry out the project.

(5) Evidence or assurances of the availability of funds, other than the Capital and Development Grants, necessary to support the operations of the Project Directorate in carrying out the project.

## COVENANTS

(1) No main, lateral or farm drain construction work shall be eligible for reimbursement under this Agreement unless the particular construction work is covered by a Project Implementation Letter duly negotiated and signed by A.I.D. and the Project Directorate.

(2) In order for main, lateral and farm drain construction work to be eligible for reimbursement under this Agreement, the following selection criteria must have been satisfied for such construction work:

(a) Design criteria and construction specifications were developed for the work and approved by A.I.D.

(b) Based upon a survey of farmers, necessary socio-economic criteria for selection of project areas have been developed.

(c) Farmers have been informed about project methods and goals and a majority of farmers in a specific project area have agreed to the construction plans, will maintain the improvements after they are carried out, and will participate in the leaching and water-use improvement program.

(d) Adequate maintenance plans have been established for main, lateral and farm drain construction.

(3) The Government will assure that all equipment and supplies financed under the CG shall be used for the project and related land-betterment activities in the Helmand-Arghandab Valley.

(4) The Government will make available to HCC adequate equipment and supplies necessary to perform the work identified in the construction plan for the project.

(5) The Government will continue to provide logistic support satisfactory to A.I.D.; including not less than 15 housing units and office facilities for USAID direct-hire and contractor personnel in Lashkar Gah.

2. Exceptions. The following exceptions to usual A.I.D. procedures are recommended:

a. Source/Origin/Componentry -- It is proposed that only Afghanistan "source" requirements should apply to the local cost financing component of this fixed percentage of actual costs (FAR-type) project, and that origin and componentry requirements will not be applicable. The result of this rule is that as long as the commodities were purchased in Afghanistan, the projects into which they are incorporated will be eligible for A.I.D. reimbursement. A.I.D. will not inquire into the country of manufacture of items purchased in-country.

This approach is recommended because of the practical impossibility of enforcing origin and componentry requirements for the local cost component of the project. The farm drain work will be labor intensive.

This means that some of the on-shelf commodities used on the project may be from Communist-bloc countries or contain components from such countries, but this expected to be minimal.

b. Waiver of FAA ¢ 110(a) - Cost Sharing Requirement -- As discussed in the financial arrangements in Section VE of this Project Paper, we propose to reimburse the GOA for a flat 75% of billings on the main, lateral and farm drain construction work. These reimbursements will be made on a fixed percentage of actual cost basis as described in paragraph E.3 of Appendix 3F of Handbook 3. Because of the necessary substantial procurement of equipment and materials for the project from the United States, this means that the overall financial contribution of the GOA to the project is anticipated to be about 12%. For this reason, a waiver from the cost-sharing requirements of FAA ¢ 110(a) is recommended. Such a waiver is permissible for RLDCs such as Afghanistan. It is strongly recommended that this waiver request be approved.

MINISTRY OF PLANNING
SECRETARIAT

ANNEX A

NO.
DATE: February 12, 1975
Ref:

88

REPUBLIC OF AFGHANISTAN
KABUL

Mr. Vincent W. Brown
Director,
United States Aid Mission to Afghanistan
Kabul, Afghanistan

C O P Y

Dear Mr. Brown:

As a result of suggestions made by the Joint Afghanistan-United States Helmand Planning Committee set up during the visit of Mr. Parker and Mr. Nooter, we request that the United States of America give us grant as istance leading to the further development of the Upper Helmand and Arghandab Valley Region.

The assistance so requested will have to meet the urgent requirement of the two important objectives explained hereunder:

(a) As was pointed out to Mr. Parker and Mr. Nooter, the drainage situation in the Valley is quite serious, and more assistance is needed in order to complete this vital part of the work. We, therefore, request that you assist us in the Upper Helmand Drainage and Irrigation Improvement Project which would involve rehabilitating many of the lateral and farm drains, building new farm drains, revising and bringing up to date the major drainage plan and installing new major drains.

In order to accomplish this task we will need the services of your experts to provide technical assistance, some old equipment repaired and new equipment purchased, and some training with emphasis on-the-job training. Any assistance that you can give us over the next few years in this regard will be greatly appreciated.

We expect that, when this improved drainage system is completed and when the farmers are taught how to better manage the use of water, yields will be increased by over 100 per cent.

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(b) As you are aware, the United States has assisted in the development of the area for over twenty years but the job is not yet completed. However, it is recommended that the creation of a system to select a project for completing work in the Upper Helmand and for determining priorities of investment in that area seems to be an urgent requirement. We, therefore, request that you assist us in conducting a soil and water survey of the Upper Helmand, Arghandab and Tarnak River Basins, including their drainage areas on the high plateau which serve as a source of the water for these rivers down to Deshu. In the first phase, we would like to have this survey inventory the soil and water resources of the river basin and make recommendations as to their optimum use. Since we would like to have this survey be immediately useful, we would expect the team conducting it to not only do the main survey but, as useful projects are unearthed, we would like them to do the pre-feasibility surveys and, perhaps, a number of feasibility surveys on the project areas that look to be highly profitable immediately.

In the second and later phases of this survey, other aspects of the area could be investigated which, hopefully, would lead to something approaching a total basin survey over time and would include not only the soil and water resources but all resources in the Upper Helmand area. The recommendations made would include plans for the optimum development of the Upper Helmand and would focus on Agriculture, Agro-based industries, Power, Irrigation and other Social Services including Education and Public Health.

In order to complete this work we will need several experts to provide technical assistance, and some survey and other necessary equipments.

This project should be started as soon as possible because its completion is essential to establish priorities among possible future investments in the Upper Helmand and we need the recommendations to guide our own future development actions.

In view of the fact that investigation of development activities in the Upper Helmand has the top priority with the Republic Government of Afghanistan, we would, therefore, appreciate your early consideration of our request.

Yours sincerely,

/s/ A.A. Ferogh
A.A. Ferogh
Deputy Minister of Planning

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

From FY 77 to FY 80
Date Prepared: Nov. 29, 1976

Project Title & Number: Central Helmand Drainage -Phase II # 306-0149

| GOAL | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | PURPOSE TO GOAL ASSUMPTIONS |
|---|---|---|---|
| (Subsequent Phases)<br>Agricultural productivity, income, and employment of small-scale farmers and laborers in drained project areas increased by 1981. | 1. Average crop yields increased at least 50 percent as result of drainage alone and total production increased as follows: | Ex Post Facto Evaluation<br><br>Farm Economic Survey(1980-81) | 1. Implementation of Master Drainage Plan<br><br>2. Continued availability of seed and fertilizers (the latter at 1975 prices) on credit.<br><br>3. No changes in on-farm irrigation practices are needed to achieve stated targets.<br><br>4. No change in traditional practices of water allocation among farmers is needed to achieve project objectives.<br><br>5. Drains will be adequately maintained.<br><br>6. Land tenure and sharecropping patterns will remain the same or become more equitable.<br><br>7. Additional employment opportunities will not be offset completely by mechanisation. |

| Crops | Av. 1975 Yields in areas to be drained (Mt/ha) | Average Yields in areas drained by 1981 (Mt/ha) | % Change |
|---|---|---|---|
| Wheat | 1.06 | 2.22 | 109 |
| Cotton | 0.66 | 1.05 | 59 |
| Corn | 0.72 | 1.16 | 61 |

| Crops | Total 1975 production from areas to be drained (1000MT) | Total production from areas drained by 1981 (1000MT) | % Change |
|---|---|---|---|
| Wheat | 7.22 | 14.33 | 98 |
| Cotton | 2.63 | 4.81 | 83 |
| Corn | 0.83 | 1.52 | 83 |

2. Net annual income increased from a 1975 base of afs 17,500 per farm owner family to afs 24,500 by 1981 (at constant prices).

3. Utilization of farm labor increased from 130,000 mandays in 1975 to 250,000 mandays by 1981.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

From FY 77 to FY 80

Project Title & Number: Central Helmand Drainage-Phase II # 306-0149

| PROJECT PURPOSE | END OF PROJECT STATUS | MEANS OF VERIFICATION | OUTPUT TO PURPOSE ASSUMTIONS |
|---|---|---|---|
| (Phase II)<br>Waterlogging and salinity reduced to desired levels throughout areas drained druing Phases I and II. (135 $km^2$) | 1. Areas drained in Phase I and in first year of Phase II show water table lowered to design depths and salinity reduced to acceptable levels (1000 -1500 parts per million).<br><br>2. In above areas average yields show impro-ment by at least 20 percent. | In-depth Evaluation<br><br>Field tests of water table and salinity levels<br><br>Socio-Economic Evaluation Unit's analyses | 1. HAVA is committed to working with farmers on project implementation and to farmer education.<br><br>2. Farmers will cooperate with HAVA<br><br>3. HAVA is committed to farm drains and will accept technical recommenda-tions for adequate drain spacing. |

# PROJECT DESIGN SUMMARY
## LOGICAL FRAMEWORK

From FY 77 to FY 80

Project Title & Number: Central Helmand Drainage - Phase II # 306-0149

| OUTPUTS | MAGNITUDE OF OUTPUTS | MEANS OF VERIFICATION | INPUT TO OUTPUT ASSUMPTIONS |
|---|---|---|---|
| 1. HAVA capibilities expanded (planning, design, field data collection and analysis, construction supervision, socio-economic evaluation, project related administration)<br>2. Drains constructed/improved<br>3. Master Drainage Plan refined<br>4. Phase III construction plan developed<br>5. Farmer info/education program identified and tested. Plan for Phase III ready.<br>6. Joint HAVA/Farmer leaching program operating on drained lands.<br>7. Soils handbooks and maps for project areas prepared.<br>8. Shared HAVA-Farmer drain maintenance program devised<br>9. Effective maintenance and supply program for construction equipment established. | 1. HAVA capabilities expaned:<br>a) qualified staff added or trained, as follows:<br><br>Year One / Year Two / Year Three / Total<br>Number New Staff: 45 / 79 / 30 / 154<br>Total Avail. Staff: 149 / 228 / 258 / 258<br>Number Staff Trained: 48 / 21 / 35 / 104<br><br>b) adequate field data for planning and design collected at least 3 months in advance of planned date for completed designs;<br>c) drawings and specifications available at least 3 months before contracts need to be signed;<br>d) adequate construction supervision provided as measured by reduction in current disparity between approved desings and as-built accomplishments;<br>e) planned numbers of laborers recruited and effectively administered;<br>f) socio-economic evaluation unit provides data to support project area selection before final decision made to work in an area, as well as analyses of drainage impact on farmers' productivity and income. | Monitoring of CPI network and financial implementation plan<br><br>Routine and In-depth evaluations<br><br>Project staff reports | 1. Existing social structure will not impede implementation of drainage effort.<br>2. Adequare unskilled farm labor can be recruited for farm drain construction.<br>3. HAVA is committed to labor intensive approach to farm drains.<br>4. HAVA recognizes need for water management<br>5. Other HAVA activities will not intrude on drainage effort.<br>6. HAVA can recruit additional manpower to meet expanding needs.<br>7. Reimbursement acts as an incentive for HAVA to perform well and at increasing rate.<br>8. HCC will place sufficient priority on drainage project.<br>9. PASA with requisite skills can be recruited on timely basis. |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Central Helmand Drainage - Phase II # 306-0149

From FY 77 to FY 80

| OUTPUTS | MAGNITUDE OF OUTPUTS | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|
| | g) reference library of engineering and soils-related materials established by 6/30/79;<br><br>h) soils laboratory fully staffed and equipped for Phase III requirements by 6/30/79<br><br>2. Drains constructed, as follows: | | |

| | Year One | Year Two | Year Three | Total |
|---|---|---|---|---|
| a) areas drained ($km^2$) | 22 | 39 | 69 | 130 |
| b) farm drains completed(km) | 210 | 400 | 650 | 1260 |
| c) main drains completed (km) | 70 | 55 | 153 | 278 |
| d) land smoothed ($km^2$) | 4.9 | 9.5 | 9.9 | 24.3 |

e) drains constructed in accordance with established technical, economic, and social criteria.

3. Updated and revised version of the Master Drainage Plan completed by May 1979.

4. A Phase III construction plan, including identification of areas to be drained and conceptual designs, issued in draft by July 1979 and in final by October 1979.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Central Helmand Drainage -Phase II # 306-0149 From FY 77 to FY 80

| OUTPUTS | MAGNITUDE OF OUTPUTS | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|
| | 5. A farmer, drainage-related information program tested and in operation by September 1978 reaching farmers whose lands are being drained in Phase II and a farmer infromation program for Phase III designed by November 1979.<br><br>6. At least 75% of farmers affected by Phase I and II drains participate in leaching program guided by HAVA.<br><br>7. Soils handbook and maps for Phases I and II completed by September 1978 and for Phase III by December 1979.<br><br>8. Shared HAVA/farmer drain maintenance program devised, to include:<br><br>a) maintenance schedules for farm and main drains established by 6/79; and<br><br>b) at least 90% of affected farmers sign farm drain maintenance agreements with HAVA<br><br>9. Effective equipment maintenace and supply program at the Construction Unit established. Test: Existing equipment kept running until the arrival of new equipment and latter made operational quickly. | | |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

From FY 77 to FY 80

Project Title & Number: Central Helmand Drainage -Phase II # 306-0149

| INPUT ACTIVITIES | RESOURCES (TYPE & QUANTITY) | | | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|---|---|
| The following activities will be required of HAVA and USAID/SCS to produce the desired outputs: | Resources | Funding (000's) | | Routine Evaluation | |
| 1. Related to upgrading HAVA capabilities: | USAID<br>1. Technical Services<br>- 4 AID technicians 144 man/months | 774 | | Monitoring of CPI network and financial implementation plan<br>Project records | |
| a. USAID/SCS advise HAVA staff on planning, design, field data collection and analysis, construction, socio-economic evaluation, administration on a continuing basis; | - 8 PASA advisors plus consultants 324 man/months | 1,958 | | Project implementation letters | |
| b. Recruit additional HAVA staff; | - 1 long range planning contractor - 36 man/month | 266 | | | |
| | | | 2,998 | | |
| c. Develop in-service training program relying on U.S. consultants; | 2. Training<br>- U.S. long term, 180 MM | 259 | | | |
| d. Select and train candidates in 3rd-country and U.S. | - U.S. short term, 96 MM | 187 | | | |
| | - 3rd country, 12 MM | 22 | | | |
| | | | 468 | | |
| e. Evaluate and redesign in-service training program. | 3. Construction Reimbursement | 7,200 | | | |
| | | | 7,200 | | |
| 2. Related to drain construction: | 4. Equipment & Supplies<br>- Construction Equpt. (HCC) | 6,335 | | | |
| a. collect and analyze field data (socio-economic and technical) | - Support Equpt. (HAVA) | 332 | | | |
| | - Reference Books | 3 | | | |
| b. prepare designs | | | 6,670 | | |
| c. prepare cost estimates | | | 17,336 | | |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

From FY 77 to FY 80

Project Title & Number: Central Helmand Drainage -Phase II # 306-0149

| INPUT ACTIVITIES | RESOURCES (TYPE & QUANTITY) | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|
| d. negotiate Project Implementation Letters (PILS) | Resources | | |
| e. negotiate construction and labor contracts | GOA | | |
| f. undertake and suprevise field construction | 1. 250 counterparts &Staff | | |
| g. administer hand-labor force | 2. $2,400,000 contribution to construction costs | | |
| h. compensate non-benefiting farmers for right-of-way (HAVA) | | | |
| i. certify completion and make reimbursement (USAID) | | | |
| 3. Related to updating Master Drainage Plan: | | | |
| a. update data base for Master Drainage Plan | | | |
| b. revise drain design criteria as appropriate | | | |
| 4. Related to Phase III construction plan: | | | |
| a. determine areas to be worked and develop conceptual designs | | | |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

From FY 77 to FY 80

Project Title & Number: Central Helmand Drainage -Phase II # 306-0149

| INPUT ACTIVITIES | RESOURCES | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|
| b. specify labor and equipment needs and cost estimates and production rates | | | |
| c. develop implementation schedule (e.g., bar chart) | | | |
| 5. Related to farmer information and eduction programs: | | | |
| a. develop drainage infromation suitable for farmer presentation using extension service within HAVA | | | |
| b. test various methods for delivery to farms | | | |
| c. evaluate and identify best method (s) | | | |
| d. use this method in explaining drainage to farmers in areas where drains are being installed | | | |
| e. identify additional information needs on priority basis (e.g., cultural practices, water management, crop selection) | | | |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK



From FY 77 to FY 80

Project Title & Number : Central Helmand Drainage -Phase II # 306-0149

| INPUT ACTIVITES | RESOURCES | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|
| f. design a farmer education program for Phse III, including requisite resources, in ormation packages, and implementation schedule | | | |
| 6. Related to leaching program: | | | |
| a. organize a system within HAVA (using consultants) to supervise leaching by farmers of newly drained lands | | | |
| b. set up an orientation program to train extension agents to run program | | | |
| c. extension agents guide Mirabs and farmers in leaching process | | | |
| d. extension agents guide farmers toward efficient water use practices following leaching | | | |
| 7. Related to Soils Map: | | | |
| a. review existing data | | | |
| b. collect and analyze additional data | | | |
| c. develop soils maps using taxonomy methodology | | | |
| d. develop a soils handbook | | | |

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number : Central Helmand Drainage -Phase II # 306-0149

From FY 77 to FY 80

| INPUT ACTIVITIES | RESOURCES | MEANS OF VERIFICATION | ASSUMPTIONS |
|---|---|---|---|
| 8. Related to maintenance program: | | | |
| a. identify respective maintenance responsibilities among HAVA, HCC and farmers | | | |
| b. obtain farmer agreements before starting farm drain work | | | |
| c. set up maintenance schedules for drains | | | |
| d. monitor implementation | | | |
| 9. Related to equipment maintenance: | | | |
| a. finalize an inventory control and procurement system | | | |
| b. transfer inventory and procurement responsibility to Afghan counterpart | | | |
| c. observe regular servicing schedule for all equipment | | | |

ANNEX C

# CENTRAL HELMAND

# DRAINAGE PROJECT

## MASTER PLAN

Prepared by the HAVA Technical Division and the GOA, in cooperation with the United States Agency for International Development (November 1976)

ANNEX C

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## I. SUMMARY

The Central Helmand Drainage Project is planned to provide increased crop production through improved drainage of agricultural land. The area covered by the project is that portion of the Helmand Valley in Southwest Afghanistan, irrigated by the Boghra and Darweshan Diversions. It is estimated that adequate drainage will be provided to an additional 103,190 hectares of land with a total project cost of Afs. 2,760,000.00 ($55,215,820.00)*.

The project plan is based on the conclusion that continuous irrigation over a number of years has resulted in salinization and waterlogging of the soils with a resultant decrease in production. This is a typical problem for irrigated lands in arid climates.

The proposed work includes excavation of main outlet drains using machinery, and excavation of farm drain systems using hand labor or a combinatio of hand labor and equipment to do the work. Some land smoothing will be required, and some irrigation systems will be modified in order to be compatible with the drainage system.

A soil survey will be instituted to improve data for drainage design as well as other agricultural uses. Design and layout of the drainage system will follow the guidelines as described in Soil Conservation Service (SCS) National Engineering Handbook, Section 16, Drainage of Agricultural Lands.

Other improvements such as better water management and agricultural management are needed to derive maximum benefits. Installation of a drainage system will in itself greatly improve crop production and is a logical first increment in the long range agriculture development of the Central Helmand Valley.

* $1 = 50 Afs.



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## II. INTRODUCTION

The Central Helmand Valley, located west of Kandahar along the Helmand River, is one of Afghanistan's most productive agricultural areas. Development of canal and irrigation systems in the area has made possible the settlement of a large part of this area. The development of the area has resulted in previously unused land becoming productive. At this time, the primary crops are wheat, cotton, melons, and corn.

With the application of irrigation water to the area, salinization has becor a problem. About 26% of the project area is severely affected by this problem. In approximately 40% of the project area, waterlogging of the soil root zones has also resulted. These two problems, along with poor agricultural and water management practices, have caused a reduction in crop yields and, in some cases, abandonment of the land. Although it is known that many management practices affect agricultural production, the problems of salinization and waterlogging are known to be the two most serious limitations to production in this area. In correcting these problems, drainage of all of the agricultural lands in the area is required. This plan provides for the development of a complete drainage system for the project area, with the purpose of improving agricultural production.

## III. DESCRIPTION OF PROJECT AREA

### A. Definition

The Project Area, as considered in this plan, includes all land which can receive water from the Boghra and Darweshan Diversions. This includes the areas of Upper Boghra, Nad-i-Ali, Marja, Shamalan, and Darweshan, which comprise approximately 113,050 hectares and are shown on Map No. 1 in the Appendix. Of this total area, approximately 67,200 are presently under irrigation.

With the exception of some relatively small areas along the river, the Boghra Canal and other isolated spots in the project area amounting to 9,360 hectares, it is assumed that all of the project land, which is not presently under irrigation, will be irrigated and settled in the future. Such land, amounting to approximately 27,690 hectares, is included in this Master Drainage Plan.

It is also estimated that approximately 8,800 hectares of land are or will be used for houses, roads, irrigation laterals, and drainage ditches. Although most of this land will eventually be drained, either directly or indirectly, and therefore included in the proposed project development plan, it is not included as agricultural land which is the main concern of this plan.

The project area, as defined above, does not include the entire Central Helmand Project Area. There are approximately 24,000 hectares of land in the areas of Sangin and Seraj, which are not included in the project area for this Master Drainage Plan. It is likely that this additional area will need a drainage system, and an additional plan will need to be developed for it in the future. The intent in defining the project in this fashion is to provide a limited, yet complete management unit on which a drainage program can be carried out.

### B. Climate of the Area

The climate is hot and arid. The following climatic data is based on twenty years of records for Lashkar Gah. Precipitation averages 90.0 centimeters (3.52 inches) annually; all in the form of rain. No rain normally falls during the months of June through October. The greatest amount of rainfall occurs during the months of January and March, and averages 21.0 centimeters (0.83 inches) per month. Temperatures average 19.4°C (67.0°F) annually. The mean monthly summer temperature exceeds 30°C (87°F) and the maximum daily temperature exceeds 52°C (126°F).

The mean monthly winter temperatures do not drop below 5.0°C (41.0°F) and the minimum daily temperature does not drop below 5.0°C (17.6°F). The growing season is approximately 270 days from mid-February to mid-November. The temperature and growing season are a little higher and longer, and the precipitation lower in Darweshan than in Lashkar Gah.

C. Physiography of the Area

The soil material was probably transported south from the mountains and formed fans which were subsequently reworked into a series of what are now high terraces and a relatively recent alluvial valley. The Nad-i-Ali and Marja areas are situated on the same principal high terrace level. The Upper Boghra, Shamalan, and Darweshan areas are in the alluvial valley. The slope of the high terraces is generally to the southeast. These are generally smooth and flat.

The valley soils are more irregular in surface contour, but still slope generally to the southeast.

D. Soils of the Area

Typically, the soils on high terraces have a sandy loam, loam, or silt loam surface which is gravelly, sandy clay loam, or clay loam subsoil containing up to 65 percent gravel; and a compact gravelly or very gravelly clay loam substratum. Very strongly cemented conglomerate underlies the soils at depths ranging from less than one to nine meters. Often, slight rises or knolls in the otherwise smoothly sloping landscape will consist of thin, gravelly, and highly saline soils over beds of crystalline gypsum interbedded with gravel and sand. The soils in the southern part of the Marja area are developed in more sandy aeolian materials. The drainability of these soils varies considerably because of the variation in soil texture and structure.

The compact gravelly and very gravelly clay loam substratum and conglomerate are barriers to drainage on these high river terraces. Water seeps from the irrigation canals down to the drainage barrier, and then very slowly to the southeast down slope toward the relatively recent alluvial valley. Excessive amounts of irrigation water are applied to the surface of the soil and saturation of the soil results. The soluble salts in the soils dissolved and move with the water. As a result, some salts move up in the soil and concentrate at the surface of the soil as evaporation and transpiration takes place. Other salts move in the ground water to the valley.

Typically, the soils in the alluvial valley have a fine sandy loam, loam, or silt loam surface layer; a silty clay loam or silty clay subsoil; and a sandy and gravelly substratum which is permeable. Fairly large areas of soils do occur, however, which have thick, slowly permeable layers of silty clay loam and silty clay. More sandy soils occur in the southern part of the Shamalan area. Dunes move across the southern part of both the Shamalan and Darweshan areas. The generally sandy and gravelly substratum constitutes an aquifer. Ground water moving from the high terraces, seepage water from irrigation canals, and irrigation water tend to fill the aquifer. The soluble salts move with the soil water either up to the surface or laterally to the south along the river valley, and gradually eastward, toward the free-flowing Helmand River.

All of the soils are calcarious and soluble chlorides, sulfates and bicarbonates are present.

## IV. THE PROBLEM AND PROPOSED SOLUTION

The development of an irrigation system, and the settlement of land in the Project Area in the past, has resulted in significant agricultural production. However, maximum agricultural production from the land has not been obtained and, in fact, is declining in many parts of the Project Area. Although relatively poor agricultural production is a result of a combination of problems, including poor irrigation water management, inadequate fertilizer application, poor cultural practices and poor seed quality and application, one of the main reasons for the already low production is the increase in salinization and wetness in the Project Area. It is these problems of salinization and wetness which this drainage plan addresses.

Salinization problems are common in hot arid climates such as the Helmand Valley. Although salts are already present in the soil, the irrigation water is the principal contributor to the problem. The Helmand River, which supplies irrigation water to the Project Area, is relatively low in salt content (approximately 215 ppm). However, as the irrigation water is applied to the soil, and is used through plant transpiration and evaporation, the salts are left to accumulate in the soil. With continuous irrigation over a period of time, salt concentrations reach a level great enough to restrict or prohibit plant growth.

The soils in about 33 percent of the Project Area are underlain by hard conglomerate that prevents downward movement of water. With the continuous application of irrigation water to these soils, the water level rises to near the surface of the soils. The result is complete saturation or waterlogging of the crop root zone and a reduction in yield. In addition, the high water table facilitates the upward movement of saline water by capillarity. As this water evaporates or is transpired, salts are left in the soil. In addition to the area underlain by conglomerate, some additional land in the Project Area is affected by the high water table. The problem in these areas is usually caused by excessive application of irrigation water, seepage from the irrigation canals, or irrigation canals acting as barriers to the flow of underground water.

The result of either salinization or excess water in the crop root zone is a reduction or elimination of crop yield. At the present time, nearly all of the cropland in the Project Area is adversely affected by one or both of these conditions. Productivity on approximately 30,000 hectares of land is severely affected by salinity problems. The problem on lands, presently under irrigation, will become greater and the crop yield less as irrigation continues. Lands, not presently being irrigated, will be irrigated and settled in the future. As this new settlement occurs, these lands will also face the same problems.

The most feasible method of removing the salts and lowering the water table is to install a system of drains. The drains need to be installed close enough together, and deep enough to allow the water to dissolve salts and leach them down through the soil and out. With the establishment of an adequate drainage system, the accumulated salts in the soil can be removed by the controlled addition of excess water. The initial leaching process will require the application of sufficient water to dissolve the accumulated salts and move them out through the drainage system. Salt concentration can then be kept within allowable limits by the application of sufficient water in excess of cropping requirements to leach out the accumulating salts that occur with continued irrigation. The leaching process is a controlled management process and must be directed by qualified technicians for it to be successful.

With the drainage system installed, the existing salts removed, the accumulation of salts prevented and the level of the water lowered, the crop yield will increase. Although additional management practices would make the results more dramatic, the drainage system, in itself, will provide positive results.

It is the belief of most irrigation and drainage specialists that all irrigated arid land will eventually require drainage to control the problems discussed above. It is with this in mind, that this plan recommends drainage for all lands in the Project Area that will eventually be irrigated.

## V. PROPOSED WORK

### A. Overview

The proposed work in this Master Drainage Plan is to provide adequate drainage systems for all land within the Project Area requiring drainage. In addition to about 500 hectares adequately drained during Phase I, it is estimated that approximately 103,190 hectares of the Project Area will eventually require drainage. The amount of land presently in crops is 67,200 hectares. It is projected that with future settlement and expansion of the crop producing area, approximately 27,690 hectares will be settled and made productive. In addition to land which will be cropland, an additional 8,800 hectares will be taken up by roads, irrigation and drainage canals, houses, villages, etc. A large part of the land used for houses and villages is also cropland as it is common, in this area, for crops such as wheat to be grown inside of compound walls. This land then, in the long term project, should be considered as land requiring drainage. This is substantiated even more by the fact that the mud houses deteriorate very fast when a waterlogged condition exists. Although the roads and ditches may not actually require drainage, they will indirectly receive drainage due to their proximity to the agricultural land and shall, therefore, be included in land to be drained. Although all of these non-croplands are included in the total area to be drained in the Master Plan, they have been separated from the croplands in the discussion. The croplands are considered the priority item in developing and installing drains in the Project Area.

The 9,360 hectares of waste land, where drainage is ujustified, is primarily along the Helmand River in the Shamalan, Darweshan, and Upper Boghra, and along the Boghra Canal in the Marja and Nad-i-Ali areas. Most of the land along the river cannot be drained and would be too wet for crop production. Some trees are growing in those areas, and it is anticipated that these areas will not be settled or irrigated in the future.

At this time, there are 500 hectares of land in the Project Area which have adequate drainage systems or on which adequate drainage systems are under construction. Location of lands settled and lands not presently settled (i.e. government or forest lands), are shown on Maps Nos. 2 to 9 in the Appendix. Settled lands as used herein are those lands occupied with government sanction or allocated to specific settlers for occupation. Drainage efforts will be only on such lands.

Table #I summarizes land status and drainage requirements in the Project Area. In discussing drainage requirements for the Project Area, each

area is taken separately. The needs vary considerably from area to area due to changes in soils, topography, irrigation systems, and land ownership patterns. In defining the needs of each area, and the amount of work required which are summarized in Table 2, typical modules are developed. Although in this drainage plan, only one module per area is used, it is likely that more variation than this will occur. At this time, the available data does not permit any closer breakdown. As additional data is developed, modules can be developed for smaller areas, thus making possible a more accurate drainage plan. One of the most significant needs in designing these modules is more information on soils in the area. A proposal to obtain this information will be discussed in a later section of this plan.

B. Area by Area Description

The following is a discussion of existing work and proposed work in each of the five areas within the Project Area:

1. Nad-i-Ali Area

The Nad-i-Ali area is shown in Map No. 2 of the Appendix and includes 16,500 hectares of land. Of this land, approximately 9,930 hectares is presently irrigated cropland. The settlement of the land and the development of the irrigation system has followed a uniform pattern. Land ownership patterns should cause no problems in developing a drainage system. The irrigation system was well planned and laid out, and it will be relatively easy to design a compatible drainage system. A large part of the irrigation distribution system is in poor shape with few control structures in place. This results in poor management of irrigation water which will have some affect on land production and drainage needs. Improvement of the irrigation system, although needed, is not a prerequisite to establishment of a drainage system. The present capacity of the irrigation system is adequate to handle all land planned for irrigation during the life of this project.

There is a partial drainage system installed in the area including approximately 41 kilometers of main drains, 86 kilometers of submain drains, and 66 kilometers of pickup drains. The drains are too shallow, and too far apart to be effective. As a result of poor maintenance, many drains are filled with weeds and silt and are serving no useful purpose.

Six kilometers of Main Drain #2, and 7 kilometers of Main Drain #3 have been constructed during Phase I. In addition, 200 hectares of farm drains will have been installed by the end of Phase I. This work is the only adequate drainage in the area.

The proposed work includes rehabilitation of 114 kilometers of main drains and submain drains, construction of 92 kilometers of new main and submain drains and construction of 14,500 hectares of farm drain systems.

The projection of needed work is based on a 1 square kilometer module having 0.5 kilometer of main drain, 1 kilometer of submain drain, 4.9 kilometers of pickup drains, and 13.1 kilometers of on-farm drains, spaced at 65 meters. The typical module is as shown in Figure 1 of the Appendix. This module is applied over the entire area to determine total work requirements.

2. Marja Area

The Marja Area is shown in Map No. 3 of the Appendix and includes 26,000 hectares of land. Of this land, approximately 12,800 is presently irrigated cropland. As in the Nad-i-Ali Area, the settlement of the land has followed a uniform pattern and should cause no problems in developing a drainage system. With the exception of the West Marja and Karise Sadi sections, the irrigation system is well laid out, and will not cause any difficulty in the development of a drainage system. In the West Marja and Karise Sadi sections, existing irrigation developed randomly. In these sections, modification of the irrigation distribution system may be necessary, in order to install a drainage system. As in Nad-i-Ali, a large part of the Marja irrigation distribution system is in poor shape, with few control of structures in place. Although needing improvement, it is not a prerequisite to establishment of a drainage system. The capacity of the existing irrigation system is adequate to provide water to all land included in this plan.

There is a partial drainage system installed in the area, including approximately 206 kilometers of main drains, and 295 kilometers of pickup drains. Work has begun on the improvement of 10.6 kilometers of Drain C, construction of 4.6 kilometers of New Drain C, and improvement of 2.3 kilometers of Waste Way (W.W.) Extension A. In addition, approximately 50 hectares of farm drains will be completed in Phase I.

The proposed work in the Marja Area includes rehabilitation of 206 kilometers of main drains, construction of 82 kilometers of new main drains, and construction of 22,950 hectares of farm drain systems. The proposed work is based on a 1 square kilometer module, having 1 kilometer of main drains, and 3.1 kilometers of farm drains spaced at 65 meters. The typical module is as shown in Figure 2 of the Appendix. This module is applied over the entire Marja Area to determine total work requirements.

Individual drainage work plans will be developed during the next two years for the West Marja and Karise Sadi sections. This work cannot be started sooner because of the lack of available information at the present time.

3. Upper Boghra Area

The Upper Boghra Area is shown on Map 4 of the Appendix, and includes 13,850 hectares of land. Of this land, approximately 8,670 hectares is irrigated cropland. The settled land follows a uniform pattern and should create no problems in the development of a drainage system. The private lands do not follow a uniform ownership pattern and may create problems in installing open drains. The irrigation system is not well planned and laid out in this area, and could be a constraint to installation of an adequate drainage system. Some modification of the irrigation system may be necessary. There is an adequate quantity of water available to irrigate all of the land included in this plan.

There are 14 kilometers of existing main drains and no farm drains in the area. The existing main drains are inadequate, especially on the lower end where the drains are far too shallow. The proposed work in the Upper Boghra Area includes rehabilitation of 14 kilometers of existing main drains, construction of 166 kilometers of new main drains and submain drains, and construction of 11,990 hectares of farm drain systems.

The proposed work is based on a 1 square kilometer module, having 0.5 kilometer of main drain, 1 kilometer of submain drain, and 4.75 kilometers of farm drains spaced at 200 meters. The typical module is as shown in Figure 3 of the Appendix. This module is applied over the entire Upper Boghra Area to determine total work requirements. A drainage work plan will be developed during the next two years for this area. This is necessary because of the lack of available information at the present time.

Approximately 10% of the land in this area is very uneven, and requires land smoothing for effective irrigation and cultivation. Little data exists to support this, and will be collected to identify more accurately the needs for this type of work.

4. Shamalan Area

The Shamalan Area is shown on Maps Nos. 5 and 6 of the Appendix, and includes 27,700 hectares of land. Of this land, approximately 19,200 hectares is irrigated cropland.

The ownership pattern on the settled land is uniform, and will not create any problems in the development of a drainage system. The pattern of

ownership on the private land is very irregular, and development of a drainage system, which is compatible to the ownership pattern will be very difficult. In the settled areas, the irrigation system is often quite irregular. The latter system may also be a constraint to installation of open drains. If open drains are installed, some modification of the irrigation systems may be required.

Another alternative would be to install closed drain system in these problem areas. Although it is understood that the land owners in the area have little confidence in closed drains, it is recommended that some small sections of closed tile drains be installed on a demonstration bases.

It is estimated that about 10% of the land requires smoothing.

The irrigation water available to the Shamalan Area at this time is not adequate to irrigate all of the land included in this plan. There is presently enough water available to irrigate approximately 18,750 hectares of land. Several proposals are being considered by HAVA to provide additional water to the area, including additional diversions from the river, pumping systems, and re-use of drainage waste water. For these reasons, it is assumed that all of the area included in the plan can, and will be irrigated in the future.

There are 98 kilometers of existing main drains in the area. All of these drains will require some improvement during the project life. Most of the drains are too shallow and lack the necessary capacity. Most of the structures passing under other drains or the Shamalan Canal are too high and will need to be rebuilt. The exact number of structures in this category is not known at this time. This type of information will be collected at the time rehabilitation of an existing drain is planned and designed.

There are 6 kilometers of main drain rehabilitation and 2 hectares of farm drains presently under construction in the area.

The proposed work in the Shamalan Area includes rehabilitation of 98 kilometers of existing drains, construction of 300 kilometers of new main and submain drains, and construction of 26,500 hectares of farm drain systems. The proposed work is based on the same module as used for the Upper Boghra Area, and is shown in Figure 3 of the Appendix. This module is applied over the entire Shamalan Area to determine work requirements.

Drainage work plans need to be developed in the near future of the project in the area near Drain K, and the Zarist Drain. This will require collection and analysis of additional field data for planning and design of a drainage system.

5. Darweshan Area

The Darweshan Area is shown on Maps Nos. 7, 8, and 9 of the Appendix, and includes 29,000 hectares of land. Of this land, approximately 16,600 hectares is irrigated cropland. As in the Shamalan Area, land ownership patterns and irrigation systems are uniform on settled land, and will cause no problems in developing drainage; however, on private lands, this is not true, and development of a drainage system which is compatible may be difficult. Some modification of irrigation systems may be required if open drains are to be installed. As in the Shamalan Area, closed tile drains may be more adaptable to the existing conditions. Some land smoothing may also be required in this area, with 10% being a rough estimate of the land requiring smoothing.

The irrigation water available to the area at this time is not adequate to irrigate all of the land included in this plan. There is presently enough water available to irrigate approximately 25,000 hectares of land. As in the Shamalan Area, there are feasible proposals for obtaining additional water, and therefore, this land is included in the drainage plan. This will, however, affect the priority on which drainage is applied to the land.

There are 130 kilometers of existing main drain, and 17 kilometers of existing farm drains in the area, all of which require rehabilitation. Approximately 15 kilometers of the existing main drains are in good condition, with the rest requiring rehabilitation. Most structures under the Darweshan Canal will have to be lowered to provide adequate outlet drains. About 50 hectares of farm drains will be completed in Phase I.

The proposed work in the Darweshan Area includes 115 kilometers of main drain to be rehabilitated, and 280 kilometers to be constructed. In addition, 1,700 hectares of farm drains will need to be rehabilitated, and 25,500 hectares of farm drains to be constructed. The proposed work is based on the same module as used for the Upper Boghra and Shamalan Areas, and is shown in Figure 3 of the Appendix. This module is applied over the entire Darweshan Area to determine work requirements.

ANNEX C

ESTIMATED
LAND STATUS AND DRAINAGE REQUIREMENTS
MASTER DRAINAGE PLAN

TABLE 1
(Hectares)

| Area Name | (1) Present Cropland (includes 7) | (2) Road, Canals & Homes, etc | (3) Area to be settled | (4) Total Area to be Drained 1 + 2 + 3 | (5) Waste Area | (6) Total Area 4 + 5 | (7) Ares Adequately Drained | (8) Remaining Area to be Drained 4 - 7 |
|---|---|---|---|---|---|---|---|---|
| Nad-i-Ali | 9,930 | 1,700 | 3,070 | 14,700 | 1,800 | 16,500 | 200 | 14,500 |
| Marja | 12,800 | 2,500 | 7,700 | 23,000 | 3,000 | 26,000 | 50 | 22,950 |
| Upper Boghra | 8,670 | 624 | 2,696 | 11,990 | 1,860 | 13,850 | - | 11,990 |
| Shamalan | 19,200 | 1,700 | 5,800 | 26,700 | 1,000 | 27,700 | 200 | 26,500 |
| Darweshan | 16,600 | 2,000 | 8,700 | 27,300 | 1,700 | 29,000 | 50 | 27,250 |
| Totals | 67,200 | 8,800 | 27,690 | 103,690 | 9,360 | 113,050 | 500 | 103,190 |

ANNEX C

MASTER DRAINAGE PLAN

HELMAND VALLEY DRAINAGE PROJECT

TABLE 2

PROPOSED WORK

| | Area to be drained ha. | *Length of Main Drains Km | *Volume of Main Drain Excavation 1000 $m^3$ | **Length of Farm Drains Km | ** Volume of Farm Drain Excavation 1000 $m^3$ | Land Smoothing ha. |
|---|---|---|---|---|---|---|
| Nad-i-Ali | 14,500 | 207 | 1,307 | 2,635 | 4,783 | - |
| Marja | 22,950 | 288 | 1,899 | 4,152 | 7,043 | - |
| Upper Boghra | 11,990 | 180 | 1,523 | 570 | 2,622 | 1,200 |
| Shamalan | 26,500 | 398 | 2,708 | 1,259 | 5,791 | 2,700 |
| Darweshan | 27,250 | 410 | 2,727 | 1,297 | 5,740 | 2,700 |
| Total | 103,190 | 1,483 | 10,164 | 9,913 | 25,979 | 6,600 |

## C. Planning Consideration

Various factors will affect the planning and implementation of this project. Of major concern are the priorities upon which the completion of work is based. As the objective of the project is to increase agricultural production with the installation of drainage systems, the primary need is to install complete on-farm drain systems. Factors such as crop production, length of time under cultivation, land classification, soil texture, required drain spacing, economic condition of the land owner, availability of irrigation water, and drain outlet conditions, must be considered in determining which pieces of land receive priority in drainage planning. The most limiting factor during the early years of work will be the availability of outlets for farm drainage. At the present time, few areas in the project have adequate outlet drains. Initial farm drain installation therefore, must be concentrated in these areas. Planning for additional outlets will depend on what areas show up to be of greatest priority when applying all relevant criteria.

Some existing conditions in the Project Area will affect planning and priorities. Drain crossings under the Shamalan and Darweshan canals will have to be given priority. Irrigation water is shut-off for about 40 days each year, during the winter. This type of work should be scheduled, when possible, so that construction can be completed during these periods.

Seepage from existing canals is contributing to the waterlogging and salinization problem. These same canals are acting as barriers to natural flow of surface and subsurface drainage water. In these areas, little can be accomplished, until interceptor drains are installed along the canals. This should be completed prior to construction of farm drains in a given area.

As previously mentioned, drainage on some lands will be impractical or impossible, until some land smoothing is done. This then, would be a factor in the planning and design of drain systems in these areas.

Availability of data, especially soils data, will be important in the planning process. Priority should then be given to the collection of required data as early as possible in the program. The subject of existing data and required data is discussed in the next section of this plan. The best method of obtaining much of this data, the soil survey, will also be discussed.

Economic, social and political consideration will also be a large factor in the planning process. The economic and social status of the people in an area must be considered in setting priorities for work. Assistance to the poorer people should be a major consideration. In addition, some



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political considerations such as spreading work over larger areas will affect priorities.

The Government of Afghanistan (GOA) has been settling landless farmers and nomadic tribes on land in the Project Area since development of the irrigation systems began. Recently, many of the settled people received only marginal land, on which they can do little more than subsist. At the same time, salinization and waterlogging problems are forcing these and other settlers to abandon their land. The need to provide drainage, so as to give at least minimal income to these farmers is imperative. In setting priorities, one of the biggest problems will be the decision on how much help to give to these marginal lands. The GOA considers the Helmand Valley to be one of its major agricultural areas, and therefore, must also consider the need to get a maximum improvement from the drainage program in a minimum of time. This need may not always be consistent with working on marginal lands.

From the political viewpoint, the GOA must also consider the need to continue settlement of remaining lands in the Project Area. As these lands will need drainage, this could also create a conflict in priorities.

As previously mentioned, the GOA is faced with the need to do work in many areas. With the landowners continually requesting help, it is very difficult to concentrate work in any one section. This consideration will have an affect on the priority of work in a given area, and on how much can be done in a given area at one time.

With the development of a drainage system, a secondary benefit will be derived. A road and farm access system, which is presently inadequate for transport of agricultural production, will be developed. The spoil banks along the drains become roads. With this, farmers will be able to get equipment to the field, and crops to the market easier and cheaper. Although not affecting the priority of work, this does have an economic and social affect on the land owners.

D. Data Collection Methodology

The design and layout of a proper drainage system is dependent on several factors including soil characteristics, irrigation system layout, water table depth, topography of the land and land ownership boundaries. In analyzing the various factors, considerable field data is required, including soil analysis and classification, hydraulic conductivity of soils, water table depth, and field survey data. All data must be collected and analyzed prior to design in any given area. At present, data is collected for use on a job by job basis. This method is adequate when the workload is

small, but could become a limiting factor as the workload increases. Lack of adequate data is also a limiting factor for long range planning. As work proceeds, data will of necessity continue to be assembled on a priority job by job basis, but concurrently, a program will begin to assemble soils data on a project wide basis which can be used for long range planning purposes. Most of the necessary information can be assembled as part of a soil survey of the Project Area. Where possible, previously assembled information will be used. The following is a summary of previous collections of information and a description of the soils survey that will be developed.

E. Available Soils Data and Soil Survey Methodology

A soil survey of 86,932 hectares was made by Morrison Knudsen Afghanistan (MKA), between 1952 and 1958. The narrative information was published as the Soil and Water Resources of Southwest Afghanistan, by the International Engineering Company (IECO) in 1959. The soil maps were not published.

Photographic copies of the original aerial photograph field sheets are more useful than line drawings, because they show more cultural features and soil differences reflected by the tone and texture of the photographic image. Arrangements have been made to obtain copies of these field sheets.

The MKA soil survey was designed primarily to collect information with which to identify and classify the degrees of hazard expected when the land was used for the production of the usual agricultural field crops of corn, wheat, cotton, etc. The land capability classification, therefore, was the only interpretation made from the soil survey. Other maps were prepared showing information such as depth to water table, depth to drainage barrier, depth to conglomerate, permeability and hydraulic conductivity. All this information was gathered separately for each map. These maps were not published, but copies are available in HAVA files.

Copies of these maps are not available for all areas within the Project Area. 13,850 hectares of Upper Boghra area had not been included in any previous project, and therefore, no information is available for it.

Drainability maps were prepared for only parts of Nad-i-Ali and Marja areas. No drainability maps are available for the other areas. All information collected for the separate maps remains to be related to the soils map which is to be developed.

The Bureau of Reclamation prepared a land classification map for the Shamalan Area. It is published in Appendix B of the USBR Shamalan Unit Feasibility Report, dated September 1968. This map was concerned

primarily with the salinity classes of the land. Hydrologic studies also were made and the data published in Appendix B of the same report. The data which is available at this time will be used as a guide for collection of additional on-site hydraulic conductivity information needed for drainage design work and soil classification.

The state of the art of Soil Survey work has undergone significant evolution in the years since the MKA study was done. Soil surveys now use the concept of soil series, rather than soils coding as used in the 1950's. Each soil series has a particular set of characteristics and ranges of properties. The properties include all those mentioned before in this section plus many more. Therefore, one map, the soil map, is the base for all the interpretations. All the areas on the soil map identified by the same symbol have properties within a specified range. Consequently, the soils behave similarly when used for a specific purpose. This fact of replicability is a great help to planning. Once the soils have been identified in the field, the planner knows how that particular soil will behave in different areas, without having to make additional exhaustive field and laboratory test. Testing, of course, is necessary to characterize each soil series as they are established. However, the amount of testing is far less than that necessary to characterize all of the combinations of coded symbols, overlain by the other kinds of data, as has been previously required.

Experience in the United States soil survey program has demonstrated it is much more efficient to remap an area than revise the old mapping, when substantial differences exist in the old and new concept of the kind of information needed for characterization. The reliability of the information is better and more consistent, when areas are remapped than when old maps are revised extensively.

The only basic information needed for planning and design decisions which the soil survey will not develop is the required field surveys; such as topography, ownership boundaries, irrigation system layout, and profile and cross-section surveys. Some information, such as cross-section and profile surveys will continue to be collected on a job by job basis, as this is the only feasible method of collecting this type of data. It would have little use for any purpose other than design of the individual job. The remainder of the information, especially ownership boundaries and irrigation system layout must be developed and assembled for long term use. Most of the information is presently available, the only problem being to prepare definitive maps to facilitate use of the data. Collection of this type of information will receive early attention.

F. Design Methodology

Location and design of adequate main drain outlets is the first step in developing a drainage system. In design of the main drains, consideration must be given to the total area to be drained, the proper depth for farm drain outlet, hydraulic characteristics of the drain channel, and stability of the drain based on soil characteristics. In setting priorities for main drain design, the relative priority on which farm drain work will be completed should be known. In this manner, it is possible to get main drain outlets into areas of highest priority for farm drains early in the program. Design and layout of farm drain systems must consider required drain depth, drain spacing, and drain configuration. In determining depth, spacing and arrangement of drains, the following items must be considered:

1. A drainage coefficient must be developed for the area. This coefficient defines the rate of removal of excess water. The drainage coefficient is affected by the source of the excess water, the rate of flow of the excess water through the soils, and the tolerance of the crops to the excess water.

2. An acceptable hydraulic conductivity value must be determined for the soils in the section being designed. The hydraulic conductivity defines the rates of movement of the water through the soil. As soils survey maps are developed, acceptable hydraulic conductivity values can be determined for each major soil series. This should make the determination of this value much more accurate and easier.

3. The existing water table depth, the required drawdown depth for good crop production, and the depth to the drainage barrier must be determined. The existing water table depth and the depth of the drainage barrier can be found at the same time hydraulic conductivity tests are made. This information will all be included in the proposed soil survey. The required drawdown depth is dependent on the type of crops being grown and the soils in the area. In the Project Area, a minimum drawdown of 1 meter is needed.

4. The required drain spacing must be calculated. This calculation is made using either the ellipse or modified ellipse equation as discussed in Section 16 of the SCS National Engineering Handbook.

5. A pattern for the drainage system must be determined, which will minimize interference with the existing irrigation system, and which will fit the land ownership pattern where possible.

Some preliminary criteria has been developed for design of drainage systems in the Project Area. It was developed using standard SCS drainage

design procedures as outlined in Section 16 of the National Engineering Handbook. Although some refinement may be required as a result of additional field experience, the criteria has been found to be accurate in the work performed to date. As more data is collected, refinement will be made if needed. The criteria was developed by Gene Vittetoe, SCS Drainage Engineer, and can be found in detail in his Temporary Duty Report of September 12, 1975. A summary of the important criteria follows:

a. Drainage Coefficient = 0.01 inch/hour (0.0254 cm/hr).

b. Determination of drain depth and spacing is to be calculated using the ellipse equation where the depth of the barrier is less than twice the depth of the drain, or by the modified ellipse equation where the barrier is deeper than twice the depth of the drain.

c. The required side slops for main drains are:

| | |
|---|---|
| Less than 1.5 M depth | 1:1 |
| 1.5 M to 2.75 M | $1\frac{1}{4}$:1 |
| Greater than 2.75 M | $1\frac{1}{2}$:1 |

d. The maximum allowable velocity is 3 feet per second.

e. The minimum hydraulic roughness coefficient (Manning's "n") is 0.030.

## VI. CONSTRAINTS

### A. Constraints to Design and Construction

The rate at which the design and construction of the drainage system can be completed is dependent on limitations in manpower and equipment. Manpower is required for data collection, planning, design, management, construction inspection, machine operation and maintenance; and hand dug farm drain construction. Expertise is required in professional skill such as engineering, soil science, and construction management; and in subprofessional skills such as surveying, data collection, construction inspection, labor supervision, laboratory analysis, and machine operation and maintenance.

The existing HAVA staff has some expertise in all of the required skills. In order to complete the proposed work in a reasonable time frame, the number and quality of the staff will need to increase. It is believed that an optimum output can be reached within three to four years. To achieve this, additional staff will have to be recruited and trained. Although a training program will help solve the problem, the GOA must also assign competent professional people to the implementation of this plan. Recruitment of such people will be difficult. Recruitment of subprofessional people on the other hand, is not expected to present too great a problem, but an intensive training program for these people will be needed. A plan for development of training and recruitment needs must therefore be completed and instituted promptly.

One other area which requires manpower is the excavation of farm drains. As particular skills are not necessary, only recruitment of large numbers of workers is required. Available system for recruitment and management of the workers has not yet been proven, however, HAVA is entering into small group labor contracts to augment the existing labor force. Construction machine operators are available for machines on hand. As the project expands, the expertise for operation and maintenance must also be expanded through training. This training should, where possible, be provided by the suppliers and be included in the contracts for the purchase of new machinery.

Equipment for data collection and construction is another major constraint. In order to improve existing available data, equipment for soil survey, land surveys and map compilation will be necessary. Although some of the necessary items have been ordered, it is important to identify additional needs and obtain them as soon as possible.

Construction equipment is a serious constraint to the installation of the project. Equipment presently being used by the Helmand Construction

Corporation is very old and is in very poor condition. Although some engines and parts have been ordered to improve the equipment, it is only an interim solution. Even with the new parts, it can be expected that the output will remain very low. It is important that equipment required to perform future work be identified promptly and that orders be placed as soon as possible after funding is made available. It is expected that as much as two years will be required to get new equipment on the job, and therefore, no major increase in machine production should be expected until after the second year of implementation.

A related problem and a constraint to progress in the project is the administrative procedures of HAVA. The process required to buy new equipment and supplies or even to get existing supplies out of the warehouse is very cumbersome. Although money is budgeted for certain purchases, there seems to be no easy way to make the purchases. A source of supply for various items and a purchasing procedure must be developed. In addition, the system for obtaining existing supplies from the warehouse must be simplified so that supplies are available for use when needed.

B. Constraints to Maximum Benefits

Although not directly affecting the design and construction of the drainage systems, there are several factors which will affect the benefits received from installation of drains. As previously stated, drainage is only one of several items which need to be improved in order to obtain maximum crop production. Improvements in operation and maintenance practices, water management and agricultural management must be a part of a long term program to increase crop production.

1. Operation and Maintenance

In order to obtain proper benefits from the drainage and irrigation systems, proper operation and maintenance is a must. Irrigation systems in the Project Area, with the exception of small water control structures, have been reasonably well maintained, but little or no maintenance has been done on the drainage system. Lack of an adequate quantity of equipment to do the work is one reason. Another major reason though is a lack of understanding concerning drainage systems on the part of both the farmers and the government officials. It is important that maintenance be carried out on both the existing and new drains within the Project Area. Maintenance is required to prevent reduction in capacity and depth of drains. The end result of poor maintenance will be inadequate drainage and poor leaching of salts from the soil. In order to improve the maintenance program, machinery must be purchased and assigned to this job and an education



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program must be started to teach the people the reason for drainage and the need for maintenance. The farmer must realize that he has responsibility in maintenance of drainage systems just as he has in maintenance of irrigation systems.

2. Water Management and Availability of Water

Proper irrigation water management will result in improved crop yields, more efficient use of drain systems, and an increase in water availability for water short areas. This is an important need if maximum benefits are to be obtained in the Project Area. To obtain maximum crop yields, it is important to apply the correct amount of water for use by the crops, as well as that water required to keep the salts leached out of the soils. Additional water above these requirements will only harm the crop and place more stress on the drainage system. In addition, the water that is saved through good water management can be used in areas which are presently short of water. All of the areas which are being included in this plan can be made productive, only if adequate water supply is made available. The present water use efficiency is estimated to be less than 50%.

Additional use of water in the Helmand River through new diversions or pumping systems will also help solve this problem. These proposals are presently being considered by HAVA. Additional storage is also being added to the Kajakai Reservoir and will increase water availability for irrigation.

It may prove feasible to obtain additional water by pumping from ground water sources in the future, when development of a dependable electrical power supply is completed. With the many options available, water can be obtained to irrigate all of the Project Area.

3. Agricultural Management

Present agricultural practices are a serious constraint to realization of maximum benefits. Agricultural management practices have improved in the past few years, but are still quite traditional in many ways. Problems in this respect include cropping practices and farm management practices.

Crop diversification, improved varieties and development of more intensive agriculture through double cropping, and other modern practices can bring about significant increases in productivity.

Fertilizer use must be increased and applied more wisely. Methods of application need improvement. In the use of fertilizer, it becomes



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necessary to show the farmers that it is worth the expense. Application of fertilizer must be based on the crop to be grown and the lack of available plant nutrients in the soil. Development of methodology and expertise in this is of prime importance. The above is also true in the use of insecticides.

Mechanization of farm practices will no doubt increase. Presently, a large amount of work is done by hand. Some tractors and equipment are used. With more farm mechanization, planting, harvesting, etc., could be completed in a more timely manner and more land put under production. Double cropping and other improved management practices would then be easier to introduce.

Land smoothing and other practices need to be considered to make better use of available land and improve crop yields.

Although many problems exist in the area of agricultural management, it is likely that improvements and modernization will come over a period of years as the level of development in the country increases. As these changes occur, associated changes in land use and settlement can be expected.

In conclusion, as each of the constraints discussed above are reduced or eliminated, agricultural production will increase. With the installation of a drainage system and the elimination of all the constraints, maximum production can be obtained.

## VII. PROJECT COST

Projection of project costs for a long term project such as this is very difficult. Estimated quantities are based on rather general modules with considerable variation likely. Costs are based on prior work done in the Project Area. It is, however, difficult to predict what the trend on costs will be over a period of years. Hand labor excavation costs can vary considerably with changes in the economy and may be much different in the future. Even the projection of labor availability may need to be re-evaluated as conditions change in the area in future years. With the many constraints in mind, an effort has been made to cost the project for all projected work.

Cost of farm drain excavation is assumed to be Afs. 50 per cubic meter of excavation. Costs are based on recent experience on similar work in the area. Some studies have been carried out in the Project Area on hand excavation capability. Work has been done on different sizes of drains and in different soils. In addition, work has been done using combinations of machinery and hand excavation. Although the cost varies for the different sizes and methods of farm drain excavation, a cost for long range planning of Afs. 50 per cubic meter seems reasonable for use. The cost of pickup drains is based on the same tests and assumes hand excavation or a combination of hand excavation and machinery will be used. A cost of Afs. 50 per cubic meter will be used for long range planning.

On submain drains the present rate for common excavation plus spoil spreading is between Afs. 75 and 85 per cubic meter. An average of Afs. 80 per cubic meter will be used.

Excavation of main drains varies considerably. The materials vary from easily excavated soil to a very hard conglomerate requiring blasting. Costs on work to date in the area have ranged from Afs. 35 per cubic meter to Afs. 450 per cubic meter. An average cost for the work has been estimated and applied to the entire Project Area. A cost of Afs. 100 per cubic meter will be used for all main drain excavation based on Phase I experience. Costs of structures are based on percentages of excavation cost for various type drains in the Project Area. This cost ranges from 5% for pickup drains to 25% for submain and main drains.

No land smoothing work has been completed in the project recently. The cost factor used is only an estimate as is the expected volume of earth to be moved. It is estimated that 75,000 cubic meters of earth will be moved per square kilometer and that the cost of moving the earth is Afs. 30 per cubic meters. The cost per square kilometer then is Afs. 225,000.00.



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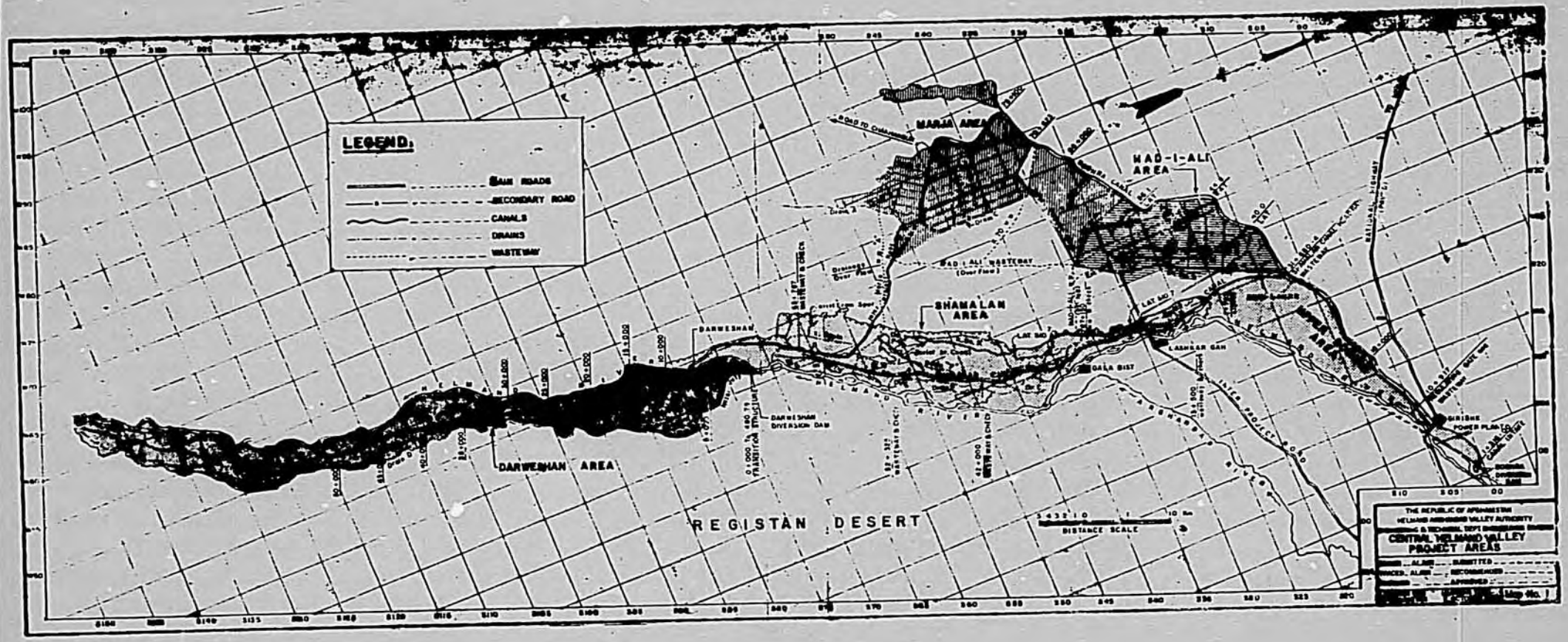
Using these values for excavation, structures and land smoothing, the total project cost is estimated to be Afs. 2,509,810,000.00. If a 10% contingency of Afs. 250,981,000.00 is added, the project cost is Afs. 2,760,791,000.00. A summary of cost by area is shown in Table 3, by aggregating costs as calculated from the modules for each area:

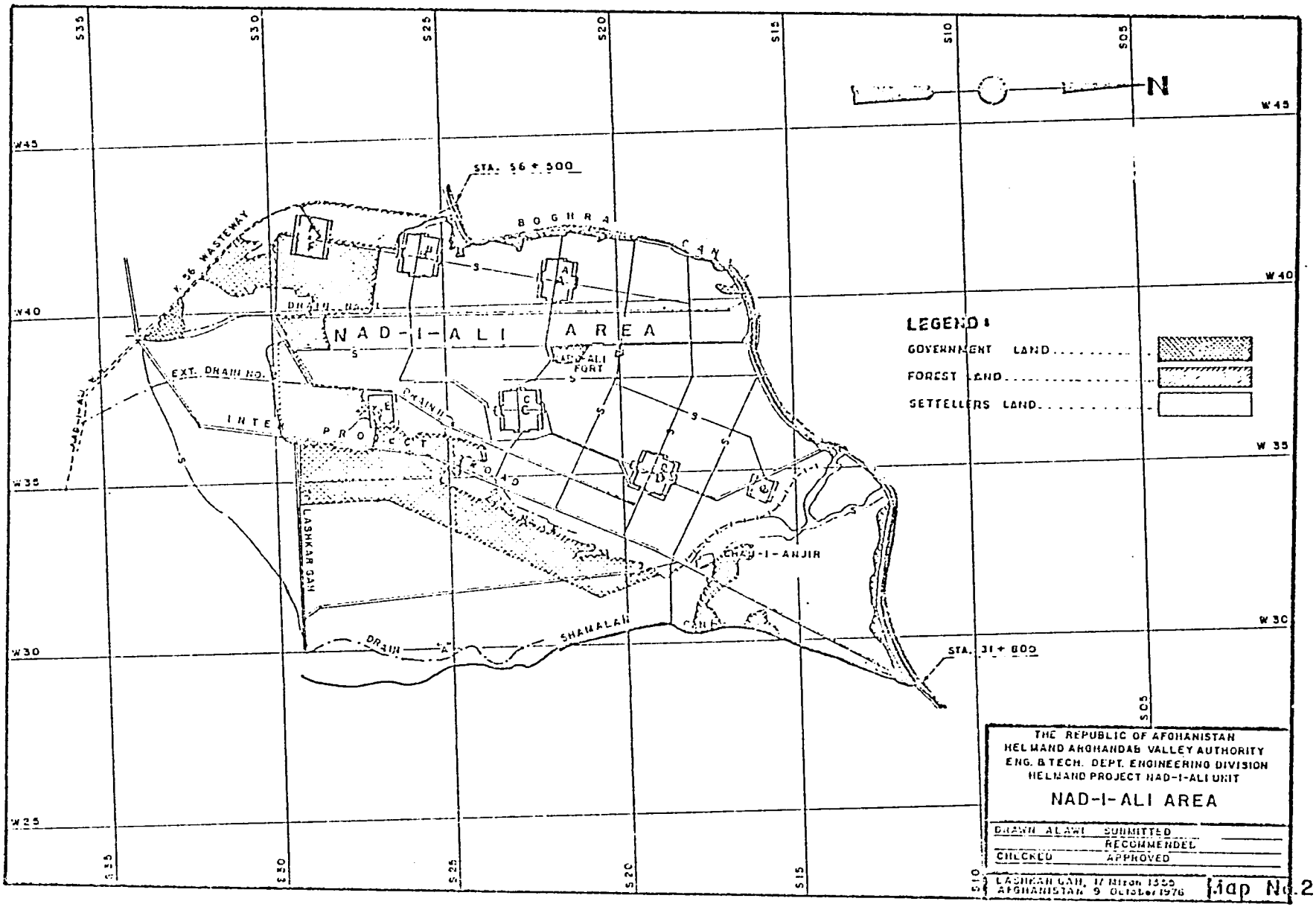
MASTER DRAINAGE PLAN
HELMAND VALLEY DRAINAGE PROJECT

Table 3

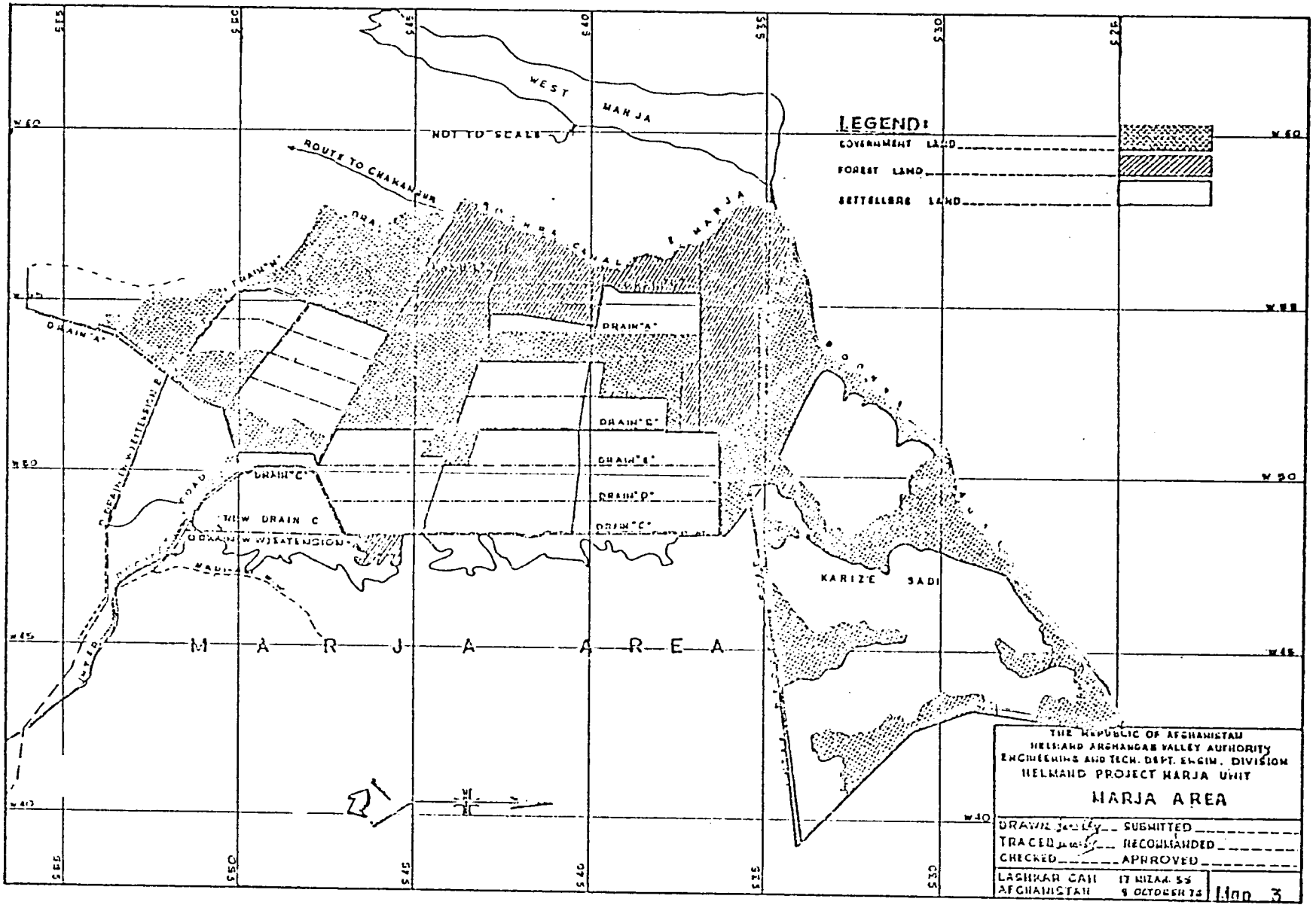
Project Cost (000Afs)

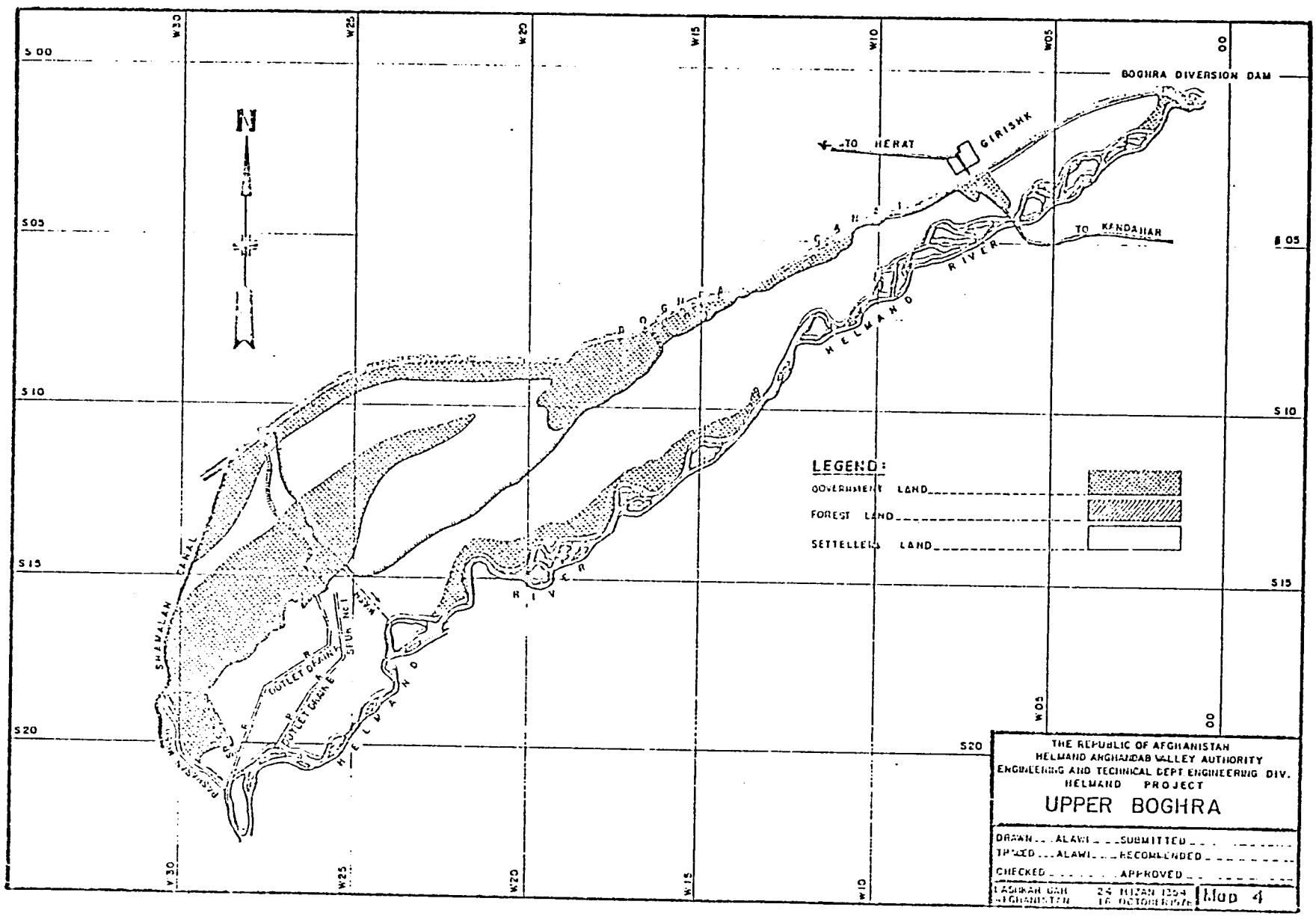
| | Nad-i-Ali | Marja | Upper Boghra | Shamalan | Darweshan | TOTAL |
|---|---|---|---|---|---|---|
| FARM DRAINS | | | | | | |
| Vol of Excavation $M^3$(000) | 2,146 | 3,381 | 2,622 | 5,791 | 5,740 | |
| Excavation cost @50 Afs/$M^3$ | 107,300 | 169,050 | 131,100 | 289,550 | 287,000 | 984,000 |
| Structure Cost @ 5% | - | - | 6,555 | 14,477 | 14,350 | 35,382 |
| PICKUP DRAINS | | | | | | |
| Vol of Excavation $M^3$(000) | 2,637 | 3,662 | - | - | - | |
| Exc. cost at 50 Afs/$M^3$ | 131,850 | 183,100 | - | - | - | 314,950 |
| Structure cost @ 5% | 6,592.5 | 9,155 | - | - | - | 15,747.5 |
| SUB-MAIN DRAINS | | | | | | |
| Vol of Excavation $M^3$(000) | 667 | 429 | 744 | 1,643 | 1,535 | |
| Exc. cost @50 Afs/$M^3$ | 53,360 | 34,320 | 59,520 | 131,440 | 122,800 | 401,440 |
| Structure cost @ 25% | 13,340 | 8,580 | 14,880 | 32,860 | 30,700 | 100,360 |
| MAIN DRAINS | | | | | | |
| Vol of Excavation $M^3$(000) | 640 | 1,469 | 779 | 1,065 | 1,192 | |
| Exc. cost @100 Afs/$M^3$ | 64,000 | 146,900 | 77,900 | 106,500 | 119,200 | 514,500 |
| Structure cost @ 25% | 16,000 | 36,725 | 19,475 | 26,625 | 29,800 | 128,625 |
| LAND SMOOTHING | | | | | | |
| Area in $Km^2$ | - | - | 12 | 26.5 | 27.3 | |
| Cost @ 225,000 Afs | - | - | 2,700 | 5,962.5 | 6,142.5 | 14,805 |
| TOTAL COST | 392,442.5 | 587,830 | 312,130 | 607,415 | 609,992.5 | 2,509,810 |

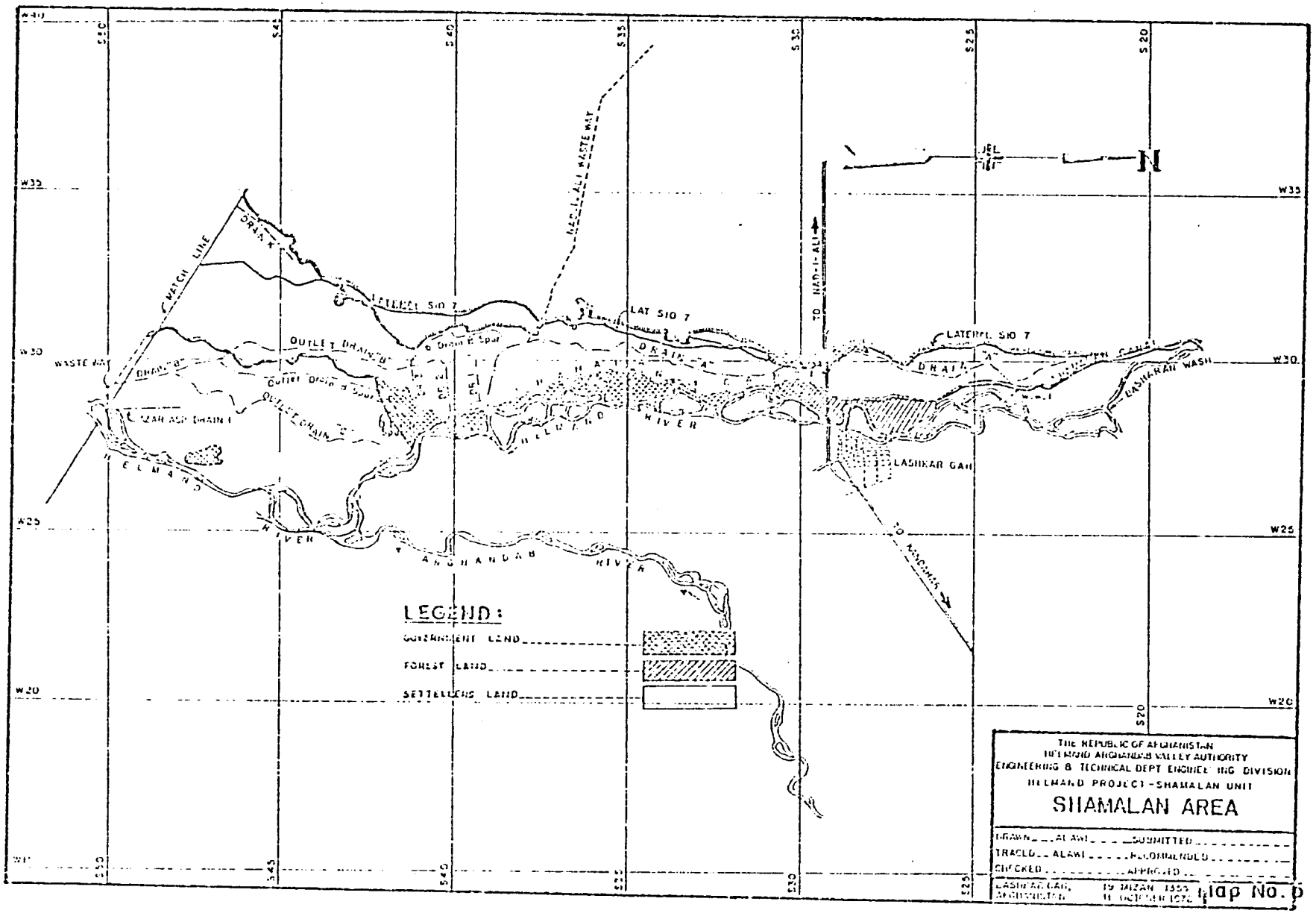

LEGEND:
MAIN ROADS
SECONDARY ROAD
CANALS
DRAINS
WASTEWAY
MARJA AREA
HAD-I-ALI AREA
SHAMALAN AREA
DARWESHAN AREA
DARWESHAN
DARWESHAN DIVERSION DAM
REGISTAN DESERT
DISTANCE SCALE
CENTRAL HELMAND VALLEY PROJECT AREAS

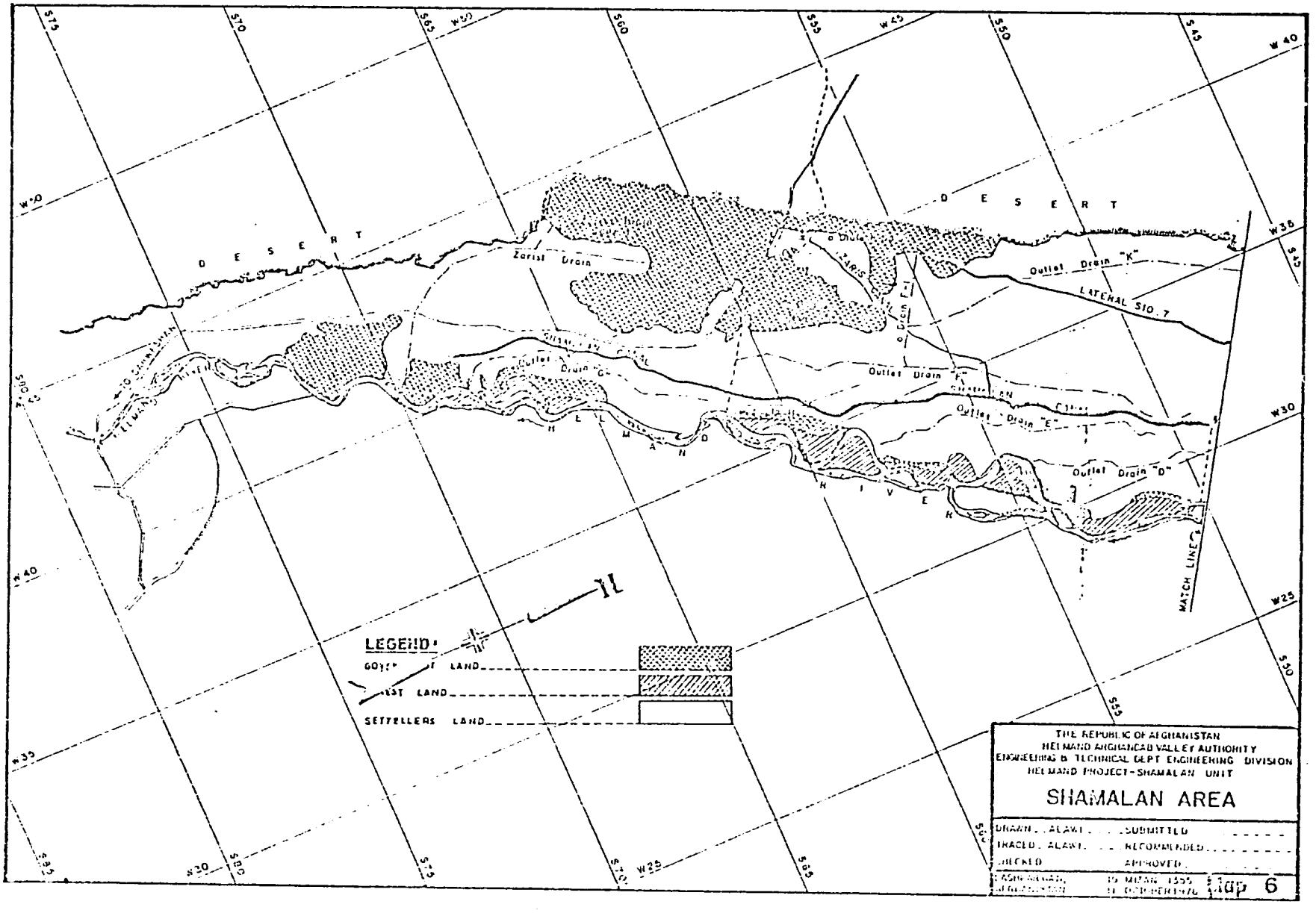

N
STA. 56 + 500
BOGHRA CANAL
X 56 WASTEWAY
DRAIN NO. 1
NAD-I-ALI AREA
NAD-I-ALI FORT
EXT. DRAIN NO.
INTER PROJECT
DRAIN
ROAD
LASHKAR GAH
CHAH-I-ANJIR
SHAMALAH
DRAIN "A"
STA. 31 + 800
LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTELLERS LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENG. & TECH. DEPT. ENGINEERING DIVISION
HELMAND PROJECT NAD-I-ALI UNIT
NAD-I-ALI AREA
DRAWN ALAWI
SUBMITTED
RECOMMENDED
CHECKED
APPROVED
LASHKAR GAH, 17 Mizan 1355
AFGHANISTAN 9 October 1976

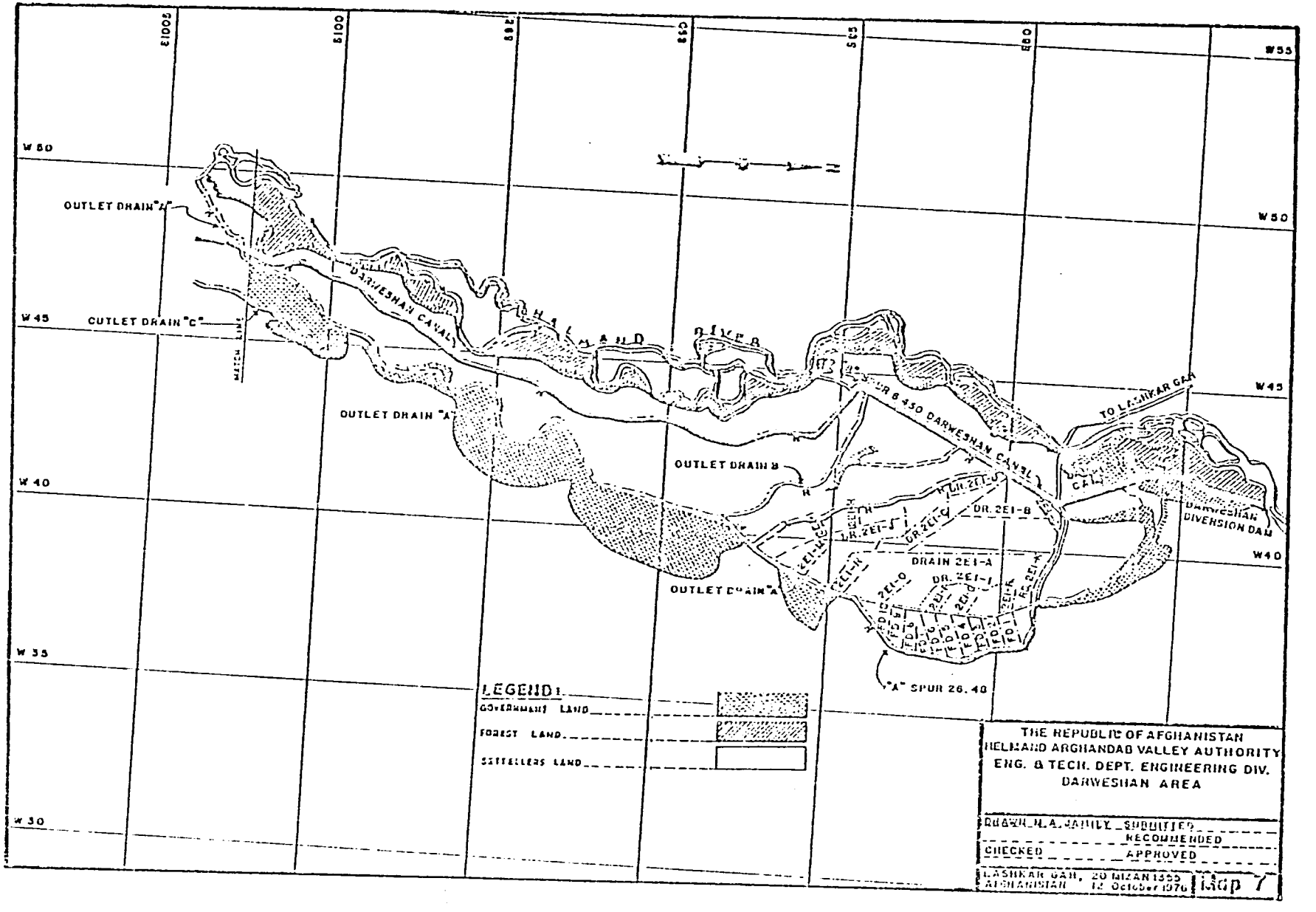
Map No. 2

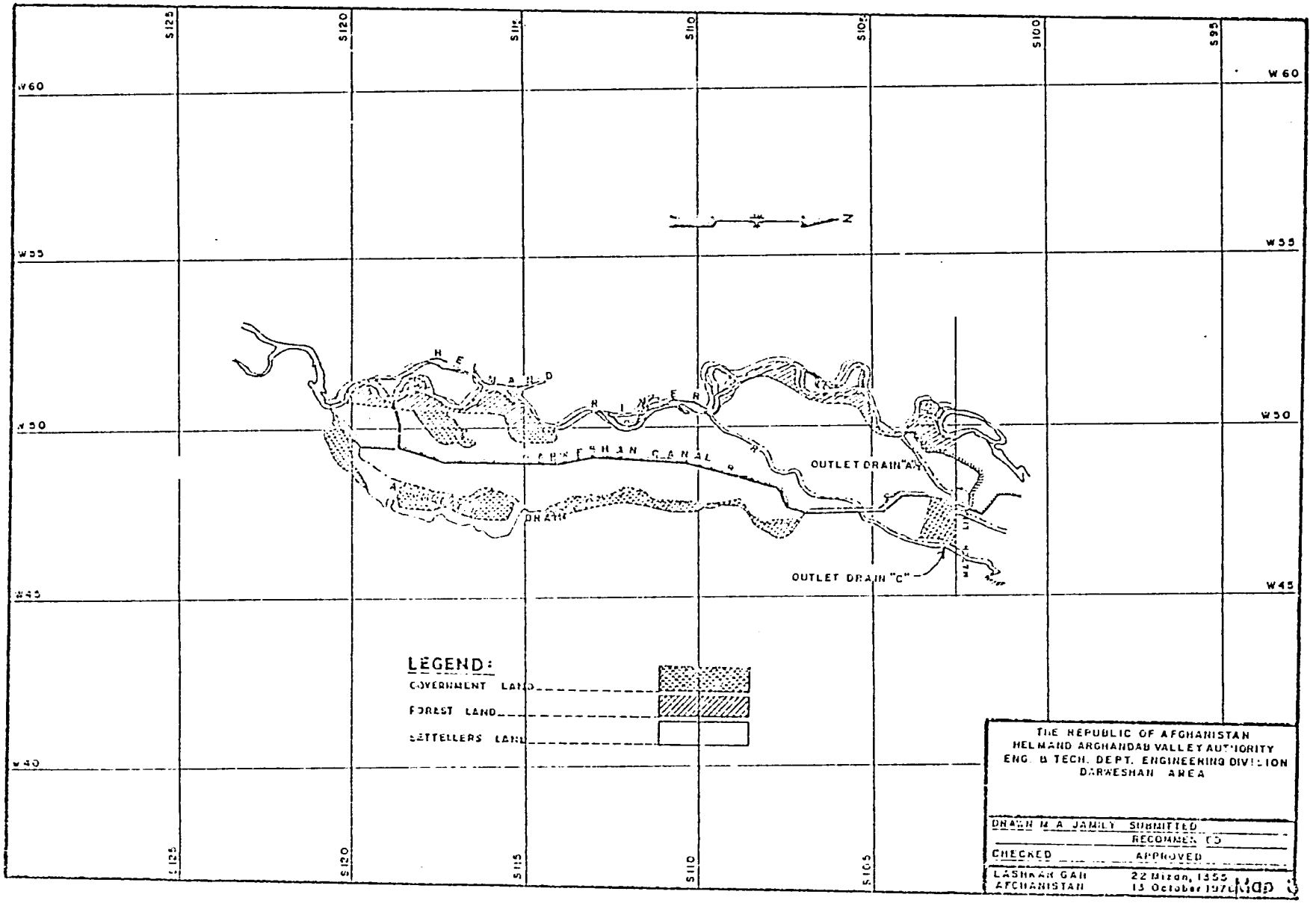

LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTELLERS LAND
NOT TO SCALE
WEST HARJA
ROUTE TO CHAKANSUR
DRAIN "A"
DRAIN "B"
DRAIN "C"
DRAIN "D"
DRAIN "E"
NEW DRAIN C
DRAIN W EXTENSION
KARIZE SADI
M A R J A A R E A
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENGINEERING AND TECH. DEPT. ENGIN. DIVISION
HELMAND PROJECT HARJA UNIT
HARJA AREA
DRAWN
TRACED
CHECKED
SUBMITTED
RECOMMANDED
APPROVED
LASHKAR GAH
AFGHANISTAN
17 MIZAN 55
9 OCTOBER 76
Map 3

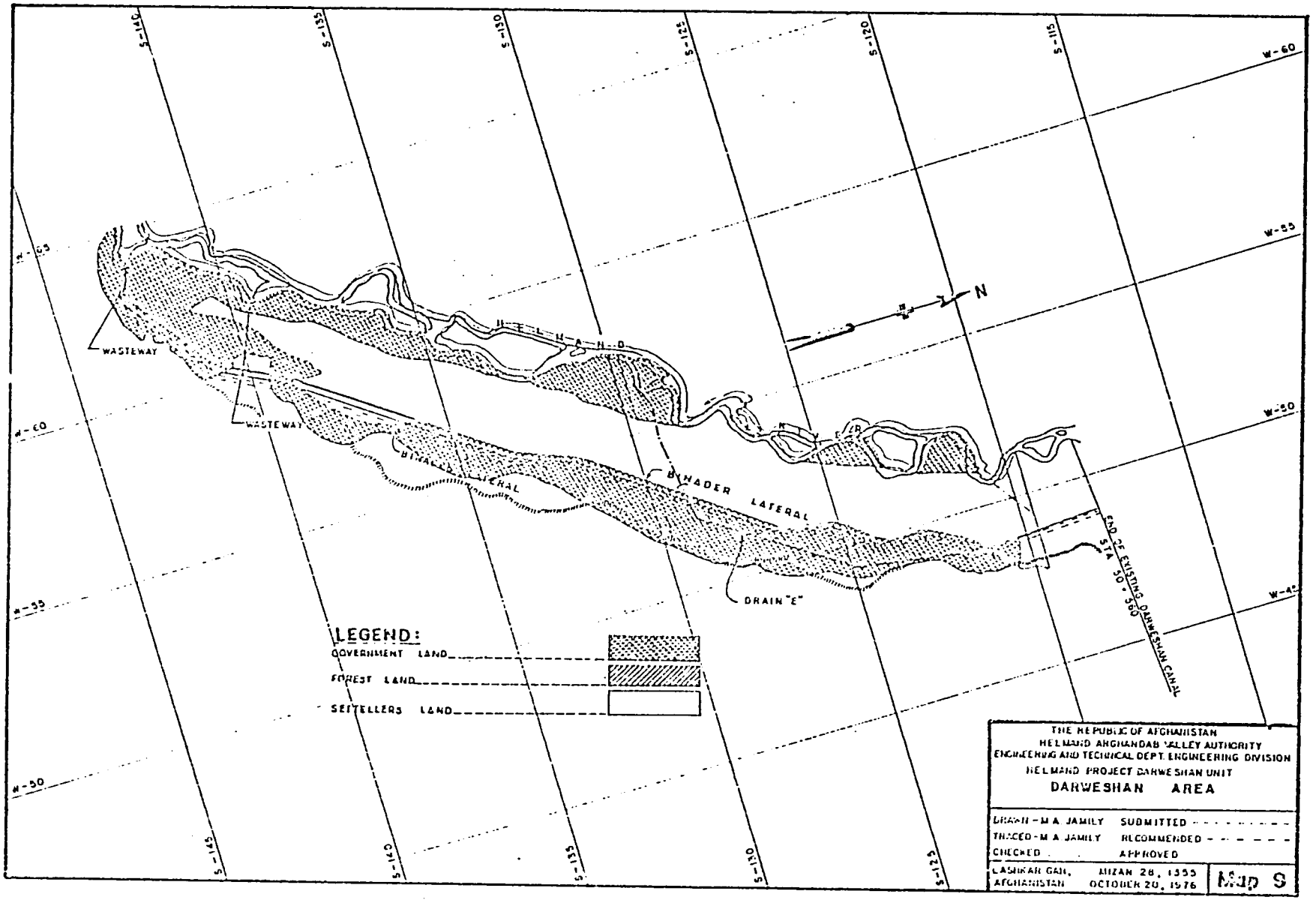

BOGHRA DIVERSION DAM
TO HERAT
GIRISHK
TO KANDAHAR
HELMAND RIVER
BOGHRA
SHAMALAN CANAL
OUTLET DRAIN
SEDA NET
LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTELLED LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENGINEERING AND TECHNICAL DEPT ENGINEERING DIV.
HELMAND PROJECT
UPPER BOGHRA
DRAWN ALAWI SUBMITTED
TRACED ALAWI RECOMMENDED
CHECKED APPROVED
24 HUTAN 1354
16 OCTOBER 1975
Map 4


MATCH LINE
DRAIN
LATERAL S10 7
LAT S10 7
OUTLET DRAIN
WASTE WAY
DRAIN
OUTLET DRAIN
HELMAND RIVER
ARGHANDAB RIVER
TO HAD-I-ALI
LATERAL S10 7
DRAIN
LASHKAR WASH
LASHKAR GAH
TO NAWAMIS
LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTLERS LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENGINEERING & TECHNICAL DEPT ENGINEERING DIVISION
HELMAND PROJECT - SHAMALAN UNIT
SHAMALAN AREA
DRAWN
SUBMITTED
TRACED
RECOMMENDED
CHECKED
APPROVED
LASHKAR GAH
19 TAURAN 1355
Map No. 6


DESERT
DESERT
Zarist Drain
Outlet Drain "K"
LATERAL SIO 7
Outlet Drain "G"
Outlet Drain "F"
Outlet Drain "E"
Outlet Drain "D"
HELMAND
RIVER
MATCH LINE
LEGEND:
SETTELLERS LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENGINEERING & TECHNICAL DEPT ENGINEERING DIVISION
HELMAND PROJECT-SHAMALAN UNIT
SHAMALAN AREA
DRAWN
TRACED
CHECKED
SUBMITTED
RECOMMENDED
APPROVED
Map 6


W 55
W 50
W 45
W 40
W 35
W 30
OUTLET DRAIN "A"
OUTLET DRAIN "C"
MATCH LINE
DARWESHAN CANAL
HELMAND RIVER
OUTLET DRAIN "A"
OUTLET DRAIN B
OUTLET DRAIN "A"
SPUR 8 450 DARWESHAN CANAL
TO LASHKAR GAH
DARWESHAN DIVERSION DAM
DR. 2E1-B
DR. 2E1-S
DRAIN 2E1-A
DR. 2E1-I
"A" SPUR 26.40
LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTELLERS LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENG. & TECH. DEPT. ENGINEERING DIV.
DARWESHAN AREA
DRAWN
SUBMITTED
RECOMMENDED
CHECKED
APPROVED
LASHKAR GAH, AFGHANISTAN
20 MIZAN 1355
12 October 1976
MAP 7


S125
S120
S115
S110
S105
S100
S95
W60
W55
W50
W45
W40
N
OUTLET DRAIN "A"
OUTLET DRAIN "C"
LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTELLERS LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENG. & TECH. DEPT. ENGINEERING DIVISION
DARWESHAN AREA
DRAWN M. A. JAMILY
SUBMITTED
RECOMMENDED
CHECKED
APPROVED
LASHKAR GAH
AFGHANISTAN
22 Mizan, 1355
13 October 1976
Map 3


S-145
S-140
S-135
S-130
S-125
S-120
S-115
W-60
W-55
W-50
W-45
N
WASTEWAY
WASTEWAY
BINADER LATERAL
DRAIN "E"
END OF EXISTING DARWESHAN CANAL
STA 50+500
LEGEND:
GOVERNMENT LAND
FOREST LAND
SETTLERS LAND
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENGINEERING AND TECHNICAL DEPT. ENGINEERING DIVISION
HELMAND PROJECT DARWESHAN UNIT
DARWESHAN AREA
DRAWN - M A JAMILY
TRACED - M A JAMILY
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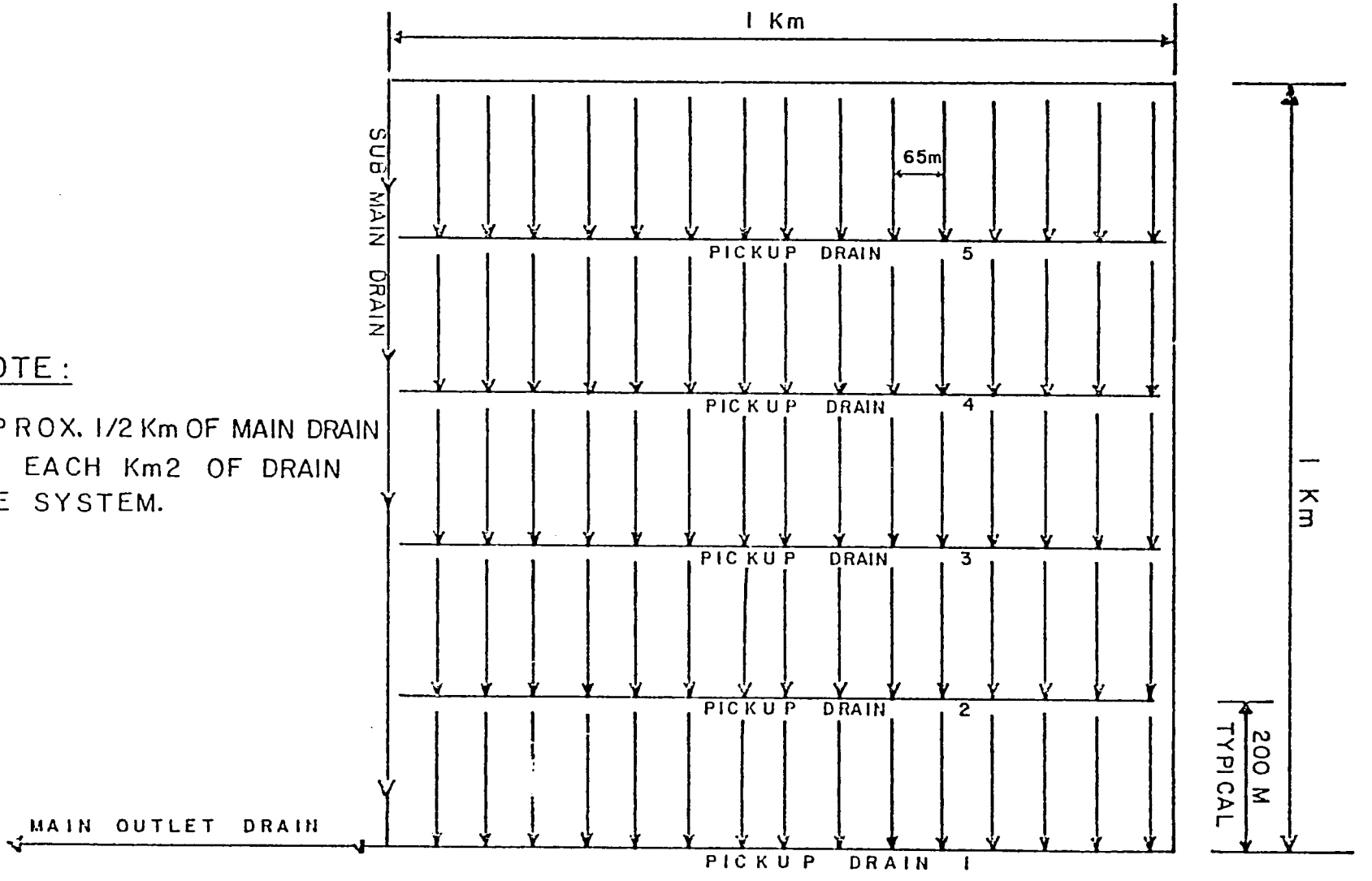
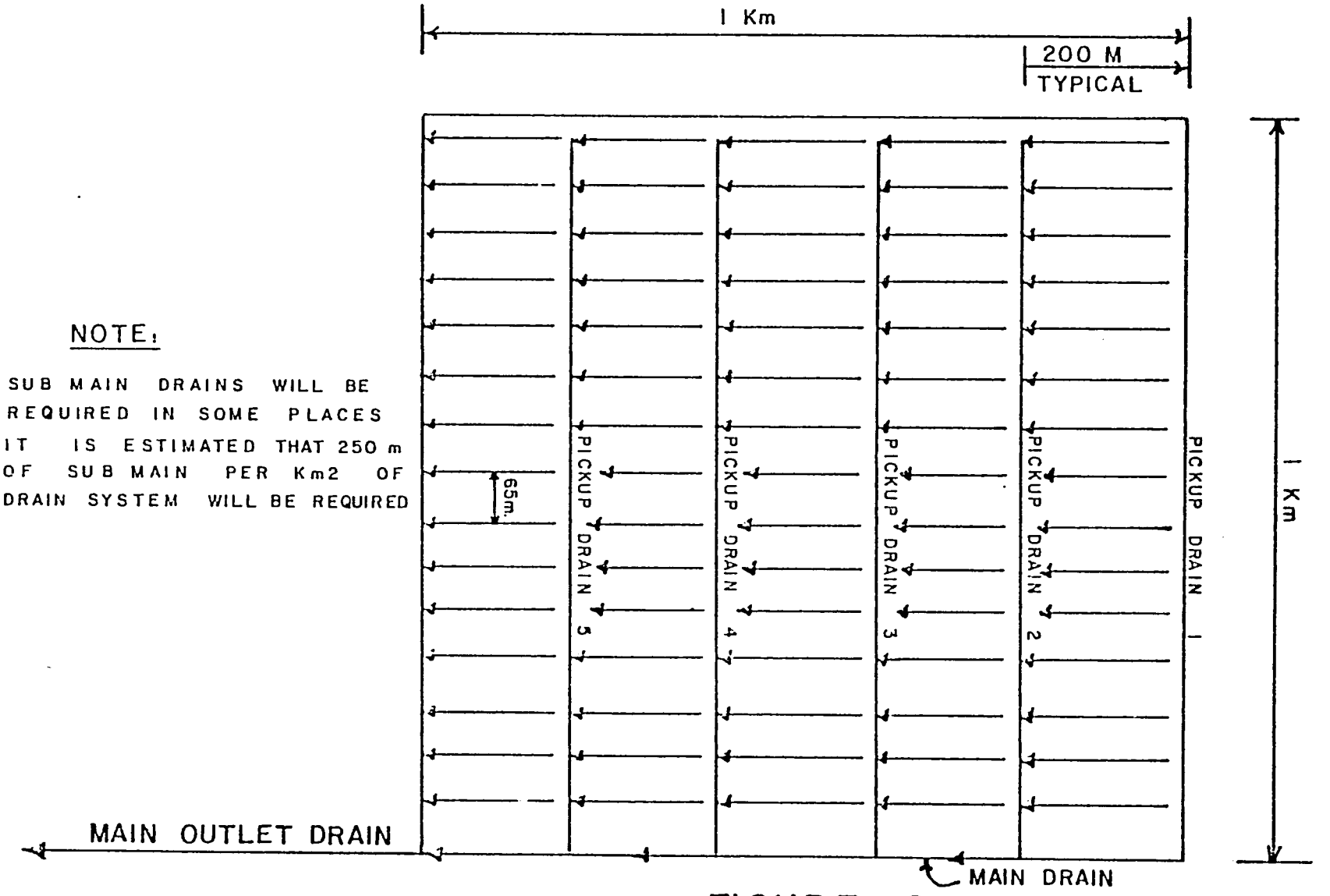
RECOMMENDED
APPROVED
LASHKAR GAH, AFGHANISTAN
MIZAN 28, 1355
OCTOBER 20, 1976
Map 9




NOTE:

APPROX. 1/2 Km OF MAIN DRAIN FOR EACH Km2 OF DRAINAGE SYSTEM.

FIGURE 1
NAD-I-ALI MODULE




NOTE:

SUB MAIN DRAINS WILL BE REQUIRED IN SOME PLACES IT IS ESTIMATED THAT 250 m OF SUB MAIN PER Km2 OF DRAIN SYSTEM WILL BE REQUIRED

FIGURE 2
MARJA MODULE

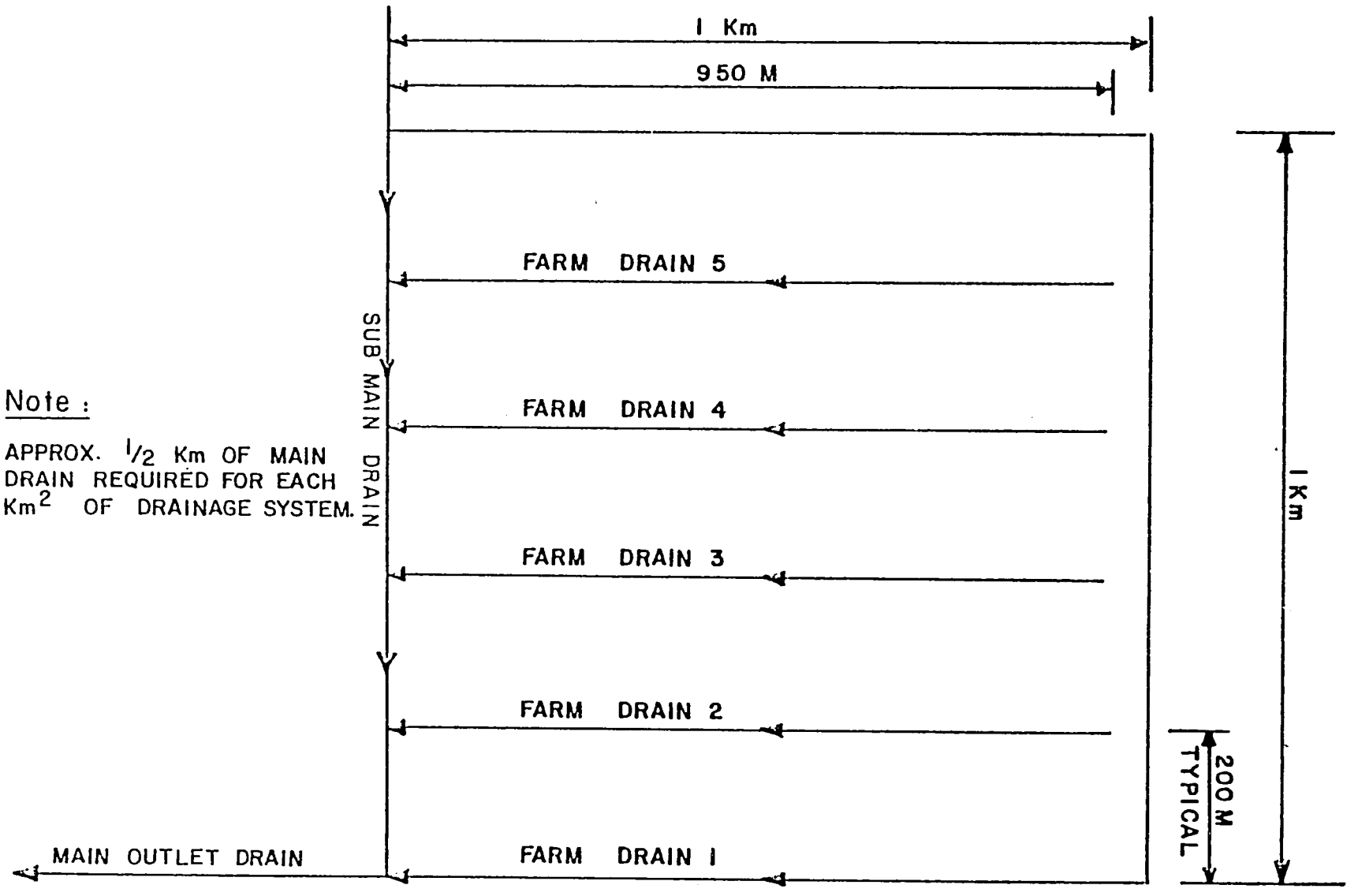



FIGURE 3
UPPER BOGHRA, SHAMALAN AND DARWESHAN MODULE

ANNEX D

# CENTRAL HELMAND DRAINAGE PROJECT

## PHASE II CONSTRUCTION PLAN

## (THREE YEARS)

Prepared by the HAVA Technical Division and
The GOA, in cooperation with the United States
Agency for International Development
(November 1976)

ANNEX D

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ANNEX D

# CENTRAL HELMAND DRAINAGE PROJECT

## PHASE II

## CONSTRUCTION PLAN
(for three years)

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## I. IDENTIFICATION OF AREAS TO BE DRAINED

The Master Drainage Plan was developed on a Project Area of 113,050 hectares (ha.). The three years Phase II, covering 13,000 ha., represents 12.6% of the total work. This construction plan describes the criteria used in the determining the best places to work for the next three years, and outlines where and how much work is to be done in Phase II. This plan develops quantities of work, manpower needs, implementation schedules for construction, estimated costs and major constraints.

### A. Selection Criteria

In nearly all of the Project Area, early provision of outlet drains is essential. Proper farm drain systems cannot be installed until adequate outlets exist. An adequate outlet then, becomes the major determinant in selection of farm drain areas for early action. As work progresses, consideration must be given to which main drains are needed first in order to provide farm drainage outlets to areas of greatest priority.

Many considerations are involved in determining the areas of greatest priority. A large amount of data are required to make a final judgement on these problems. At present, sufficient data exists from previous work to make possible a general analysis of areas. As work continues in the project, more specificity and guidance will be acquired as additional information is obtained during Phase II.

In addition to where outlets are inadequate or non-existent, in some peripheral areas there is also inadequate irrigation water. These two constraints eliminated some land from consideration for farm drain construction during Phase II. On the remaining land, the selection criteria included the severity of salinity/waterlogging, the potential productivity of the soil once drained, the desire expressed by farmers in various areas for farm drain construction, drain spacing and farm sizes in the areas under consideration. Furthermore, it is a policy of the Government of Afghanistan (GOA) that development benefits be spread geographically, and



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that the activity produce benefits which are clearly perceived by the people. This selection criterion also had to be taken into account.

The Farm Socio-Economic Survey (FES) conducted in early CY 1976 gathered data on such items as farm size, tenancy arrangements, farm income and farm problems perceived by farmers, the latter included those of the salinity, high water tables and adequacy of irrigation water. While it would have been helpful to conduct a follow-up intensive survey in each of the areas which this plan identifies for farm drain construction, time did not permit doing so and the benefits relative to the costs did not justify such an effort at this stage of the planning process.

However, FES data indicates that by and large the areas identified for farm drain construction are inhabited by farmers in the lowest one-third farm income group and that very few, if any, are in the upper 50% group. Area by area farm socio-economic analysis will be undertaken by the Socio-Economic Evaluation Unit before work begins to confirm the priority of the areas identified in this plan.

Finally, high priority will have to be given to solving the problem of drain crossings under the Shamalan and Darweshan Canals. Irrigation water is shut-off for about 40 days each year during the winter. Any drainage work involving major irrigation facilities should be scheduled during this period. It must be recognized that the existence of an adequate outlet, particularly in the early stage, will determine where farm drains will be installed. Other factors, no matter how important, cannot be used as a selection factor until outlets are constructed.

B. Condition of Existing Outlets at the End of Phase I

During Phase I, the following main drain improvement will have been completed, which will provide outlet drains for the areas 1 kilometer (km.) upslope from these drains:

1. Drain 2 - Nad-i-Ali (upper and lower sections) 13 km. (See map 2).
2. Drain 3 - Nad-i-Ali, 7 km. (See map 2).
3. Drain C - Marja, 14 km. (See map 3).
4. Marja Wasteway - Shamalan, 6 km. (See map 6).

In addition to completed work, it is planned that the following designs will be completed by the end of Phase I:

Marja Drain C - 3.6 km.
Darweshan Drain C - 11 km.



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Shamalan - New Zarist Drain, 14.5 km.
Nad-i-Ali Drain I, 10 km.

This work can be contracted for and construction can begin as soon as funds are available for Phase II, and within the first year will provide additional adequate outlets for farm drains.

Condition of other main drains, by area, is as follows:

Nad-i-Ali (Map 2)

The first work done in Phase I was the construction of 6.4 km. of new wasteway for Drain 2. Since it was designed as a wasteway, it does not provide adequate depth for farm drains on the adjacent areas. Drain 2 was improved for 5.6 km. above the newly constructed wasteway and 1 km. at the upper end. Drain 3 was improved for 7 km. above its junction with Drain 2. These provide the only adequate outlets in this area. Other existing drains are too shallow for farm drain outlets.

Marja (Map 3)

During Phase I, 14.0 km. of Drain C is to be improved. About one half of Marja has a well planned system of main drains. Some of these drains were constructed sufficiently deep; however, they have become so overgrown with dense vegetation and partially filled with sediment to the point that their capacity is now inadequate. The remainder of the area has only minor development of a drainage system.

Upper Boghra (Map 4)

Drains A and B have been constructed by Helmand Arghandab Valley Authority (HAVA). The upper portion of these drains are of sufficient depth for farm drain outlets. No other constructed drainage exist in the area.

Shamalan (Maps 5 and 6)

Phase I work in Shamalan will have centered on the enlargement of the Marja wasteway. The only other adequate outlets are Drain K, which is presently under construction by HAVA, and the upper portion of Drain A. Drains A, B, and H pass under the Shamalan Canal, and at that point, the culverts are too high in elevation to permit development of subsurface drainage above the canals. These culverts prevent the drains from being deepened, without replacing the culverts, and also restrict the capacity of the drains.

Darweshan (Maps 7, 8, and 9)

No main drain work is to be completed in Darweshan as a part of Phase I. Drains D and A-1 spur have recently been constructed by HAVA. Drain E is under construction and should be completed prior to the initiation of Phase II. These are the only drains of sufficient depth for farm drain outlets. Drains A and C pass under the Darweshan Canal and the culverts at these crossings are also too high in elevation to permit development of subsurface drainage above the canals.

C. Planned Phase II Work

Farm drain work planned for the first year is in areas with existing outlets. These outlets are of recent construction and were selected because of the severity of the salinity and waterlogging problems along the drain.

The selection of main drain work for year 1 and 2 will increase areas with adequate outlets and will enable installation of farm drains in years 2 and 3 in the priority areas already identified.

Table I provides a complete summary of the amount of work by area and year.

1. Main Drains

The main drain work by areas is as follows:

Nad-i-Ali

There are 41 km. of main drains and 30 km. of submains planned for construction in Phase II. This includes improvement of Drain I and its associated submain system and construction of Drain 4 and associated submains. Drain 2N will also be completed. A new drain into the Chah-i-Anjir subarea, and a new drain parallel to and 2 km. west of Drain 2 will be constructed. Map 2 shows work to be done.

Marja

Phase II contains 54 km. of main drains and 12 km. of submains. New drains will be provided for the Karize Sadi and West Marja subareas. Outlet extensions A and B will be improved to complete the terminal outlet system for the major portion of the area. Submains will be constructed to provide outlets to Blocks 11a, 12b, 8e, and 9e. Main Drain B will be improved. Map 3 shows the work to be done.



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Upper Boghra

Phase II includes 12 km. of main drains. Drains C, D, and E will be constructed into areas not presently having a constructed drainage system. Map 4 shows the work to be done.

Shamalan

There are 50 km. of main drain work included in Phase II. The outlet drain system for the Zarist subarea will be revised and constructed. Marja Wasteway B will be constructed parallel to the present wasteway across the upper portion of the Zarist subarea. Drain H will be improved. A new outlet to the river and a new crossing under the Shamalan Canal will be constructed for Drain A. New Drains J and L will be constructed. Maps 5 and 6 show the work to be done.

Darweshan

Phase II includes 62 km. of main drain and 17 km. of submain work. Drains A, B, and C, and their associated submain drains will be improved. A new outlet to the river with a new crossing under the Darweshan Canal is planned for Drain A. New Drains F and G will also be constructed. Maps 7, 8, and 9 show the work to be done.

Farm Drains Planned for Phase II

The amount of farm drain work and the map where it is shown by year is as follows:

| Area | Area to be Drained | Length of Farm Drains | Map |
|---|---|---|---|
| Nad-i-Ali | 24 km.$^2$ | 315 km. | 2 |
| Marja | 24 km.$^2$ | 315 km. | 3 |
| Upper Boghra | 10 km.$^2$ | 48 km. | 4 |
| Shamalan | 36 km.$^2$ | 171 km. | 5 & 6 |
| Darweshan | 36 km.$^2$ | 171 km. | 7, 8, & 9 |
| Totals: | 130 km.$^2$ | 1,020 km. | |

ANNEX D

PHASE II

PLANNED WORK

Table I

| Area | Item | Unit | 1st | 2nd | 3rd | Total |
|---|---|---|---|---|---|---|
| Nad-i-Ali | Area Drained | $km^2$ | 4 | 8 | 12 | 24 |
| (145 $km^2$) | Farm Drains | km | 52 | 105 | 158 | 315 |
| | Pickup Drains | km | 20 | 40 | 60 | 120 |
| | Sub-Main Drains | km | 9 | 6 | 15 | 30 |
| | Main Drains | km | 10 | 7 | 24 | 41 |
| Marja | | | | | | |
| (230 $km^2$) | Area Drained | $km^2$ | 4 | 8 | 12 | 24 |
| | Farm Drains | km | 52 | 105 | 158 | 315 |
| | Pickup Drains | km | 20 | 40 | 60 | 120 |
| | Sub-Main Drains | km | 0 | 8 | 4 | 12 |
| | Main Drains | km | 20 | 4 | 30 | 54 |
| Upper Boghra | | | | | | |
| (120 $km^2$) | Area Drained | $km^2$ | 2 | 3 | 5 | 10 |
| | Farm Drains | km | 10 | 14 | 24 | 48 |
| | Sub-Main Drains | km | 0 | 0 | 0 | 0 |
| | Main Drains | km | 0 | 0 | 12 | 12 |
| Shamalan | | | | | | |
| (265 $km^2$) | Area Drained | $km^2$ | 6 | 10 | 20 | 36 |
| | Farm Drains | km | 28 | 48 | 95 | 171 |
| | Sub-Main Drains | km | 0 | 0 | 0 | 0 |
| | Main Drains | km | 14 | 11 | 25 | 50 |
| Darweshan | | | | | | |
| (272 $km^2$) | Area Drained | $km^2$ | 6 | 10 | 20 | 36 |
| | Farm Drains | km | 28 | 48 | 95 | 171 |
| | Sub-Main Drains | km | 0 | 0 | 17 | 17 |
| | Main Drains | km | 17 | 19 | 26 | 62 |
| Totals | Area Drained | $km^2$ | 22 | 39 | 69 | 130 |
| | Farm Drains | km | 170 | 320 | 530 | 1,020 |
| | Pickup Drains | km | 40 | 80 | 120 | 240 |
| | Sub-Main Drains | km | 9 | 14 | 36 | 59 |
| | Main Drains | km | 61 | 41 | 117 | 219 |

D. Future Refinements

Phase II work has been carefully thought out using the best available information. The data base has been less than optimum and in newly considered areas such as Upper Boghra, West Marja, and Karize Sadi it is almost non-existent. This plan as presented, represents the combined thinking of all planning participants. While the quantity of work planned will present a challenge to all implementation participants, the targets are believed to be realistic and achievable. Though refinements in data may dictate that different areas than those specified herein are of greater priority, the construction quantities should not change significantly. In this regard, then, the plan should not be considered as "set in concrete." The plan must be reviewed periodically and deserving changes made to keep pace with changing conditions and information.

## II. ESTIMATING METHODOLOGY

### A. Method of Excavation

It is planned to utilize labor to the maximum extent possible for the required farm drain excavation. A recruitment and management system is being developed to handle this effort. The plan is to start with a small number of laborers the first year, and increase the number each year until it is apparent that optimum utilization has been obtained.

It is estimated that it is possible to keep 6 draglines operating on the project for the first 2 years. The machines will be used to excavate main and submain drains and to assist in farm drain excavation in the Shamalan and Darweshan areas. Thirteen new draglines are to be used the 3rd year to replace the old machines and to increase the size of the equipment pool.

It is also planned to purchase industrial backhoes to assist in excavating pickup drains in the Nad-i-Ali and Marja areas. These should also be available the 3rd year.

### B. Rate of Work and Unit Costs

Information available for estimating rates of work and unit costs for all excavation is less than optimum. The machine work, done in Phase I, has not produced consistent data. The machinery is very old and down for repairs a large percentage of the time. Because of the worn condition of the machinery, work at varying production rates depends on the condition of the given machine at the time and the capability of the operator. The hardness of the excavated material, the amount of water present, and the position of the machine in relation to the work are also factors that influence production rates.

Data collected in hand labor production has also proven to be inconclusive. A study was undertaken to determine laborer production. The study results showed an average of $0.24m^3$/hr./laborer. Later data collected by HAVA, indicates a longer term production of less than $0.14m^3$/hr. Some difference would be expected because the original study was conducted under the strong supervision of the study committee, whereas, supervision after the study was less than desired. Therefore, the conflicting information is difficult to reconcile and determination of a reasonable cost is difficult to reach. But for purposes of this plan, a rate of $0.20m^3$/hr. is used.

The estimates presented are the result of the best judgement of the planning participants and are compatible with present cost of work. Rates of production and costs are intended for planning purposes only and do not necessarily reflect what may be used in a current contract.

Table 2 provides a summary of proposed methods of excavation, the production rates and costs.

C. Design Cross Section

The farm drains in the Marja and Nad-i-Ali areas will be approximately 1.6 meters (m) deep, have a bottom width of 0.30 m and side slopes of 0.25 horizontal and 1.0 vertical. The typical cross section area is taken as 1.12 $m^2$. Pickup drains in Marja and Nad-i-Ali will be approximately 2.0 m deep with bottom width of 0.30 m and the side slopes of 0.75 to 1.0. Typical cross sectional area is 3.95 $m^2$.

Farm drains in the Shamalan and Darweshan areas will be approximately 2.0 m deep, have a bottom width of 0.30 m and side slopes of 1.0 to 1.0, depending on the soil materials encountered. Typical cross sectional area is 4.6 $m^2$.

Submains in all areas will be approximately 2.0 m deep, have bottom width of 1.2 m and side slopes of 1.25 to 1.0. Typical cross section area is 7.4 $m^2$.

The main drains in all areas will be from 2 to 3 m deep with the objective of keeping the water surface approximately 2.0 m below the field surface. The bottom width will depend on the volume of water to be discharged and the design depth of flow. The side slopes will be 1.25 to 1.0 or 1.5 to 1.0, depending on the depth of the drain and the soil materials encountered. Typical cross section is taken as 15.3 $m^2$.

Where there are existing drains and the work is to be primarily enlargement, the amount of excavation is estimated to be 35% of new drain excavation.

D. Associated Structures

A number of associated structures must be installed in conjunction with the construction of drainage ditches. For example, a road crossing structure will be required at each intersection with another drain at 2 to 3 km. intervals for crossing the drain, and where new drains cross existing roads. The irrigation distribution system will cross drainage ditches in a number of places. This will require the installation of pipe or concrete flumes to safely convey the irrigation water across the drain. The irrigation canal and laterals are often located immediately adjacent to existing ditches. Therefore, enlargement of the drain will necessitate reconstruction of the irrigation system including all associated structures.

Excess irrigation water often collects in areas adjacent to the drainage ditches and inlet structures are planned to safely convey this water into the ditches.

An analysis of work done in Phase I indicates that structural work is approximately 25% of excavation cost on main and submain drains and 5% on all pickup drains, and on farm drains in the Shamalan, Darweshan, and Upper Boghra areas. These figures then are used for estimating purposes in this plan.

E. Land Smoothing

Land smoothing is required on some of the lands in the Shamalan, Darweshan, and Upper Boghra areas to make installation of a drainage system worthwhile. It is estimated that 75,000 cubic meters of earth moving per square kilometer will be required. At the estimated cost of Afs. 30 per cubic meter, the total cost per square kilometer to achieve land smoothing will be Afs. 225,000.00. The amount of land smoothing included in the three year construction plan is based on preliminary field observations of the work areas and will need further refinement.

## Excavation Cost

### Table 2

| Type of Excavation | Method of Excavation | Excavation Rate $M^3$/hr | Cost per hour Afs. | Cost per $M^3$ Afs. |
|---|---|---|---|---|
| Farm Drains | | | | |
| Nad-i-Ali & Marja | Laborers | 0.20 | 8.0 | 40 |
| Shamalan, Darweshan & Upper Boghra | Laborers | 0.16 | 8.0 | 50 |
| | Small Dragline | 30 | 1,200 | 40 |
| Pickup Drains | | | | |
| Nad-i-Ali & Marja | Laborers | 0.16 | 8.0 | 50 |
| | Backhoe | 15 | 750 | 50 |
| Sub-Main Drains | | | | |
| All | Large | 30 | 2,400 | 80 |
| Main Drains | | | | |
| All | Large Dragline | 24 | 2,400 | 100 |



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## III. RESOURCES

### A. Construction Equipment and Labor Needs

Equipment and labor needs are determined by the types of work and the volume of excavation. Each area has been planned based on type of work and resources available. A summary of equipment and labor needs is shown in Table 3.

#### 1. Nad-i-Ali and Marja

The Nad-i-Ali and Marja areas are similar in topography, soils and extent of development. All farm drains will be excavated with laborers using hand tools. Pickup drains will also utilize hand laborers the first 2 years. New backhoes should be available the 3rd year and will be used to assist in excavating main and submain drains and 4 new draglines will be used the 3rd year of Phase II.

Equipment and labor needs for these areas are shown in Tables 4 and 5.

Table 3

SUMMARY

Equipment and Labor Needs
Three-Year Construction Plan

| Area | 1st Year | | 2nd Year | | 3rd Year | | |
|---|---|---|---|---|---|---|---|
| | Average # Laborers | # Old Draglines | Average # Laborers | # Old Draglines | Average # Laborers | # New Draglines | # Backhoes |
| Nad-i-Ali | 447 | 1 | 893 | 1 | 920 | 2 | 3.3 |
| Marja | 447 | 1 | 893 | 1 | 920 | 2 | 3.3 |
| Shamalan | 147 | 2 | 459 | 2 | 811 | 4 | - |
| Darweshan | 147 | 2 | 459 | 2 | 811 | 4 | - |
| Upper Boghra | 156 | - | 234 | - | 390 | 1 | - |
| Totals | 1,344 | 6 | 2,938 | 6 | 3,852 | 13 | 6.6 (7) |

Table 4

Nad-i-Ali Area

Equipment and Labor Need
Three-Year Construction Plan

| Item | Unit | 1st Year | 2nd Year | 3rd Year |
|---|---|---|---|---|
| * Farm Drain Volume | $M^3$ | 58,000 | 117,600 | 176,400 |
| Laborers @350 $M^3$/yr | Ea | 168 | 336 | 503 |
| * Pickup Drain Volume | $M^3$ | 78,000 | 156,000 | 234,000 |
| Laborers @280 $M^3$/yr | Ea | 279 | 557 | 417 |
| ** Backhoes @ 35,000 $M^3$/yr | Ea | - | - | 3.3 |
| * Main and sub-main Drain Volume | $M^3$ | 120,150 | 121,665 | 358,860 |
| *** Draglines | Ea | 1 | 1 | 2 |
| Total Laborers | | 447 | 893 | 920 |
| Total Draglines | | 1 (old) | 1 (old) | 2 (new) |
| Total Backhoes | | - | - | 3.3 |

* Volumes are derived from typical cross-sectional areas described above and from the lengths in Table 1.

** Based on 50% of the work being done by backhoe the 3rd year.

*** Based on 120,000 $M^3$/yr for two years with an old dragline and 180,000 $M^3$/yr the third year with new draglines.

TABLE 5

Marja Area

Equipment and Labor Needs
Three - Year Construction Plan

| Item | Unit | 1st Year | 2nd Year | 3rd Year |
|---|---|---|---|---|
| Farm Drain Volume | $M^3$ | 58.800 | 117,600 | 176,400 |
| Laborers @ 350 $M^3$/Yr | Ea | 168 | 336 | 503 |
| Pickup Drain Volume | $M^3$ | 78,000 | 156,000 | 234,000 |
| Laborers @ 280 $M^3$/Yr | Ea | 279 | 557 | 417 |
| Backhoes @ 35,000 $M^3$/yr | Ea | | | 3.3 |
| Main and submain Drain Volume | $M^3$ | 118,000 | 120,400 | 349,370 |
| Draglines | Ea | 1 | 1 | 2 |
| Total Laborers | | 447 | 893 | 920 |
| Total Draglines | | 1 (old) | 1 (old) | 2 (New) |
| Total Backhoes | | | | 3.3 |

2. Upper Boghra, Shamalan, and Darweshan Areas

These areas are also similar in topography, soils and type of work to be accomplished. It is planned to use a combination of draglines and laborers to excavate the farm drains in the Shamalan and Darweshan areas. The draglines will "rough out" the ditch as deep as possible, depending on the width of the bucket. Laborers will be used to complete the work design depth and to finish grading the side slopes. The draglines will excavate approximately 75% of the volume, and the laborers 25%. Two old small draglines will be used in the first 2 years. Four new draglines will be used the 3rd year.

Farm drains in the Upper Boghra area will be excavated by laborers.

Main and submain drains will be excavated by dragline. Two old draglines will be used in Shamalan and Darweshan the first 2 years. Two new draglines will be used in the 3rd year in each of the Shamalan and Darweshan areas. One new dragline will be used the 3rd year in Upper Boghra.

Summary of equipment and labor needs for these areas are shown in Tables 6, 7, and 8.

Selection of areas for demonstrations of tile drain acceptability will be made during the first year and installation will be done in the 2nd and 3rd years. It is planned to have at least 1 demonstration in each of the Project Areas.

Table 6

Upper Boghra Area

Equipment and Labor Needs
Three-Year Construction Plan

| Item | Unit | 1st Year | 2nd Year | 3rd Year |
|---|---|---|---|---|
| Farm Drain Volume | $M^3$ | 43,700 | 65,500 | 109,250 |
| Laborers @ 280 $M^3$/yr | Ea | 156 | 234 | 390 |
| Dragline Volume | $M^3$ | - | - | 183,600 |
| Dragline @ 180,000 $M^3$/yr | Ea | - | - | 1 |
| Total Laborers | Ea | 156 | 234 | 390 |
| Total Draglines (new) | Ea | - | - | 1 |

Table 7

Shamalan Area

Equipment and Labor Needs
Three-Year Construction Plan

| Item | Unit | 1st Year | 2nd Year | 3rd Year |
|---|---|---|---|---|
| Farm Drain Volume | $M^3$ | 131,100 | 218,500 | 437,000 |
| Laborer Volume | $M^3$ | 41,100 | 128,500 | 227,000 |
| Laborers @ 280 $M^3$/yr | Ea | 147 | 459 | 811 |
| Dragline Volume @ 90,000 $M^3$/yr | $M^3$ | 90,000 | 90,000 | 90,000 |
| Dragline Volume @ 120,000 $M^3$/yr | $M^3$ | - | - | 120,000 |
| Dragline (small) | Ea | 1 | 1 | 1 |
| Dragline (large) | Ea | - | - | 1 |
| Main Drain Volume | $M^3$ | 115,200 | 118,800 | 362,700 |
| Dragline @ 120,000 $M^3$/yr | Ea | 1 | 1 | - |
| Draglines @ 180,000 $M^3$/yr | Ea | - | - | 2 |
| Total Draglines (old) | Ea | 2 | 2 | 0 |
| Total Draglines (new) | Ea | - | - | 4 |
| Total Laborers | Ea | 147 | 459 | 811 |

Table 8

Darweshan Area

Equipment and Labor Needs
Three-Year Construction Plan

| Item | Unit | 1st Year | 2nd Year | 3rd Year |
|---|---|---|---|---|
| Farm Drain Volume | $M^3$ | 131,100 | 218,500 | 437,000 |
| Laborer Volume | $M^3$ | 41,100 | 128,500 | 227,000 |
| Laborers @ 280 $M^3$/yr | Ea | 147 | 459 | 811 |
| Dragline Volume @ 90,000 $M^3$/yr | $M^3$ | 90,000 | 90,000 | 90,000 |
| Dragline Volume @ 120,000 $M^3$/yr | $M^3$ | - | - | 120,000 |
| Dragline (small) | Ea | 1 | 1 | 1 |
| Dragline (large) | Ea | - | - | 1 |
| Main Drain Volume | $M^3$ | 121,800 | 122,400 | 361,000 |
| Dragline @ 120,000 $M^3$/yr | Ea | 1 | 1 | - |
| Dragline @ 180,000 $M^3$/yr | Ea | - | - | 2 |
| Total Draglines (old) | Ea | 2 | 2 | 0 |
| Total Draglines (new) | Ea | - | - | 4 |
| Total Laborers | Ea | 147 | 459 | 811 |

## B. Technical Personnel Needs

Technical personnel needs can be broken into four major categories: planning, preliminary design, final design and construction supervision. Responsibilities and Organization are discussed below:

### 1. Responsibilities

#### a. Planning

There are 2 distinct separate phases of planning. There is a need for short range, individual job planning and for long range planning on a broader scale.

In Phase I, the HAVA Planning Division personnel have regularly done the job planning including much of the preliminary design, but long range planning (for Phase II) has been done only on a crisis basis at the expense of short range planning. As Phase II work is undertaken, there is a need for the Planning Division to augment its staff in order to carry on concurrently short and long range planning. Job planning should be limited to developing land ownership, irrigation layout, areas to be drained by and discharge capacity of drains, general hydraulic conductivity, etc., in sufficient detail to develop a job plan for design.

Long range planning can be further broken down into 2 phases. One is the immediate need to develop complete conceptional plans for areas where limited data is now available. Phase II includes work in the Zarist and Drain K subareas of Shamalan, West Marja and Karize Sadi subareas of Marja, the Chah-i-Anjir subarea of Nad-i-Ali and the Upper Boghra area. There is a substantial data void in all of these areas, and planning is needed before development of a drainage system can be accomplished. The other is the need to revise the Master Plan and plan for a Phase III. These tasks will require major long range planning inputs from HAVA and USAID.

The development of the soil survey and maps will be an important part of all phases of planning. The soil survey should be started as early as possible to make information available for early job planning and subarea plans. The soil survey will classify, map, and interpret the soils. Soil texture, effective depth, moisture holding capacity, permeability, salinity, atterbury limits, hydraulic conductivity, depth of water table, depth to hard layer (calichi or conglomerate) are some of the characteristics considered. As soil surveys become available, the entire planning process will be improved and simplified. Soil survey should be completed on all areas scheduled for farm drains in Phase II early the 1st year, and areas to be included in Phase III should be completed in the 2nd year.

The laboratory will do the testing of soils and construction materials necessary to support the soil survey mapping, classification and interpretation, program planning and construction activities. Seive analysis, partial size distribution analysis, PH, electric conductivity, exchangeable conductivity, exchangeable cations, cation exchange capacity, organic carbon, calcium carbonate, gypsum, bulk density, water content, atterbury limits, exchangeable sodium, maximum density of soils, water analysis, concrete mix formulation and compression strength are some of the tests needed.

b. Preliminary Design

Preliminary design work will be based on the job plan developed by planning personnel. Using the job plan as a guide, the preliminary design staff will collect sufficient additional field survey data for the selected areas to develop alternative design solutions and select the preferred solution. Field survey data will include ditch cross sections and profiles, topography, engineering soils information, and hydraulic conductivity data. Alternative design studies will involve making design computations and drawings in sufficient detail to determine relative feasibility of the alternatives. From the alternative studies, a recommended solution can be selected. A preliminary design report will be developed, outlining alternatives studied and a recommended solution. Preliminary design work will be done under the direction of a final design engineer, with the assistance of a preliminary design engineer.

c. Final Design

Final design work will be based on preliminary design data. The final design section will check and refine all design computations on the recommended solution. Final hydraulic and structural design will be completed. Construction drawings and specifications, and cost estimates will also be developed as a part of final design.

To provide continuity through the design phase, a design engineer will be assigned at the beginning of the preliminary design. The design engineer will provide general guidance for all the work in preliminary design, will assist with alternative studies, and concur in the recommended solution. He will also supervise all final design work.

d. Contracting and Construction

Contract administration will be responsible for preparing complete contract documents and general contract administration during the contract period. Final payment will be based on quantity computations supported by as built data, approved change orders and final acceptance by the Chief Engineer.

Construction personnel will be responsible for all work during construction. This will include construction layout, surveys, construction inspection, as built surveys and contract administration. Sufficient construction coordinators will be provided to properly coordinate all phases of the work. Construction layout will be provided in a timely manner prior to actual construction. Layout surveys will also provide data for quantity determination. Inspectors will be assigned as necessary to ascertain that all work is being done in accordance with the designs and specifications. As built surveys and drawings will be made to confirm construction quality and provide a record of actual construction accomplishment.

2. Organization and Personnel Requirements

a. HAVA

Technical support will be organized through specialized teams. Each team will be assigned specific types and/or area of work. These organizational requirements necessitate changes in staffing patterns and increases in the number of personnel within HAVA. Table 9 is a summary of personnel needs for HAVA. All 3rd year staffing requirements assume that a Phase III workload, whether USAID supported or not, will be forthcoming.

(1) Planning

A planning team will consist of an experienced planner as team leader, 1 additional planner, 7 engineering surveyors, 3 field data collectors, and 4 office support technicians. Two teams will be required the 1st year. Two teams will be required the 2nd and 3rd years for job planning, and 1 for long range planning.

(2) Preliminary Design

A preliminary design team will be composed of 1 engineer, 14 engineering surveyors, 6 field data collectors, and 4 office support technicians. One team would be required the 1st year, and 2 for years 2 and 3.

(3) Final Design

A final design team will be 1 engineer as team leader, 1 additional engineer to assist, 4 technicians and 4 draftsmen. Two teams will be required the 1st year, and 3 for the 2nd and 3rd years.

(4) Construction

A construction team will consist of a construction coordinator, 8 inspectors 14 engineering surveyors, and 2 office support technicians.

One team will be required the 1st year, 2 the 2nd year, and 3 for the 3rd year.

(5) Contract Administration

The contract administration team will consist of 1 contract specialist, and a technical support staff of 4. One team will be sufficient for the 1st 2 years, and 2 teams will be required for the 3rd year.

(6) Soil Survey

The soil survey will be under the technical direction of a coordinator, beginning the 2nd year. Teams will consist of 2 field soil scientists, 3 soil technicians, one 4-man hydraulic conductivity crew, half of the time of a 2-man drilling crew, and a 2-man backhoe crew.

The first step will be for 1 experienced field man to train 2 field soil scientists and 2 technicians, in the field of mapping techniques. Two teams will be needed each year. The 1st year, productivity will be low because all the personnel will need to be trained.

(7) Soils and Materials Testing Laboratory

The testing laboratory will have a director supervising the existing 9-man staff of technicians. The director should be a soil scientist or a soil mechanic specialist. The laboratory's work should peak during the 1st year and remain constant thereafter.

TABLE 9

HAVA Personnel Needs

| No. | Position | Counter part | Avail-able | 1st Yr Need | Addition 1st Yr | 2nd Yr Need | Addition 2nd Yr | 3rd Yr Need | Addition 3rd Yr |
|---|---|---|---|---|---|---|---|---|---|
| H-1 | Head, Engineer | A-4 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| H-2 | Head, Planning | A-5 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| H-3 | Chief Design | A-6 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| H-4 | Chief, Construction | A-8 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| H-5 | Planners | A-5 | 3 | 4 | 1 | 6 | 2 | 6 | 0 |
| H-6 | Preliminary Design Engineer | A-6 | 0 | 1 | 1 | 2 | 1 | 2 | 0 |
| H-7 | Design Engineer | A-6 | 3 | 4 | 1 | 6 | 2 | 6 | 0 |
| H-8 | Construction Coordinator | A-8 | 1 | 1 | 0 | 2 | 1 | 3 | 1 |
| H-9 | Contract Specialist | A-8 | 1 | 1 | 0 | 1 | 0 | 2 | 1 |
| H-10 | Engineering Surveyors | | 35 | 42 | 7 | 77 | 35 | 91 | 14 |
| H-11 | Field Data Collectors | | 9 | 20 | 11 | 29 | 9 | 29 | 0 |
| H-12 | Technicians | | 15 | 26 | 11 | 40 | 14 | 46 | 6 |
| H-13 | Inspectors | | 8 | 8 | 0 | 16 | 8 | 24 | 8 |
| H-14 | Draftsmen | | 8 | 8 | 0 | 12 | 4 | 12 | 0 |
| H-15 | Soil Coordinator | A-7 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| H-16 | Soil Scientists | A-7 | 2 | 4 | 2 | 4 | 0 | 4 | 0 |
| H-17 | Soil Technicians | | 3 | 6 | 3 | 6 | 0 | 6 | 0 |
| H-18 | Soil Laboratory Head | A-7 | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| H-19 | Laboratory Technician | | 9 | 9 | 0 | 9 | 0 | 9 | 0 |
| H-20 | Machine Operator | | 1 | 6 | 5 | 6 | 0 | 6 | 0 |
| H-21 | Farmer Education Water Use Specialist | A-9 | 0 | 1 | 1 | 1 | 0 | 1 | 0 |
| H-22 | Socio-Economic Data Analyst | | 1 | 1 | 0 | 1 | 0 | 1 | 0 |
| H-23 | Socio-Economic Data Collector | | 0 | 2 | 2 | 4 | 2 | 4 | 0 |
| | | | 104 | 149 | 45 | 228 | 79 | 258 | 30 |

3. USAID/SCS Personnel

a. Based on the work to be accomplished and training and advisory inputs, the following U. S. personnel will be needed as advisors in Phase II:

| No. | Position | Counterpart No. | Phase I | Phase II |
|---|---|---|---|---|
| A-1 | Senior Advisor | V. P. HAVA | 1 | 1 |
| A-2 | Heavy Equipment Specialist | HCC | 1 | 1 |
| A-3 | Warehousing Advisor | HCC | 1 | 1 |
| A-4 | SCS Team Leader | H-1 | 1 | 1 |
| A-5 | Drainage Planning Engineer (1) | H-2 & 5 | 0 | 1 |
| A-6 | Design Engineer | H-3, 6 & 7 | 2 | 2 |
| A-7 | Soil Scientist (2) | H-15, 16 & 18 | 1 | 2 |
| A-8 | Construction Engineer (3) | H-4, 8 & 9 | 0 | 1 |
| A-9 | Farmer's Education/Water Use Advisor (4) | H-21 | 0 | 1 |
| | Total | | 7 | 11 |

(1) Augmented planning needs (both short and long range) make addition of planning engineer mandatory.

(2) Need for data collection to update plans as well as to allow for better selection of project activity requires 1 added soils scientist.

(3) Phase I has proven that this position is a must in any expanded program.

(4) This advisor is needed to describe drainage to farmers, devise a leaching program, and develop a farmer education program related to agriculture.

b. Short term consultants will be required to assist in on-the-job training programs, in preparing plans for upgrading irrigation systems, and in other program matters concerning agricultural production.

## IV. COST

### A. Construction Cost

The construction work including areas to be drained, lengths of drains, volume of excavation and cost for each area and year is included in Tables 10, 11, 12, 13, and 14.

A summary of cost by area and year is included in Table 15.

### B. Other Costs

Other associated costs such as training, equipment, USAID advisors, etc., are major costs that must be considered in programming Phase II. These costs, however, are not considered as a direct drainage construction cost for Phase II, and are not included in this plan. Each mentioned cost will be developed and included in appropriate documents for project implementation.

## SUMMARY OF VOLUMES AND COSTS

### Nad-i-Ali

### Table 10

| | Unit | First Year | Second Year | Third Year | Total |
|---|---|---|---|---|---|
| **FARM DRAINS** | | | | | |
| Area to be drained | $km^2$ | 4 | 8 | 12 | 24 |
| Length of Drains | km | 52 | 105 | 158 | 315 |
| Volume of Excavation | $M^3$ | 58,800 | 117,600 | 176,400 | 352,000 |
| F. D. Cost | Afs | 2,352,000 | 4,704,000 | 7,056,000 | 14,112,000 |
| **PICKUP DRAINS** | | | | | |
| Length | km | 20 | 40 | 60 | 120 |
| Volume | $M^3$ | 78,000 | 156,000 | 234,000 | 468,000 |
| Excavation Cost | Afs | 3,900,000 | 7,800,000 | 11,700,000 | 23,400,000 |
| Structure Cost | Afs | 195,000 | 390,000 | 585,000 | 1,170,000 |
| P. D. Cost | Afs | 4,095,000 | 8,190,000 | 12,285,000 | 24,570,000 |
| **SUB-MAIN DRAINS** - New | | 9 | 6 | 15 | 30 |
| -Improvement | | 0 | 0 | 0 | 0 |
| Length, total | km | 9 | 6 | 15 | 30 |
| Volume | $M^3$ | 66,600 | 44,400 | 111,000 | 222,000 |
| Excavation Cost | Afs | 5,328,000 | 3,552,000 | 8,880,000 | 17,760,000 |
| Structure Cost | Afs | 1,332,000 | 888,000 | 2,220,000 | 4,440,000 |
| SMD Cost | Afs | 6,660,000 | 4,440,000 | 11,100,000 | 22,200,000 |
| **MAIN DRAINS** - New | | 0 | 4 | 12 | 16 |
| -Improvement | | 10 | 3 | 12 | 25 |
| Length, total | km | 10 | 7 | 24 | 41 |
| Volume | $M^3$ | 53,550 | 77,265 | 247,860 | 378,67 |
| Excavation Cost | Afs | 5,355,000 | 7,726,500 | 24,786,000 | 37,867,50 |
| Structure Cost | Afs | 1,338,750 | 1,931,625 | 6,196,500 | 9,466,87 |
| Land Smoothing Cost | Afs | - | - | - | |
| M. D. Cost | Afs | 6,693,750 | 9,658,125 | 30,982,500 | 47,334,37 |
| TOTAL COST | | 19,800,750 | 26,992,125 | 61,423,500 | 108,216,37 |

## SUMMARY OF VOLUME AND COST

### MARJA

Table 11

| | Unit | First Year | Second Year | Third Year | Total |
|---|---|---|---|---|---|
| **FARM DRAINS** | | | | | |
| Area to be drained | $km^2$ | 4 | 8 | 12 | 2 |
| Length of Drains | km | 52 | 105 | 158 | 31 |
| Volume of Excavation | $M^3$ | 58,800 | 117,600 | 176,400 | 352,80 |
| F. D. Cost | Afs | 2,352,000 | 4,704,000 | 7,056,000 | 14,112,00 |
| **PICKUP DRAINS** | | | | | |
| Length | km | 20 | 40 | 60 | 12 |
| Volume | $M^3$ | 78,000 | 156,000 | 234,000 | 468,00 |
| Excavation Cost | Afs | 3,900,000 | 7,800,000 | 11,700,000 | 23,400,00 |
| Structure Cost | Afs | 195,000 | 390,000 | 585,000 | 1,170,00 |
| P. D. Cost | Afs | 4,095,000 | 8,190,000 | 12,285,000 | 24,570,00 |
| **SUB-MAIN DRAINS** - New | | - | 8 | 4 | 1 |
| -Improvement | | - | 0 | 0 | |
| Length | km | - | 8 | 4 | 1 |
| Volume | M3 | - | 59,200 | 29,600 | 88,80 |
| Excavation Cost | Afs | - | 4,736,000 | 2,368,000 | 7,104,00 |
| Structure Cost | Afs | - | 1,184,000 | 592,000 | 1,776,00 |
| SMD Cost | Afs | - | 5,920,000 | 2,960,000 | 8,880,00 |
| **MAIN DRAINS** - New | | 4 | 4 | 16 | 2 |
| -Improvement | | 15 | 0 | 14 | 2 |
| Length | km | 19 | 4 | 30 | 5 |
| Volume | M3 | 118,825 | 61,200 | 319,770 | 499,79 |
| Excavation Cost | Afs | 11,882,500 | 6,120,000 | 31,970,000 | 49,979,50 |
| Structure Cost | Afs | 2,970,625 | 1,530,000 | 7,994,250 | 12,494,87 |
| Land Smoothing Cost | Afs | - | - | - | |
| M. D. Cost | Afs | 14,853,125 | 7,650,000 | 39,971,250 | 62,474,87 |
| TOTAL COST | | 21,300,125 | 26,464,000 | 62,272,250 | 110,036,37 |

## SUMMARY OF VOLUMES AND COST

### Upper Boghra

### Table 12

| | Unit | First Year | Second Year | Third Year | Total |
|---|---|---|---|---|---|
| **FARM DRAINS** | | | | | |
| Area to be drained | $km^2$ | 2 | 3 | 5 | 10 |
| Length of Drains | km | 10 | 14 | 24 | 48 |
| Volume of Excavation | $M^3$ | 43,700 | 65,550 | 109,250 | 218,500 |
| F. D. Cost, Exc | Afs | 2,185,000 | 3,277,500 | 5,462,500 | 10,925,000 |
| Structure | | 109,250 | 163,875 | 273,125 | 546,250 |
| Total | | 2,294,250 | 3,441,375 | 5,735,625 | 11,471,250 |
| **PICKUP DRAINS** | | | | | |
| Length | km | | | | |
| Volume | $M^3$ | | | | |
| Excavation Cost | Afs | | | | |
| Structure Cost | Afs | | | | |
| F. D. Cost | Afs | | | | |
| **SUB-MAIN DRAINS** - New | | | | | |
| -Improvement | | | | | |
| Length | km | | | | |
| Volume | $M^3$ | | | | |
| Excavation Cost | Afs | | | | |
| Structure Cost | Afs | | | | |
| SMD Cost | Afs | | | | |
| **MAIN DRAINS** - New | | | | | |
| -Improvement | | | | 12 | 12 |
| Length | km | | | 12 | 12 |
| Volume | $M^3$ | - | | 183,600 | 183,600 |
| Excavation Cost | Afs | | | 18,360,000 | 18,360,000 |
| Structure Cost | Afs | | | 4,590,000 | 4,590,000 |
| Land Smoothing Cost | Afs | 100,000 | 150,000 | 225,000 | 475,000 |
| M. D. Cost | Afs | 100,000 | 150,000 | 23,175,000 | 23,425,000 |
| TOTAL COST | | 2,394,250 | 3,591,375 | 28,910,625 | 34,896,250 |

## SUMMARY OF VOLUMES AND COST

### Shamalan

### Table 13

| | Unit | First Year | Second Year | Third Year | Total |
|---|---|---|---|---|---|
| **FARM DRAINS** | | | | | |
| Area to be drained | $km^2$ | 6 | 10 | 20 | 36 |
| Length of Drains | km | 28 | 48 | 95 | 171 |
| Volume of Excavation | $M^3$ | 131,100 | 218,500 | 437,000 | 786,600 |
| F. D. Cost Exc | Afs | 5,655,000 | 10,025,000 | * 19,750,000 | ** 35,430,000 |
| Structures | | 282,750 | 510,250 | 987,500 | 1,771,500 |
| Total | | 5,937,750 | 10,526,250 | 20,737,500 | 37,201,500 |
| **PICKUP DRAINS** | | | | | |
| Length | km | | | | |
| Volume | $M^3$ | | | | |
| Excavation Cost | Afs | | | | |
| Structure Cost | Afs | | | | |
| F. D. Cost | Afs | | | | |
| **SUB-MAIN DRAINS** - New | | | | | |
| -Improvement | | | | | |
| Length | km | | | | |
| Volume | $M^3$ | | | | |
| Excavation Cost | Afs | | | | |
| Structure Cost | Afs | | | | |
| SMD Cost | Afs | | | | |
| **MAIN DRAINS** - New | | 4 | 6 | 23 | 33 |
| -Improvement | | 10 | 5 | 2 | 17 |
| Length | km | 14 | 11 | 25 | 50 |
| Volume | $M^3$ | 115,200 | 118,800 | 362,700 | 596,700 |
| Excavation Cost | Afs | 11,520,000 | 11,880,000 | 36,270,000 | 59,670,000 |
| Structure Cost | Afs | 2,880,000 | 2,970,000 | 9,067,500 | 14,917,500 |
| Land Smoothing Cost | Afs | 500,000 | 1,000,000 | 1,000,000 | 2,500,000 |
| M. D. Cost | Afs | 14,900,000 | 15,850,000 | 46,337,500 | 77,087,000 |
| **TOTAL COST** | | 20,837,750 | 26,376,250 | 67,075,000 | 114,289,000 |

* Based on using one small dragline to excavate 90,000 $M^3$/yr.

** Based on using one small dragline @ 90,000 $M^3$/yr and one large dragline @ 120,000 $M^3$/yr.

## SUMMARY OF VOLUMES AND COST

### Darweshan

Table 14

| | Unit | First Year | Second Year | Third Year | Total |
|---|---|---|---|---|---|
| **FARM DRAINS** | | | | | |
| Area to be drained | $km^2$ | 6 | 10 | 20 | 36 |
| Length of Drains | km | 28 | 48 | 95 | 171 |
| Volume of Excavation | $M^3$ | 131,000 | 218,000 | 437,000 | 786,600 |
| F. D. Cost: Exc | Afs | 5,655,000* | 10,025,000* | 19,750,000** | 35,430,000 |
| Structures | | 282,750 | 501,250 | 987,500 | 1,771,500 |
| Total | | 5,937,750 | 10,526,250 | 20,737,500 | 37,201,500 |
| **PICKUP DRAINS** | | | | | |
| Length | km | | | | |
| Volume | $M^3$ | | | | |
| Excavation Cost | Afs | | | | |
| Structure Cost | Afs | | | | |
| F. D. Cost | Afs | | | | |
| **SUB-MAIN DRAINS** - New | | | | 5 | 5 |
| -Improvement | | | | 12 | 12 |
| Length | km | | | 17 | 17 |
| Volume | $M^3$ | | | 101,800 | 101,800 |
| Excavation Cost | Afs | | | 8,144,000 | 8,144,000 |
| Structure Cost | Afs | | | 2,036,000 | 2,036,000 |
| SMD Cost | Afs | | | 10,180,000 | 10,180,000 |
| **MAIN DRAINS** - New | | 3 | 2 | 12 | 17 |
| -Improvement | | 14 | 17 | 14 | 45 |
| Length | km | 17 | 19 | 26 | 62 |
| Volume | $M^3$ | 121,500 | 122,400 | 259,200 | 503,100 |
| Excavation Cost | Afs | 12,150,000 | 12,240,000 | 25,920,000 | 50,310,000 |
| Structure Cost | Afs | 3,037,500 | 3,060,000 | 6,480,000 | 12,577,500 |
| Land Smoothing Cost | Afs | 500,000 | 1,000,000 | 1,000,000 | 2,500,000 |
| M. D. Cost | Afs | 15,687,500 | 16,300,000 | 33,400,000 | 65,387,500 |
| TOTAL COST | | 21,625,250 | 26,826,250 | 64,317,500 | 112,769,000 |

* Based on using one dragline to excavate 90,000 $M^3$/yr.

** Based on using one dragline @ 90,000 $M^3$/yr and one dragline @120,000 $M^3$/yr

Table 15

DRAIN COST SUMMARY

THREE YEAR CONSTRUCTION PLAN, PHASE II

(Afghanis)

| AREA | 1st Year | 2d Year | 3rd Year | Total |
|---|---|---|---|---|
| Nad-i-Ali | 19,800,750 | 26,992,125 | 61,423,500 | 108,216,375 |
| Marja | 21,300,125 | 26,464,000 | 62,272,250 | 110,036,375 |
| Upper Boghra | 2,394,250 | 3,591,375 | 28,910,625 | 34,896,250 |
| Shamalan | 20,837,750 | 26,376,250 | 67,075,000 | 114,289,000 |
| Darweshan | 21,625,250 | 26,826,250 | 64,317,500 | 112,769,000 |
| TOTAL AFS..... | 85,958,125 | 110,250,000 | 283,988,875 | 480,207,000 |

## V. IMPLEMENTATION OF CONSTRUCTION

Selection of work to be accomplished during Phase II has been done by the HAVA Planning and Engineering Division, in accordance with available outlets and existing data at this time. It is recognized that changes in areas and/or segments of work may be required. These changes will be made by HAVA with concurrance of USAID Advisors.

Job planning for design and longer range planning will be accomplished by the HAVA Planning Division, which will also be responsible for soil surveys.

Engineering design and construction supervision will be the responsibility of the HAVA Engineering Division.

All excavation will be accomplished using machinery or hand labor or a combination of both. The Helmand Construction Corporation (HCC), under contract with HAVA, will excavate submain and main drains and construct associated structures, as well as provide machinery that may be used in pickup and farm drains.

Hand labor, under contract with HAVA, will be utilized to the maximum extent in excavating farm and pickup drains in the Nad-i-Ali and Marja areas, and to work in combination with draglines to excavate the farm drains in the Shamalan and Darweshan areas. Contracted hand labor will also be used to excavate farm drains in the Upper Boghra area.

At present, HCC has 7 very old draglines that are operable which will be available for Phase II construction. It is anticipated that an average of 6 will be operating at any time. The first 2 years excavation work is planned based on utilization of these 6 draglines, and is programmed on maximum capability of the machines. This means working the machines as many hours per day and as many days as possible. New machinery, programmed for the completion of all work in the Master Drainage Plan, is to be purchased early in year 1, and should be on the job by the beginning of the 3rd year. At that time, the new draglines will be used on all work programmed for draglines.

New backhoes will be purchased early in year 1, and when they arrived, will be used to assist in the excavation of pickup drains in the Nad-i-Ali and Marja areas.

A planning exercise in the form of an extended bar chart which relates all aspects of data collection, design preparation, contracting arrangements, construction supervision and inspection, and certification and payment for work was completed in preparing this construction plan. This enabled

the work to be performed and the inputs necessary to do it to be selected on a rational basis and the rate of work to be established at a pace that is realistically achievable within the capabilities of the GOA. This chart is far too extensive for inclusion in this plan, but is available and will be used in refinements to the plan in the future.

## VI. CONSTRAINTS

The major constraints to accomplishment of the planned project is in the available number and productive capability of men and machinery.

Phase II is being undertaken with a limited number of trained people in every specialty required. The draglines that are to excavate the essential outlets are 25-35 years old.

The first task will be to recruit new personnel and train a corps of engineers, planners, soils scientist and field surveyors, and office and laboratory support personnel to keep up the flow of ready designs and supervise construction. The task will certainly not be easy and will present a challenge to all participants.

HAVA has sufficient technically qualified personnel for the initial phase of training, provided that it combines the architectural section with the design section of the Engineering Office. Candidates for field positions are expected to come through promotion or recruitment from the local high schools, which graduate 225 students each year.

Assuming the personnel constraint is removed, machinery becomes a limiting factor. Without main drains for outlets, farm drains cannot be excavated. Without farm drains, the project will not achieve its purpose. Main drains depend on the continued operation of the draglines that have already been rebuilt many times.

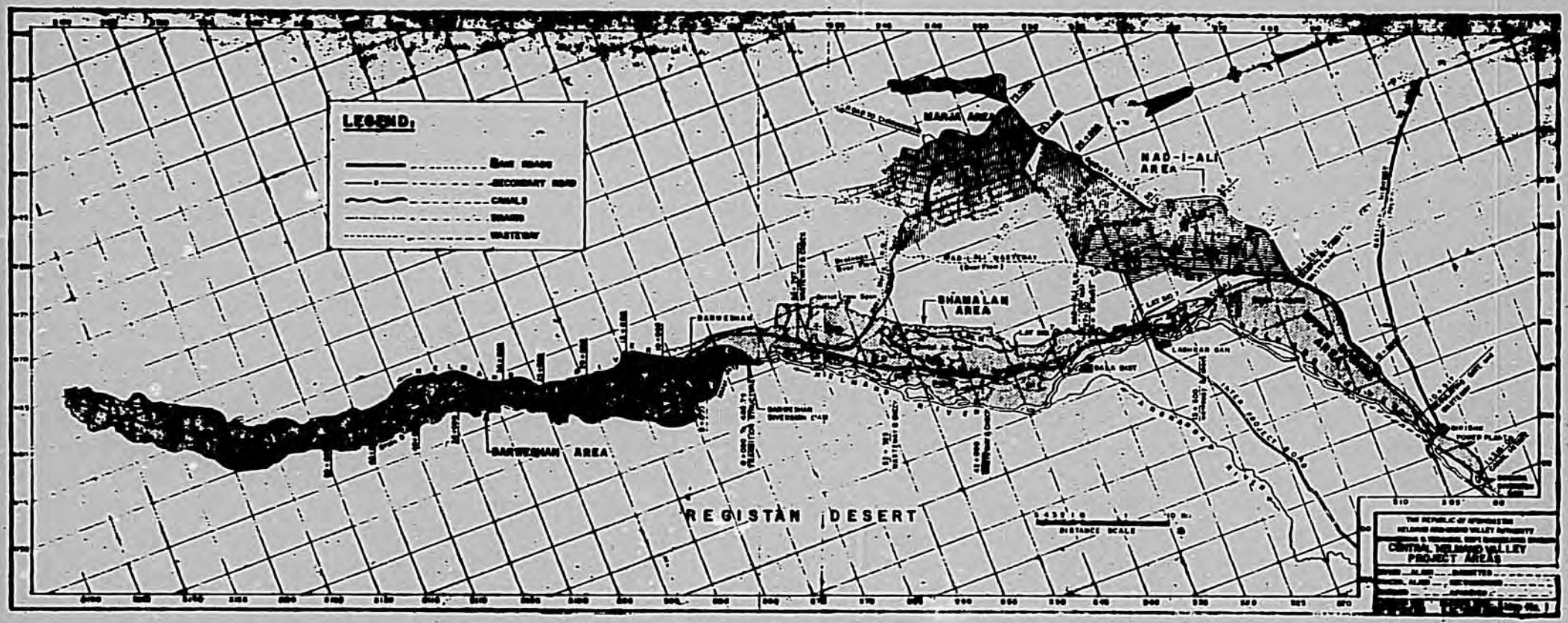
The chain reaction of inadequate operating capability of the draglines will result in limited real accomplishment in Phase II. To keep the draglines operating will require a constant and adequate supply of spare parts and the applied expertise of all HCC and USAID equipment repair specialists.

The ultimate success of Phase II depends on the purchases and delivery of new equipment to replace the old machinery of the Helmand Construction Corporation.

It is therefore imperative that a new spread of equipment be purchased that can take care of both the construction and maintenance needs of the project. Timely arrival by the 3rd year requires early action in the processing of purchase documents.

Another constraint is developing a corps of hand laborers. The 3rd year plan is for 3,842 laborers. This has to be built up from the current level of 290 daily wage laborers working early in Phase I. Continued day wage has proven to be impractical from the productivity and management aspects,

therefore, an adequate corps must be built around contracting with landowners and other interested individuals. There is a little reason to believe that a corps of laborers cannot be established, but it is going to require special assignments and constant attention of the HAVA Construction Coordinators.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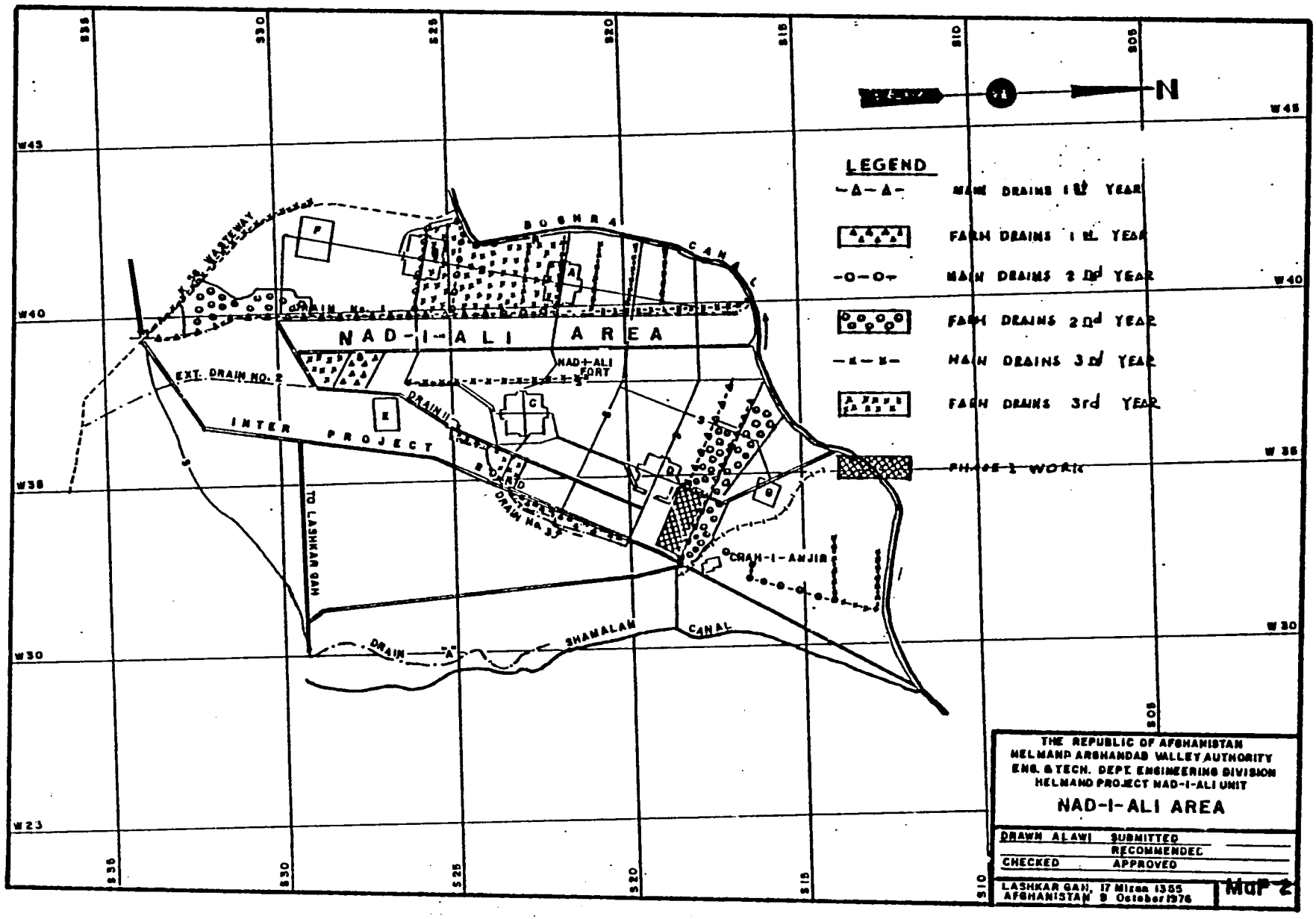
SECONDARY ROAD
CANALS
DRAINS
WASTEWAY
MARJA AREA
NAD-I-ALI AREA
SHAMALAN AREA
DARWESHAN
DARWESHAN AREA
REGISTAN DESERT
DISTANCE SCALE
CENTRAL HELMAND VALLEY
PROJECT AREAS

175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LEGEND
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PHASE I WORK
NAD-I-ALI AREA
NAD-I-ALI FORT
BOGHRA CANAL
DRAIN No. 1
EXT. DRAIN NO. 2
INTER PROJECT
DRAIN II
DRAIN No. 3
TO LASHKAR GAH
DRAIN "A"
SHAMALAN CANAL
DRAIN-I-ANJIR
W45
W40
W35
W30
W23
S35
S30
S25
S20
S15
S10
S05
THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENG. & TECH. DEPT. ENGINEERING DIVISION
HELMAND PROJECT NAD-I-ALI UNIT
NAD-I-ALI AREA
DRAWN ALAWI
SUBMITTED
RECOMMENDED
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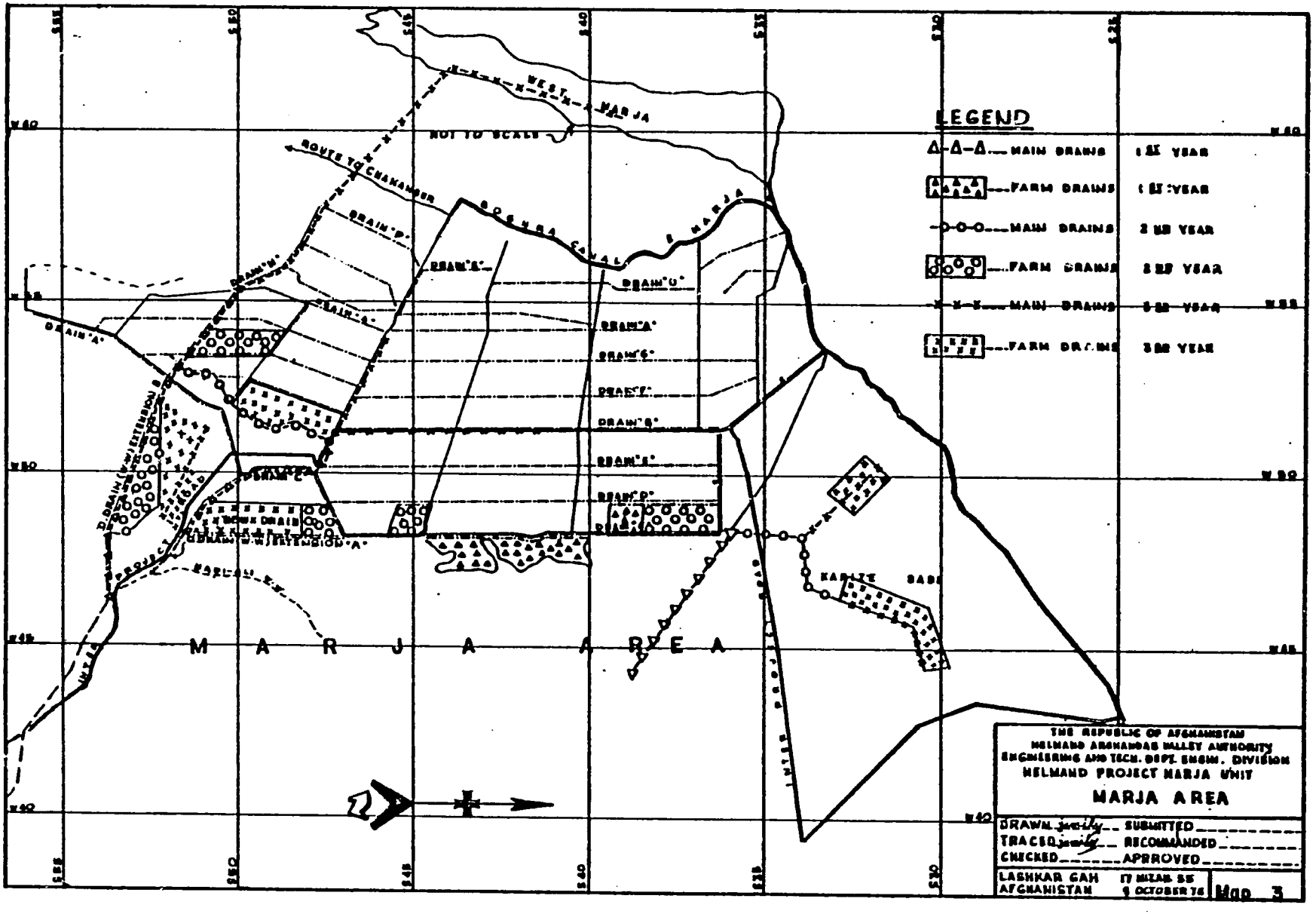
APPROVED
LASHKAR GAH, 17 Mizan 1355
AFGHANISTAN 9 October 1976
MAP 2

174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MARJA
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MARJA
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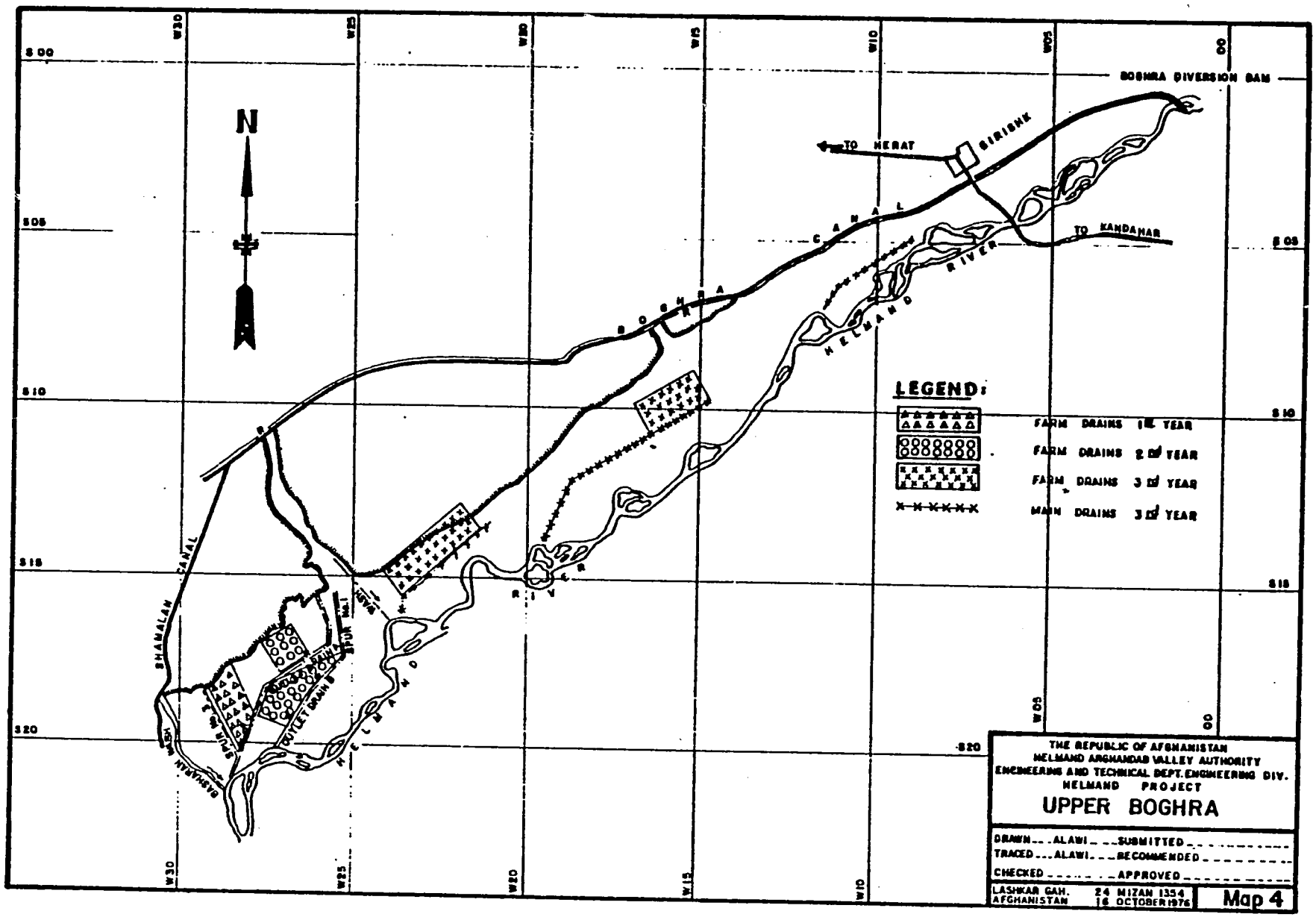
LASHKAR GAH
AFGHANISTAN
9 OCTOBER 74
MAP 3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TO HERAT
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TO KANDAHAR
BOGHRA CANAL
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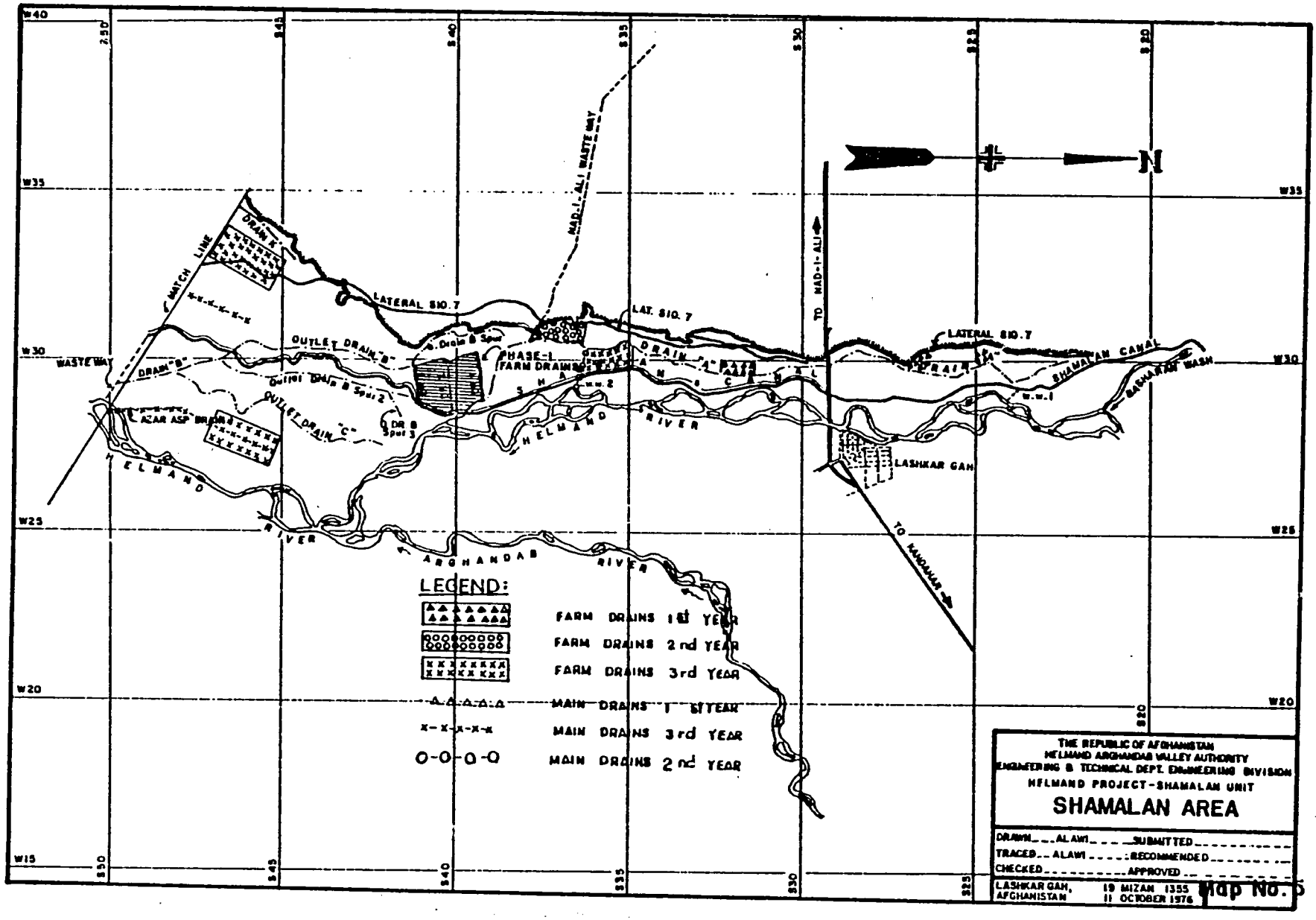
LASHKAR GAH. AFGHANISTAN
24 MIZAN 1354
16 OCTOBER 1976
Map 4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TO KANDAHAR
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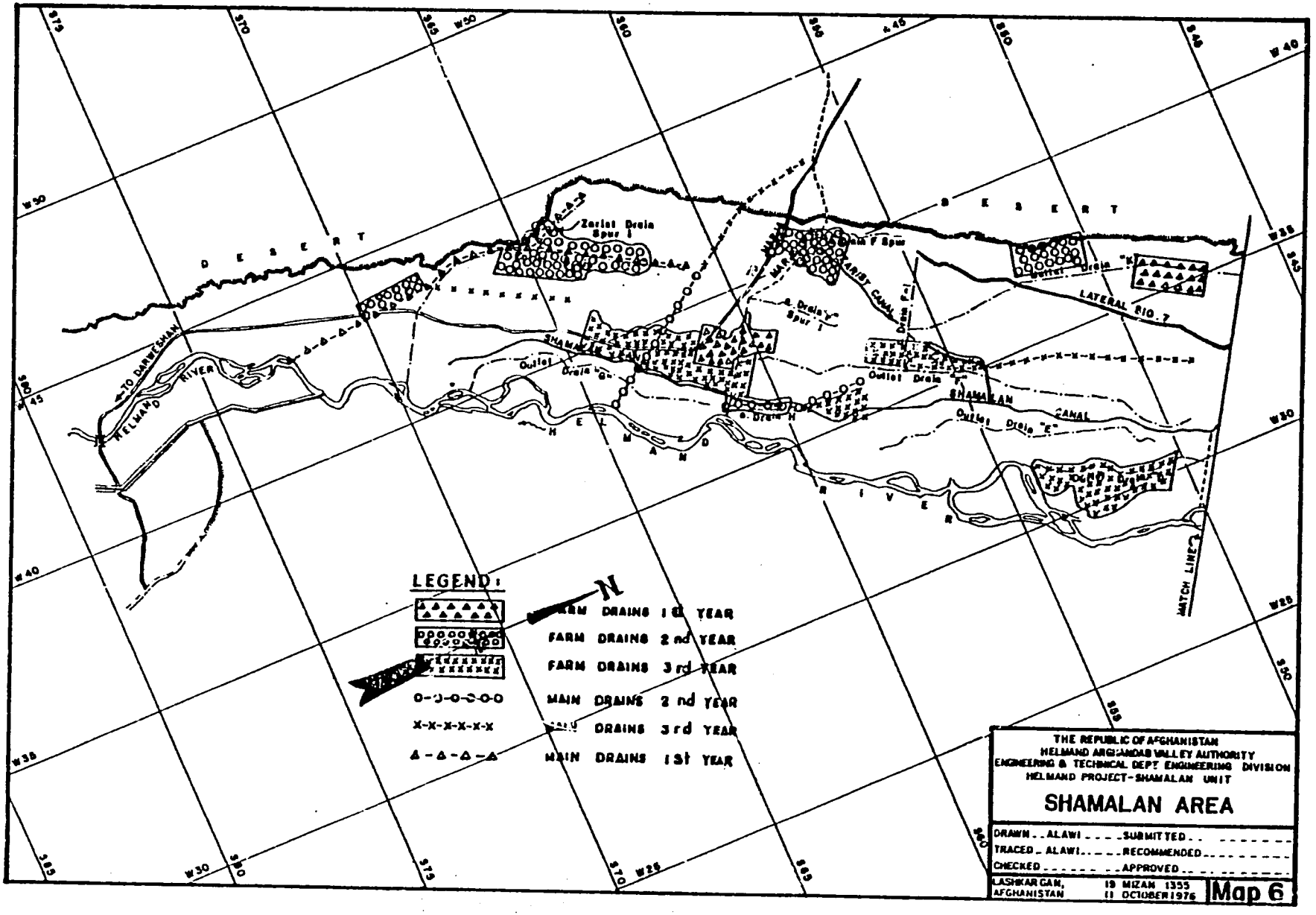
19 MIZAN 1355
11 OCTOBER 1976
Map No. 5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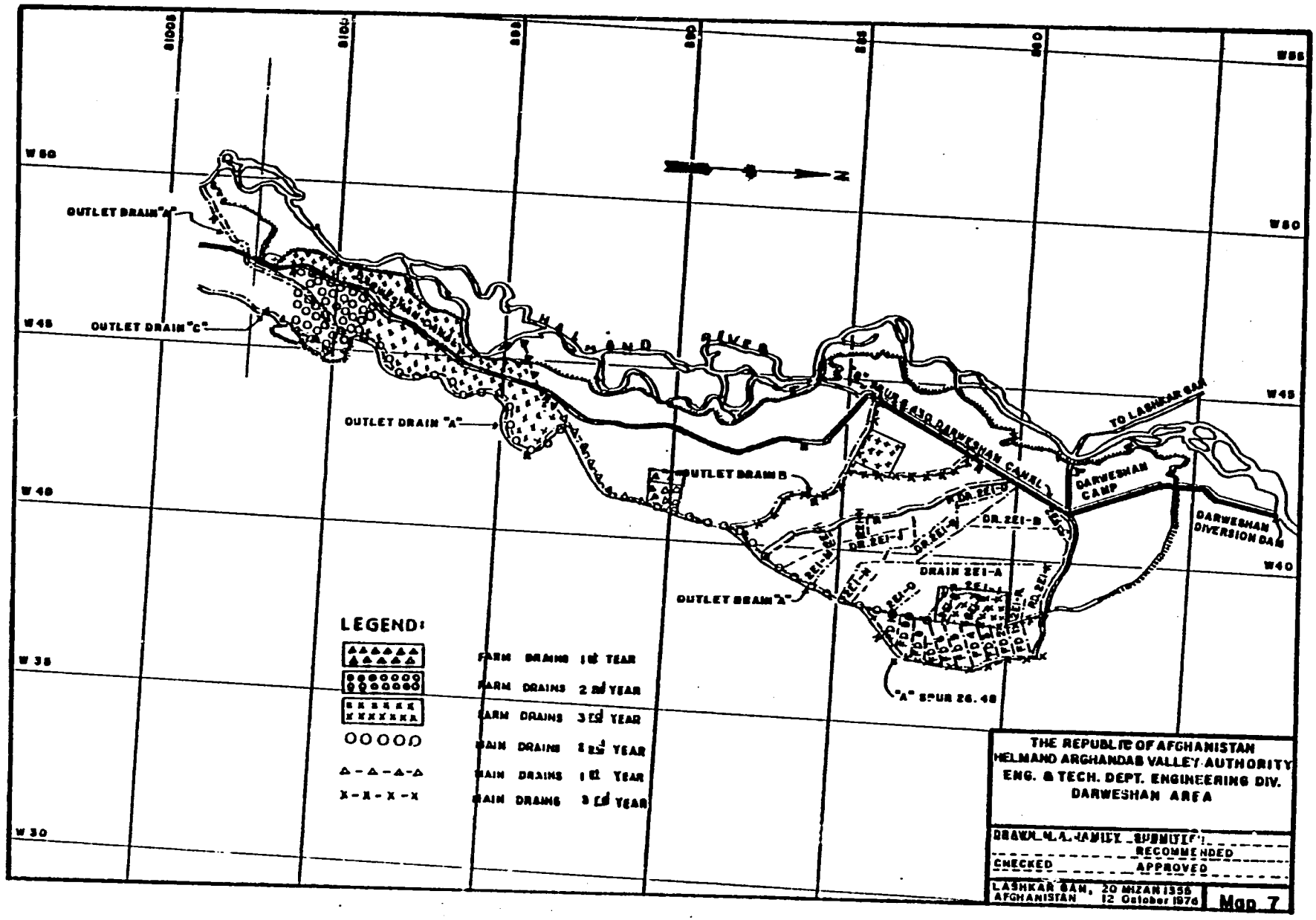
19 MIZAN 1355
11 OCTOBER 1976
Map 6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OUTLET DRAIN "C"
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OUTLET DRAIN "A"
HELMAND RIVER
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DR. ZE1-J
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THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENG. & TECH. DEPT. ENGINEERING DIV.
DARWESHAN AREA
DRAWN M.A. JAMILY SUBMITTED
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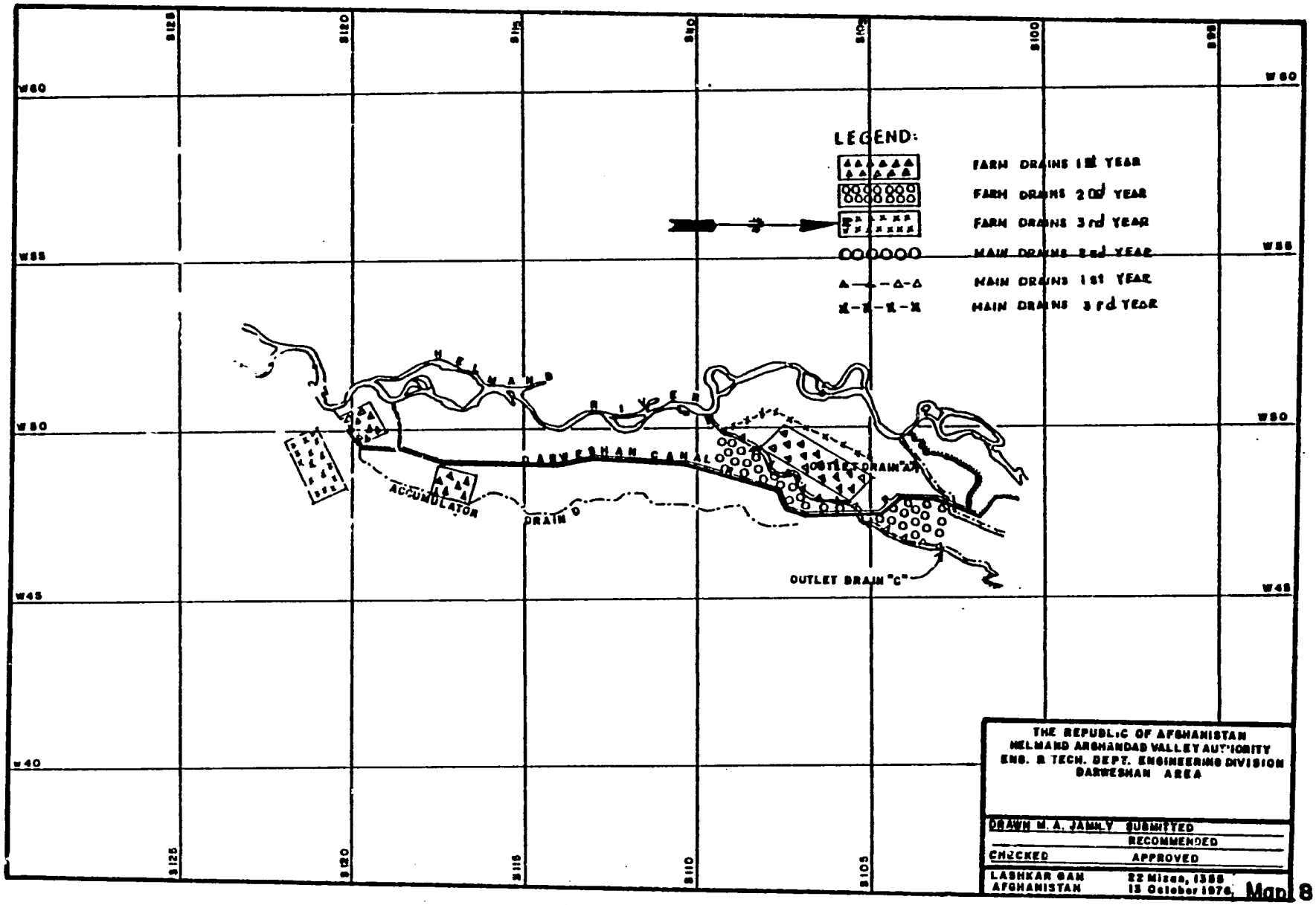
LASHKAR GAH, AFGHANISTAN
20 MIZAN 1355
12 October 1976
Map 7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HELMAND RIVER
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THE REPUBLIC OF AFGHANISTAN
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ENG. & TECH. DEPT. ENGINEERING DIVISION
DARWESHAN AREA
DRAWN M. A. JAMILY
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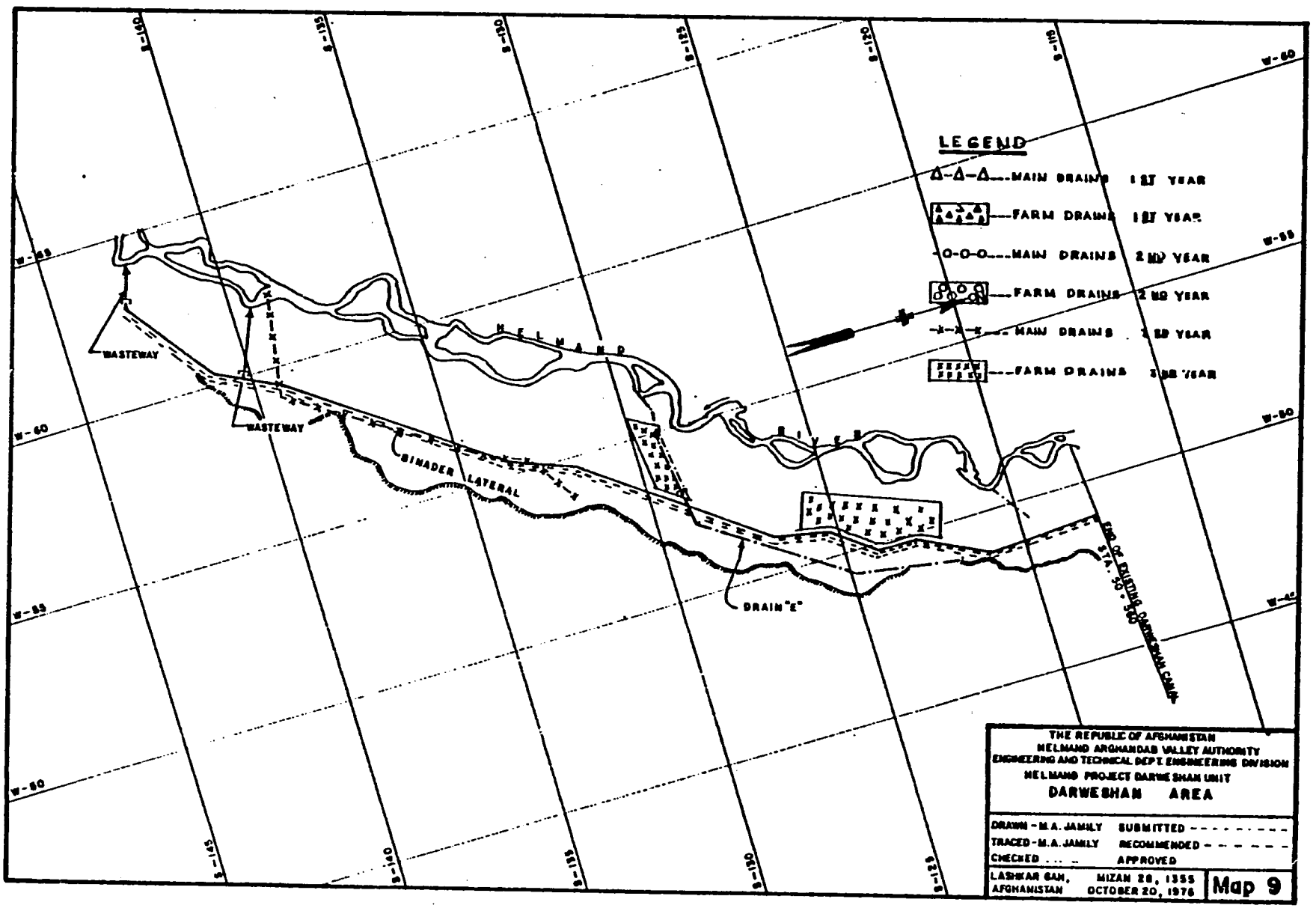
LASHKAR GAH
AFGHANISTAN
22 Mizan, 1355
13 October 1976

Map 8


LEGEND
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FARM DRAINS 1ST YEAR
MAIN DRAINS 2ND YEAR
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MAIN DRAINS 3RD YEAR
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RIVER
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S-150
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THE REPUBLIC OF AFGHANISTAN
HELMAND ARGHANDAB VALLEY AUTHORITY
ENGINEERING AND TECHNICAL DEPT. ENGINEERING DIVISION
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LASHKAR GAH, AFGHANISTAN
MIZAN 28, 1355
OCTOBER 20, 1976
Map 9

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ANNEX E

# CENTRAL HELMAND DRAINAGE PROJECT

## PHASE II EQUIPMENT PLAN

## (THREE YEARS)

Prepared by the HAVA Technical Division and
The GOA, in cooperation with the United States
Agency for International Development
(November 1976)

# CENTRAL HELMAND DRAINAGE PROJECT

## PHASE II

## EQUIPMENT PLAN

### I. Background

The Helmand Arghandab Valley Authority (HAVA) will provide overall management of this project; will undertake the design work, and will handle contract administration as necessary to execute the construction work. The Helmand Construction Corporation (HCC) is a government corporation that has been established within the last year. It is an outgrowth of the old Helmand Arghandab Construction Unit (HACU) that was organized to do construction work in the Helmand Arghandab Valley Area. In contrast to its forerunner (HACU), HCC is now authorized to work nation wide.

This equipment plan covers the needs of both HCC and HAVA in performing the work proposed by this project. Until recently, the major equipment owned by HCC was acquired with their own foreign exchange or through various loans and grants from the U. S. Government. Except for the equipment that was loan funded as a part of the Shamalan Canal Project, none of the equipment has been committed to the work of HAVA. Since its reorganization, HCC has developed equipment sources from other countries including Soviet Union. Some types of equipment from these sources will become available for use on this project and have not been included for procurement in this equipment plan.

II. Rationale for Equipment Purchase

The development program in Afghanistan is large in comparison to the present construction capability. The demands being made on HCC to perform work in other parts of the country is stretching its capability and equipment to the limit. The first two years of the Phase II Helmand Drainage Project is centered around using present HCC equipment, with some relief from the non-U. S. sources. The use of this equipment will limit the project rate of work until additional equipment can be obtained. Success in the first two years will depend on the commitment of the Government of Afghanistan (GOA), the Ministry of Water and Power, and HCC to the programmed work.

The recent establishment of a maintenance unit with HCC will go a long way to assuring that the Helmand Valley maintenance work is given adequate attention. It will be necessary to equip this unit so it can do the job.

It is recognized that HAVA's responsibilities go beyond the Project Area as described in the Master Drainage Plan, and that additional equipment is also needed to perform work in the other areas of responsibility. However, it is deemed appropriate here that equipment to be procured be only that needed to meet the needs in Phase II and further work under the Master Drainage Plan. Any equipment for other work must be addressed to and supported in separate plans, and possibly financed through other sources.

Pricing in this plan assumes AID dollar financing to Karachi (CIF) and GOA financing to the Project from there.

## III. HAVA Equipment Needs

Implementation of this project will require that the existing equipment pool be built up with additional automotive and engineering equipment to meet the increased demands of the Phase II work.

Automotive equipment is needed to provide access to this 90-mile long project by the HAVA project administrators, construction contract supervisors, inspectors, survey crews, and field data collectors. The types of equipment to be procured will include jeep type vehicles for use by supervisors and smaller crews. The use of jeep type vehicles will be new to this project and will avoid the use of larger vehicles for small groups of people and should result in appreciably lower operating costs. All automotive equipment will have four-wheel drive capability, because of the complete absence of paved roads and the frequent need to ford ditches throughout the project. Air conditioning will not be provided in any of the automotive equipment. Automotive equipment for use of field crews will be either carryall type vehicles or crew cab type pickup trucks, so that entire crews and their equipment and supplies can be transported in one vehicle.

Engineering equipment will add to the existing capability and includes both office and field equipment. Office equipment will include drafting equipment and calculators, and the field equipment will include engineering and soil data collection items such as transits, levels, tapes, hand augers, etc.

The funding required for the HAVA automotive and engineering equipment is $335,000.00 as listed below:

| ITEM | | COST, $ |
|---|---|---|
| Automotive Equipment | | |
| 30 vehicles | | |
| Initial Cost | $6,000.00 | |
| 30% freight | 1,800.00 | |
| 15% spare parts | 900.00 | |
| 30 vehicles @ | $8,700.00 | $270,000.00 |
| Engineering Equipment | | |
| Field crews, 8 @ $5000 | | 40,000.00 |
| Office | | |
| Draftsman's kits, 12 @ $500 | 6,000.00 | |
| Calculators, hand, 20 @ $150 | 3,000.00 | |
| Calculators, desk, 15 @ $150 | 2,250.00 | |
| Calculators, desk, 15 @ $400 | 6,000.00 | |
| Calculators, programmable, 2 @ $800 | 1,600.00 | |
| Miscellaneous Engineering Supplies | 3,150.00 | |
| Reference books | 3,000.00 | 25,000.00 |
| | | $335,000.00 |

IV. HCC Equipment Needs

The list of equipment which follows is needed to supplement equipment currently available to do the work proposed in this project. Equipment to be supplied from other than AID sources has been designated. The earlier comments on automotive type equipment about adding four-wheel drive capability and deleting air conditioning also apply here.

The kind of equipment selected and the sizes and quantities listed herein were the result of collaborative efforts of all concerned in planning the project. Additional details concerning each kind of equipment have been developed and will be incorporated into the technical specifications for procurement. Quantities of equipment needed were compiled from a very detailed chart covering all three years and all five areas over the 90-mile-length of the project. This chart was divided into 96 subprojects from which the equipment and manpower resources needed were identified.

Drainage construction equipment consists of draglines for main drain excavation with dressing by dozers and graders, ditching machines and backhoes for farm drain work, and scrapers for land smoothing and possibly some new main drain work above the water table.

Maintenance equipment is gradalls and ditch cleaning machines supported by dozers and graders. A study is underway to determine the feasibility of using cutting machinery on the vegetation growing in the ditches.

Support equipment is that needed to maintain and service the construction and maintenance fleet, in both the field and shop such as service trucks, equipment transporters, personnel carriers, welders, generators, and special tools. Also included here are small construction equipment such as pumps, compressors, and concrete mixers which are needed to supplement those previously provided under AID Loan 012. An allowance for spare parts has been included at 15% of the acquisition cost of the new equipment. Shop supplies include shim stock, bearing metal, plates, rods and strip, tool kits, electrical hydraulic and pneumatic parts and supplies, gasket material and various other materials.

An allowance has been included to cover the cost of U.S. experts on a short term basis to train equipment operators and mechanics on the project site.

| Description | Number Needed | Unit Cost $ | Total Cost $ |
|---|---|---|---|
| **DRAINAGE CONSTRUCTION** | | | |
| Draglines, 1 cu. yd. | 6 | 160,000.00 | 960,000.00 |
| Draglines, 2.5 cu. yd. | 7 | 200,000.00 | 1,400,000.00 |
| Dozers, Cat. D-8 or equivalent | 2 | 172,000.00 | 344,000.00 |
| Scrapers, 11 cu. yd. (+2 from Loan 012) | 2 | 71,000.00 | 142,000.00 |
| Graders, 12 ft. blade | 2 | 60,000.00 | 120,000.00 |
| Ditching Machines, 6 ft. capacity | 2 | 47,000.00 | 94,000.00 |
| Backhoes, rubber tires | 5 | 18,000.00 | 90,000.00 |
| Backhoes, track mounted | 2 | 30,000.00 | 60,000.00 |
| Total - Construction . . . . . | | | $3,210,000.00 |
| **MAINTENANCE** | | | |
| Gradall, .5 cu. yd. | 3 | 150,000.00 | 450,000.00 |
| Dozers, Cat. D-8 or equivalent | 2 | from 012 | |
| Grader, 12 ft. blade | 2 | from 012 | |
| Ditch Cleaning Machines | 2 | 38,000.00 | 76,000.00 |
| Total - Maintenance . . . . . | | | $526,000.00 |
| **HCC SUPPORT EQUIPMENT** | | | |
| Front End Loader, 3.5 cu. yd. | 1 | 60,500.00 | 60,500.00 |
| Trucks, Dump, 10 cu. yd. | 8 | from GOA Credits | |
| Trucks, Flatbed, 3 tons | 5 | from GOA Credits | |
| Trucks, Tank, Fuel | 2 | 28,000.00 | 56,000.00 |
| Trucks, Lubricating Service | 2 | 28,000.00 | 56,000.00 |
| Trucks, Tractor, 300 Hp | 2 | 40,000.00 | 80,000.00 |
| Cranes, Truck Mt. 25 tons | 1 | 60,000.00 | 60,000.00 |
| Trailers, Lowboy | 2 | 21,000.00 | 42,000.00 |
| Trucks, Pickup, 6 passengers | 10 | 9,000.00 | 90,000.00 |
| Cranes, Truck Mt. 10 tons | 2 | 35,000.00 | 70,000.00 |
| Bus, 55 passengers | 1 | 26,000.00 | 26,000.00 |
| Air Compressor, Portable, 365 cfm | 2 | 23,000.00 | 46,000.00 |
| Air Compressor, Stationary, 450 cfm | 1 | 26,000.00 | 26,000.00 |



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| Description | Number Needed | Unit Cost $ | Total Cost $ |
|---|---|---|---|
| HCC SUPPORT EQUIPMENT (cont'd) | | | |
| Concrete Mixers, 16 cu. ft. | 1 | 11,000.00 | 11,000.00 |
| Concrete Mixers, 11 cu. ft. | 1 | 8,500.00 | 8,500.00 |
| Water Pumps 4" | 3 | 4,500.00 | 13,500.00 |
| Water Pumps 6" | 2 | 7,000.00 | 14,000.00 |
| Sludge Pump | 2 | 2,000.00 | 4,000.00 |
| Water Pumps 2" | 5 | 800.00 | 4,000.00 |
| Electric Welders w/trailers | 3 | 3,000.00 | 9,000.00 |
| Generators, 10 KW | 4 | 6,000.00 | 24,000.00 |
| Machine Shops - Portable | 2 | 8,000.00 | 16,000.00 |
| Lathe, Metal, 36" Swing | 1 | 50,000.00 | 50,000.00 |
| Shop Equipment and Tools | lot | 80,000.00 | 80,000.00 |
| Tools, Special, Dragline | lot | 15,000.00 | 15,000.00 |
| Tools, Special, Backhoe | 1 | 5,000.00 | 5,000.00 |
| Office Equipment | lot | 8,000.00 | 8,000.00 |
| Spare Parts - 15% of Original Price | | | 690,000.00 |
| Shop Supplies | lot | 400,000.00 | 400,000.00 |
| Training by U.S. Experts | | | 300,000.00 |
| Total Support Equipment . . . . . | | | $2,264,500.00 |
| GRAND TOTAL . . . . . | | | $6,000,500.00 |

ANNEX F

# CENTRAL HELMAND DRAINAGE PROJECT

## PHASE II TRAINING PLAN

## (THREE YEARS)

Prepared by the HAVA Technical Division and
The GOA, in cooperation with the United
States Agency for International Development
(November 1976)

ANNEX F

# PHASE II

## HELMAND VALLEY DRAINAGE PROJECT

## TRAINING PLAN

The goal of the Helmand Valley Drainage Project is to provide increased productivity, income, and employment through drainage of all irrigated land within the Project Area. A large amount of planning, design, and construction work will be required in order to implement this plan. As planned, this work will start at a relatively low level during the first year of Phase II and will build up until a peak in drain design and construction is reached in years 3 & 4. After reaching this peak, the work will be completed at about the same level of production each following year. It is estimated that it will require about 16 years to complete the plan. In addition to drainage, it is anticipated that other improvements will be made to increase agricultural production over this period.

In order to complete this work and achieve the set goal within a reasonable time frame, the technical capability of HAVA must be expanded. This means an increase in both the number of qualified people in the various skills and the capabilities of the individuals. It is proposed that a training program be carried out which will bring the HAVA personnel to the peak required by the end of the second year of Phase II. Additional training would be expected, following year 2, in order to keep the capability at the required level. An important secondary benefit of the training will be the incentive provided to encourage new people to come to the Helmand Valley to work.

Training is presently needed to bring up the capability in the areas of engineering supervision and management, drainage planning and design, soil surveying, data collection skills, surveying, and construction inspection and supervision. In addition, as the scope broadens, training in irrigation and agricultural management will be important to meet the overall objective of maximized agricultural production.

The following is needed to bring the capability of HAVA to that needed by year 3 and maintain it:

1. Practical training for 6 design engineers, to increase proficiency in hydraulics, structural design, soil mechanics and organization of contract drawing, for six months with a Soil Conservation Service (SCS) State Design Unit.



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2. Practical training for 6 engineering supervisors, to increase the proficiency in organization and management of an engineering office, work scheduling and personnel training procedures, for six months in an appropriate SCS engineering office.

3. Combination of practical training and course study for 5 planners, to increase knowledge and skills in drainage and irrigation planning, for one year. Breakdown between time spent in practical training and course study will depend on the education and background of the participant. Practical training should be in a SCS planning office in the U. S. that is responsible for planning complete drainage systems on irrigated land.

4. Practical training for 3 construction engineers, to increase proficiency in construction supervision, record keeping, and scheduling, for six months assignment in a SCS construction unit.

5. Two years college training for 3 soil scientists, leading to a major or B. S. degree in soil science. Two summers should be spent in practical training with a SCS Soil Scientist. Purpose would be to provide required educational and practical training to prepare trainees for individual soil survey and interpretation work. They would also be expected to provide training to other staff members upon their return.

6. Two years college training for two engineers leading to a major or B. S. degree in drainage and irrigation engineering. Two summers should be spent in practical training with a SCS office, having a work load in irrigation and drainage. The purpose would be to provide required educational and practical training to prepare trainee for leadership training roles in drainage and irrigation system planning and design. Trainee should, in addition, become capable of providing advice on water management problems.

7. Practical on-the-job training for 42 engineering surveyors to increase proficiency in all types of engineering surveys. Emphasis should be placed on learning what kinds of information are required for certain jobs. After completing the training, the individuals should be capable of providing the same kind of training to new employees. A TDY specialist will be needed for 90 days to carry out this training.

8. Practical on-the-job training for 12 construction inspectors to increase proficiency in construction methods, record keeping, and scheduling. After completing the training, the individuals should be capable of providing leadership in completing the work and in training new people. A TDY specialist will be needed for 60 days to carry out this training.

9. Practical on-the-job training for 10 soils data collectors to in-

crease proficiency in the collection of data required for soils surveys and drainage design. After completing the training, the individuals should be able to provide leadership in completing the work scheduled and in training new people. A TDY specialist for 60 days will be needed to carry out this training.

10. Practical on-the-job training for 6 soils laboratory technicians to increase proficiency in running all required tests for completion of soils surveys and drainage design. After completing the training, the individuals should be able to provide leadership in completing the work and training new people. The soil scientist advisors, assigned to the project, can carry out this training.

11. Practical on-the-job training for 3 agronomists to increase proficiency in providing advice and education to land owners on drainage, leaching and water use practices. The Farmer Education/Water Use Advisor, assigned to the project, can carry out this training.

12. Four months short course in drainage, held annually in The Netherlands, for a total of 3 drainage planners. This is a comprehensive course and should be additional training for those already capable individuals.

Although the needs, as outlined, are intended to increase and maintain the capability of the HAVA staff for Phase II, an equivalent or gradually reduced level of training should be continued thereafter in order to keep the capability at a high level.

The training items as listed above are general types of training. Specific training needs in the form of practical or course work should be designed for each individual, based on the capabilities and needs of the position. Some training, such as surveying, data collection, and soils laboratory training should be held in Lashkar Gah. On-the-job training should be provided by the HAVA and USAID staffs as needed to increase proficiency in these fields. As an incentive and for additional experience, a limited number of these individuals should be given observation tours to a third country.

In addition to other training, 3 HAVA supervisors should be given a 6 week tour of drainage projects in the United States. This should provide an increased understanding of the methods of solving many drainage problems.

In order to prepare individuals for training in the United States or other English speaking countries, an English Language Course

should be given to improve the level of comprehension of HAVA staff, who might qualify for such participant training.

HAVA has sufficient technically qualified personnel for the initial phase of training, provided that it combines the architectural section with the design section of the Engineering Office. Candidates for field positions are expected to come through promotion or recruitment at local high schools, which graduate 225 male students each year.

A summary of the training items, and the number of trainees required in each of the first three years is given in the following table, while the estimated cost of the program is shown in table 2.

| | Position | 1st Year | 2nd Year | 3rd Year | Total |
|---|---|---|---|---|---|
| 1. | Design Engineers | 2 | 2 | 2 | 6 |
| 2. | Engineering Supervisors | 2 | 2 | 2 | 6 |
| 3. | Planners | 1 | 2 | 2 | 5 |
| 4. | Construction Engineers | 1 | 1 | 1 | 3 |
| 5. | Soil Scientists | 1 | 1 | 1 | 3 |
| 6. | Drainage and Irrigation Engineers | 0 | 1 | 1 | 2 |
| 7. | Surveyors (on-the-job) | 22 | 10 | 10 | 42 |
| 8. | Construction Inspectors (on-the-job) | - | - | 12 | 12 |
| 9. | Data Collectors (on-the-job) | 10 | - | - | 10 |
| 10. | Soil Laboratory Technicians (on-the-job) | 4 | 0 | 2 | 6 |
| 11. | Agronomists (on-the-job) | 1 | 1 | 1 | 3 |
| 12. | Drainage Planners (Third Country) | 1 | 1 | 1 | 3 |
| 13. | HAVA Supervisors (observation tours) | 3 | 0 | 0 | 3 |
| | | 48 | 21 | 35 | 104 |



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TABLE 2

APPROXIMATE COST
TRAINING PLAN
HELMAND VALLEY DRAINAGE PROJECT
PHASE II

| | | | 1977 | 1978 | 1979 | 1980 | Totals |
|---|---|---|---|---|---|---|---|
| US | ACADEMIC | SOIL SCIENTIST (2yr) | 11,050 (1) | 23,300 (2) | 22,800 (2) | 12,000 (1) | 69,150 |
| | | Drainage Engineer (2yr) | | 11,650 (1) | 22,800 (2) | 12,000 (1) | 46,450 |
| US | SHORT TERM | Design Engineers | 19,200 (2) | 19,800 (2) | 20,400 (2) | | 59,400 |
| | | Engineer Supervisors | 19,200 (2) | 19,800 (2) | 20,400 (2) | | 59,400 |
| | | Engineer Planners | 19,200 (2) | 39,600 (2) | 40,800 (2) | | 99,600 |
| | | Construction Engineers | 9,600 (1) | 9,900 (1) | 10,200 (1) | | 29,700 |
| | | Farm Education & Water Use Specialist | 9,600 (1) | 9,900 (1) | 10,200 (1) | | 29,700 |
| | | HAVA Supervisors | 9,600 (3) | | | | 9,600 |
| IRAN | THIRD COUNTRY | Construction Supervisors | 6,000 (4) | 6,400 (4) | 6,800 (4) | | 19,200 |
| | | Soil Lab technicians | 36,000 (4) | | 20,400 (2) | | 56,400 |
| AFGH | IN COUNTRY | Surveyors | 9,900 (22) | 4,500 (10) | 4,500 (10) | | 18,900 |
| | | TDY | 9,000 (1) | 9,000 (1) | 9,000 (1) | | 27,000 |
| | | Data Collectors | 3,000 (10) | | | | 3,000 |
| | | TDY | 6,000 (1) | | | | 6,000 |
| | | Construction Inspectors | | | 3,600 (12) | | 3,600 |
| | | TDY | | | 6,000 (1) | | 6,000 |
| | | Drainage Seminar | 6,000 (40) | | | | 6,000 |
| | | Total | 173,350 | 153,850 | 197,900 | 24,000 | 549,100 |

ANNEX F

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ANNEX G

# ENVIRONMENTAL ASSESSMENT

## A. SOURCE:

This discussion has been prepared by the USAID staff in Kabul without outside assistance. It is in keeping with the "best efforts" guidance for the first half of FY 1977 as contained in AIDTO Circular A-44 which provides for uninterrupted flow of program implementation and funding activities during this transition period while these added procedures are incorporated into the Agency's workload.

## B. LIMITED AID INFLUENCE:

It must be recognized that developing countries receiving AID assistance are independent, sovereign nations with their own individual national policies, needs, priorities and perceptions of the relative importance of environmental quality in the framework of their economic development. AID's influence on the development strategies and priorities of these countries is limited and these countries cannot always be expected to readily accept United States environmental concepts or policies, especially when these have taken Americans many generations to evolve.

## C. PROJECT DESCRIPTION

The work to be performed under this three-year project consists of the construction of drainage facilities for approximately 12.6% of the irrigable cropland in the Central Helmand River Valley in Southern Afghanistan. The irrigation system was designed and constructed in the late 1950's and provides irrigation water to four areas on the right bank through the Boghra Canal and one area on the left bank through the Darweshan Canal.

The Boghra Canal provides 2600 cfs. of water to two areas reclaimed from the Dasht-I-Margo desert, Nad-I-Ali and Marja, which comprise 16,500 and 26,000 hectares respectively and the Upper Boghra and Shamalan area in the river valley proper, which covers 13,850 and 27,700 hectares respectively. The Darweshan canal provides 1,000 cfs. of water to the Darweshan area in the river valley proper of 29,000 hectares. Total area irrigated is some 67,200 hectares along 150 kilometers of the Central Helmand River Valley.

The development of the irrigation system, as originally designed, contained provision of both open and closed tile drains, not all of which were installed. Most are too shallow for proper drainage. Maintenance of drains has not been adequately performed. Production on these irrigated lands has been gradually declining due to waterlogging and salinity in the soil. The purpose of the present project is to provide additional as well as improved drainage facilities, leaching programs, land smoothing, and some water use improvements to reduce the waterlogging and salinity and improve the crop yields and production. The rate of work to be accomplished has been determined by the pace that can be reasonably expected from the Government of Afghanistan given the inputs designed into this project.

D. PROJECT IMPACT:

The inputs of this project are designed to arrest the waterlogging and salinity build-up in the currently cultivated areas and those to be cultivated and should, with time, increase the crop yields and production. The environmental aspects that can be identified and evaluated are discussed below.

1. Land Use. The irrigation of these lands has brought under productive use desert areas that were formerly of no human benefit. Unfortunately, the productivity of this land has been in decline because of waterlogging and salinity. The drainage inputs to be provided along with the leaching and land smoothing efforts will reverse this trend while it is still economically reversible and will increase the productivity of the land. The soil characteristics will improve as the water table drops below the plant root zone and the leaching process removes unwanted salts. The beneficial use of the land will be enhanced by this project.

2. Water Quality. This project will not change the physical state (temperature, sediment load, etc.) of the waters being used to irrigate the area. However, the chemical state of the irrigation water will be changed in that the salt content will be increased. As demonstrated below, however, this reduction in quality is such that the waters leaving the project areas are still of sufficient quality to remain first class irrigation waters.

Israelson's book "Irrigation Principles and Practices" gives the standards for irrigation waters as follows:

| Water Class | Total Salts PPM |
|---|---|
| 1 | 0 - 700 |
| 2 | 700 - 2000 |
| 3 | over 2000 |

The Helmand river water at the Boghra diversion, at the start of the project areas, has an average salt content of 215 ppm. This is first class irrigation water. The following analysis covers the effects of current drainage on the river's salinity during the month of June when the drainage water is at its maximum salinity and the river is at its lowest flow. This is the period when the river below the irrigation area is at its peak of salinity.

| Drainage Area | Flow | Total Salts PPM | Total Salts CCS |
|---|---|---|---|
| Nad-I-Ali | 2.06 | 980 | 2,020 |
| Marja | 2.14 | 1,400 | 2,996 |
| Shamalan | 3.31 | 771 | 2,552 |
| Zarist | 0.15 | 3,500 | 525 |
| Total | 7.66 | | 8,093 |

Note: Flow equals quantity in cubic meters per second
PPM equals parts per million
CCS equals cubic centimeters per second

The Helmand River below the Arghandab junction and above the drainage outlets from the irrigated areas has a flow of 200 cms and salt content of 259 ppm which when mixed with the drainage water raises the salt content to 290 ppm.

$$\frac{8093 + 51,800}{7.66 + 200} \text{ or 290 ppm}$$

This is the salt content of the water entering the Darweshan irrigation area. The drain water from Darweshan has a flow of 3.38 cms and contains 1400 ppm of salts. The Helmand River just above the Darweshan drains has a flow of 180 cms and contains the indicated 290 ppm of salts which when mixed with the drainage water raises the salt content to 310 ppm.

$$\frac{52,200 + 4,732}{180 + 3.38} \text{ or 310 ppm}$$

Although this is the month when the river is the saltiest, the water remains in the range of first class irrigation water.

The drainage water from Nad-I-Ali, Marja and Shamalan now amounts to 10.4 percent of the irrigation water diverted into the Boghra Canal. The drain water from Darweshan is 14.2 percent of the irrigation water introduced into the area. It is expected that the drain water from all areas will level off at about 15 percent of the irrigation water used when all the drains are completed. 1/ Field tests conducted by HAVA and BuRec in 1967 indicate that drainage water from the present undrained land will, when the area has adequate drainage, have 2500 ppm of salt the first year, decreasing at the end of the third year to a level which will remove about the same amount of salt as is being brought in with the irrigation water. It is estimated that in the steady state (leaching completed) the drainage waters of Nad-I-Ali, Marja, and Shamalan will contain an average 1425 ppm of salt. The actual area to be drained in Phase II, which is only a small part of the total project lands, will have drainage water with a salt content as high as 2500 ppm. However, for this analysis, we will assume that all the drainage water entering the river will contain 2500 ppm of salt.

Using the same method of calculation as above, the increased drainage water and salt removal would raise the salt content of the river to only 381 ppm at the lower end of the Darweshan area. Irrigation water with 381 ppm of salts is of very good quality. When the project is completed and the drainage water levels off at the expected 1425 ppm of salts, the quality of the downstream river water will only contain 303 ppm of salt.

Listed below for comparison are salinity levels from some U.S. rivers as listed in the USDA Handbook No. 60.

| River | Location | Dissolved Salts ppm |
|---|---|---|
| Missouri | Williston, North Dakota | 838 |
| Arkansas | La Junta, Colorado | 981 |
| Canadian | Conchos Dam, New Mexico | 586 |
| Rio Grande | El Paso, Texas | 754 |
| Colorado | Yuma, Arizona | 740 |
| Pecos | Carlsbad, New Mexico | 2,380 |
| Sevier | Delta, Utah | 1,574 |

Thus, the estimated 303 ppm to be achieved in the Helmand River will not have a significant negative impact on water quality downstream of the project area.

1/ The 15 percent is estimated to be that necessary to maintain a steady salt level in irrigated areas once the excess salts have been leached.

3. Air Quality

This project will not introduce any additives to the air. Pollutants from construction equipment will be added but the numbers of machines involved are so small and their spacing so great in relation to the project area that the overall effect will be negligible.

4. Natural Resources

This project will result in the more efficient use of irrigation water as adequate drainage results and excess salts are leached from the land. This increased efficiency will allow more land to be brought under cultivation without use of additional water and represents conservation of one of Afghanistan's scarcest natural resources: Water.

5. Cultural

Since the project will be concentrated in areas previously cultivated successfully, or where cultivation has been attempted, it should not engender difficulties for historic, religious or archeological interests. Also, no perceivable conflicts with the Afghan teachings, lore or history will arise.

6. Socio-economic

The labor intensive methods to be used on this project will result in better use of the now underemployed farm population and will contribute to the economic well being of the area and its peoples. The additional lands to be brought under cultivation will require more persons to become involved in farm labor and may offer a more attractive alternative to those farm laborers now migrating to Iran where work is plentiful and wages appreciably higher. Given this alternative, farm laborers would opt for employment nearer their homes, even at lower wages, rather than moving across the border to Iran.

7. Health

The impact of this project on health will be beneficial. Elimination of stagnant pools of water in low, poorly-drained fields and in blocked ditches where flows become negligible will destroy breeding places for mosquitoes and effectively assist in the malaria eradication program that is being implemented in the Helmand Valley.

There is no indication to date that conditions in Afghanistan are conducive to support of schistosomiasis. Consequently, the inputs of this project will not contribute to this problem.

# VALUES USED IN COMPUTING 1975 FARM COSTS AND INCOME

## Input Costs

Fertilizer: Afs 10,600/MT Urea; afs 11,600/MT DAP. Retail prices of afs 520 and afs 570 per 50-kg bag for urea and DAP respectively plus afs 10/bag for transportation to farm.

Seeds: (j = jerib = 0.1936 ha; m = mon= 4.416 kg)

Wheat, Improved: Afs 981/ha -- 5.5m/j; afs 34.5/m; afs 190/j.

Wheat, Local

Nad-i-Ali, Marja: Afs 563/ha -- 3.4 m/j; afs 32/m; afs 109/j.
Shamalan, Darweshan: Afs 801/ha -- 4.7m/j; afs 33/m; afs 155/j.

Cotton: no cost -- provided free to farmers by government-owned gin to promote cotton production.

Corn: Afs 331/ha — 2.2 m/j; afs 29/m; afs 64/j.

Mung Beans: Afs 130/ha -- 1 m/j; afs 25/m; afs 25/j.

Clover: Afs 542/ha — 0.9m/j; afs 117/m; afs 105/j.

Barley: Afs 341/ha -- 2.2 m/j; afs 30/m; afs 66/j.

Vegetables: Afs 212/ha -- cost estimated at afs 41/j.

Labor: Wage rates of 100, 85, 50, 45 and 30 afs/day respectively for harvesting wheat, picking cotton, planting cotton, other labor on cotton, and general farm work.

## Field Work

Tractor: Afs 1033/ha for single crops; afs 465/ha for second crops, or afs 200/j for work with plow and afs 90/j for work with field cultivator.

Oxen: Afs 1060/ha -- afs 205/j.

Tractor owners provided cost data for fuel, lube, operators, repairs and maintenance and for tires. Except for fuel, which was based upon its cost per jerib of field work, the costs were presented on a yearly basis. Allocating all costs, operating and ownership, to cultivation gives the following averages:

| Item | Cost of Cultivating (afs/jer) |
|---|---|
| Fuel | 53 |
| Operator (afs 24,000/year ÷ 600 j/year) | 40 |
| Lube (afs 9200 ÷ 600) | 15 |
| Repairs, Maintenance (afs 10,200 ÷ 600) | 17 |
| Tires (cost, afs 25,000; 2.5 year life) | 17 |
| Depreciation (cost, afs 400,000; 20 year life) | 33 |
| Interest cost (10% of average investment of afs 213,000 ÷ 600) | 36 |
| Total | 211 |

In this country, tractors have many uses other than for cultivation, however. Especially, they are used to transport farm crops, animals and people and perhaps as much as 20 percent of the above cost items (except fuel) should be allocated to activities other than cultivation. Such an adjustment gives a cost estimate of afs 180 per jerib for field work. The average custom rate is less than this. The tractor driver, however, is hired on a yearly basis and the custom rate is substantially higher than the operating cost (but not operating plus ownership). Custom work at the going rates may thus appear attractive. It was noted by farmers that the resale value of a tractor five years old is practically as high as the price of a new tractor.

Based on our survey information, the financial cost of keeping and using an oxen amounts to about afs 4,260 annually. Data from the FES indicate that a pair of oxen can, on average cultivate slightly more than 4 hectares of land annually. The cost of field work performed by oxen is higher than that performed by tractor, the difference being especially pronounced for second crops and clovers where tractor preparation is done with field cultivators, rather than with plows. For our estimates, the cost of keeping and using oxen was allocated equally over all land cultivated with oxen. For farmers than own oxen, however, the extra cost of using them to prepare land for second crops would be very low.

Interest: 10 percent annually for both explicit and imputed.

Land Taxes: Afs 62/ha — afs 12/jerib average

Farm Equipment (Other than Tractor). Since most of this equipment has a useful life of a single harvest season, it is considered a current cost and valued at prices provided by interviewees.

Working Animals (per head/year; of age two-years and over).

Oxen: Afs 4,260 -- Ownership, afs 1,230; feed, afs 3,030. Oxen have residual value of afs 5,000 - 6,000. This cost is subsumed under cultivation costs.

Donkeys: Afs 1,060 — Ownership, afs 280; feed afs 780.

Output Values

Farm output was valued at the following farm-gate prices. Crops are shown on a gross value basis; livestock, net.

Crops, Gross

Wheat: Afs 6,350/MT. Afs 6,125/MT for grain plus afs 1/mon (afs 225/MT) for straw. A fixed ratio of 1.0 to 0.815 between grain and straw yield is assumed.

Cotton: Afs 13,100/MT of seed cotton. Average price received by farmers at gin less transport costs of afs 4/mon or afs 900/MT.

Corn: Afs 6,000/MT. Afs 5,660/MT for grain plus 6 percent as value of corn fodder for livestock.

Mung Beans: Afs 4,850/MT.

Clover/Alfalfa: Afs 680/MT. Afs 3/mon of freshly cut forage.

Miscellaneous: Afs 5,500. This category is mainly barley.

Vegetables: Afs 2,265/MT. This category consists mainly of carrots, tomatoes and melons.

Fruits: Afs 4,250/MT. This category is composed mostly of grapes (afs 18.5-19.0/mon) but includes some pomegranates and "other" fruits.

Livestock and Poultry (Net). Per animal/bird

Cattle: Afs 6,000. Ownership costs average afs 600 annually; feed costs, afs 3,600. Milk production averages 5 liters/day (at afs 6/liter) for 270 days a year. One liter per day (270 days) is consumed by calf. Value of calf by end of year is less than value of feed in it (milk, afs 1,620; other feed, afs 120). Return on calf comes in second year by which time its market value is about afs 3,000. Feed in it amounts to afs 2,100 total. Feed cost for cow is estimated at 1,500 annually. Residual value (for meat) at end of productive life is approximately afs 5,000. Once production cycle started, there would be two calves with cow (one nursing and one over a year old). Depending on a number of assumptions, ownership cost may average afs 600 annually. After allowance for death losses, net income per cow averages something close to afs 6,000/year.

Sheep: Afs 900: For wool, milk and meat.

Goats: Afs 400: For milk and meat.

Chickens: Afs 150: 110 eggs/year/bird at afs 18/dozen.

Other Fowl: Afs 110.

TABLE 1.1 -- Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Marja Target Farms*

| Crop | Percent of Cropped Land (%) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farm-gate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 70.2 | 2.71 | 1.20 | 3.25 | 20,638 |
| Cotton | 30.8 | 1.19 | 0.63 | 0.75 | 9,825 |
| Single | (20.7) | (0.80) | (0.67) | (0.54) | (7,074) |
| Double | (10.1) | (0.39) | (0.55) | (0.21) | (2,751) |
| Corn | 8.0 | 0.31 | 0.90 | 0.28 | 1,680 |
| Mung Beans | 3.9 | 0.15 | 0.16 | 0.02 | 97 |
| Misc. | 2.6 | 0.10 | 0.02 | - | - |
| Clovers | 5.2 | 0.20 | 6.04 | 1.20 | 816 |
| Vegs | 3.9 | 0.15 | 1.52 | 0.23 | 521 |
| Fruit | 0.3 | 0.01 | 2.83 | 0.03 | 128 |
| Total | 124.6 | 4.81 | | | 33,705 a/ |
| Double Cropped | 24.6 | 0.95 | | | |
| Cropped Land | 100.0 | 3.86 | | | |
| Other Uses | 4.4 | 0.17 | | | |
| Idle Land | 16.3 | 0.63 | | | |
| Owned b/ | 120.6 | 4.66 | | | |

* Source: Computed from survey data and prices of Annex H.1.

a/ Average net income from livestock amounted to afs 5,105 per farm.

b/ By owner-operators.

TABLE 1.2 — Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Marja Control Farms*

| Crop | Cropped Land (%) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farm-gate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 60.6 | 2.29 | 3.22 | 7.39 | 46,927 |
| Cotton | 42.3 | 1.60 | 1.08 | 1.72 | 22,532 |
| Single | (22.0) | (0.83) | (1.39) | (1.15) | (15,065) |
| Double | (20.4) | (0.77) | (0.75) | (0.57) | (7,467) |
| Corn | 19.0 | 0.72 | 1.32 | 0.95 | 5,700 |
| Mung Beans | 2.9 | 0.11 | 0.90 | 0.10 | 485 |
| Misc. | 0.3 | 0.01 | 0.18 | 0.00 | - |
| Clovers | 7.4 | 0.28 | 18.25 | 5.09 | 3,461 |
| Vegs | 5.6 | 0.21 | 4.20 | 0.88 | 1,993 |
| Fruits | 8.2 | 0.31 | 5.30 | 1.62 | 6,885 |
| Total | 146.3 | 5.53 | | | 87,993 a/ |
| Double Cropped | 46.3 | 1.75 | | | |
| Cropped Land | 100.0 | 3.78 | | | |
| Other Uses | 7.4 | 0.28 | | | |
| Idle Land | 7.9 | 0.30 | | | |
| Owned | 114.0 | 4.31 | | | |
| Rented | 1.3 | 0.05 | | | |

* Source: Computed from sruvey data and values in Annex H.1.

a/ In addition, net value of livestock products amounted to afs 9,120 per farm.

TABLE 1.3 -- Production Costs, Average per Farm, Marja Target Farms*
(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 9,238 | 1,330 | 2,846 | 2,650 | 16,064 |
| Cotton | 3,939 | 3,507 | 1,145 | - | 8,591 |
| Single | | | (845) | | |
| Double | | | (300) | | |
| Corn | 663 | | 260 | 103 | 1,026 |
| Mung Beans | 29 | | 125 | 20 | 174 |
| Misc. | | | 84 | 34 | 118 |
| Clover | | | 168 | 108 | 276 |
| Vegs | | | | 32 | 32 |
| Fruits | | | | - | - |
| Total | 13,869 | 4,837 | 4,628 | 2,947 | 26,281 |
| Gen Farm | - | 743 | - | 5,100 a/ | 5,843 |
| Total | 13,869 | 5,580 | 4,628 | 8,047 | 32,124 |

* Source: Computed from sample data and costs of Annex H.1.

a/ Misc: Land taxes, afs 1,490; transportation (donkeys), afs 480; equipment, afs 840; interest, afs 1,590; and other, afs 700.

TABLE 1.4 — Production Costs, Average per Farm, Marja Control Farms*
(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 14,305 | 1,836 | 2,405 | 2,244 | 20,790 |
| Cotton | 6,690 | 7,690 | 1,538 | | 15,348 |
| Single | | | (872) | | |
| Double | | | (666) | | |
| Corn | 1,500 | | 590 | 238 | 2,328 |
| Mung Beans | 215 | | 90 | 14 | 319 |
| Clover | | | 230 | 152 | 382 |
| Vegs | | | 172 | 45 | 217 |
| Fruits | | | - | - | - |
| Total | 22,710 | 8,956 | 5,025 | 2,693 | 39,384 |
| Gen Farm | - | 960 | - | 5,841 a/ | 6,801 |
| Total | 22,710 | 9,916 | 5,025 | 8,534 | 46,185 |

* Source: Computed from sample data and costs of Annex H.1.

a/ Misc: Afs 267, taxes; afs 805, transportation (donkeys); afs 1,416, equipment; afs 2,353, interest; and afs 1,000 for other.

TABLE 1.5 — Bazgar's Share in Farm Production, Gross and Net, Control and Target Farms, Average per Farm, Marja*

(afghanis)

| Crops | Control Farms: Gross Share | Control Farms: Costs: Fertilizer | Control Farms: Costs: Labor | Control Farms: Net Share | Target Farms: Gross Share | Target Farms: Costs: Fertilizer | Target Farms: Costs: Labor | Target Farms: Net Share |
|---|---|---|---|---|---|---|---|---|
| Wheat | 3,429 | 758 | 158 | 2,513 | 2,503 | 694 | 75 | 1,734 |
| Cotton | 2,557 | 521 | 604 | 1,432 | 1,041 | 378 | | 663 |
| Corn | 414 | 90 | | 324 | 241 | 43 | | 199 |
| Mung Beans | 75 | 19 | | 57 | 16 | | | 16 |
| Clover | 73 | | | 73 | 64 | | | 64 |
| Vegs | 8 | | | 8 | 13 | | | 13 |
| Fruits | 62 | | | 62 | 31 | | | 31 |
| Total | 6,620 | 1,388 | 158 | 4,470 | 3,909 | 1,115 | 75 | 2,720 |
| Average, per Bazgar a/ | | | | 7,450 | | | | 6,043 |

* Source: Computed from survey data and prices of Annex H.1.

a/ Average 0.6 sharecroppers per farm on control farms and 0.45 on target farms.

TABLE 1.6 -- Projected Time-Flow of Financial Benefits and Costs of Farm Drain Construction on Average Target Farm
(afs per farm)

| Year | Gross Income from Crops | Total Prod. Costs Crops | Net Income from Livestock | Net Farm Income | Net Farm Income of: Share-croppers | Net Farm Income of: Owner-Operators | Change in Net Income of a/ Owner-Operato |
|---|---|---|---|---|---|---|---|
| 0 | 33,705 | 32,124 | 5,105 | 6,686 | 2,720 | 3,966 | - |
| 1 | 53,727 | 36,862 | 5,463 | 22,328 | 3,334 | 18,994 | 15,028 |
| 2 | 68,744 | 40,415 | 6,178 | 34,507 | 3,795 | 30,712 | 26,746 |
| 3 | 78,755 | 43,284 | 7,251 | 42,722 | 4,102 | 38,620 | 34,654 |
| 4 | 83,760 | 44,968 | 8,682 | 47,474 | 4,255 | 43,220 | 39,254 |
| 5 | 83,760 | 44,968 | 8,682 | 47,474 | 4,255 | 43,220 | 39,254 |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| 20 | 83,760 | 44,968 | 8,682 | 47,474 | 4,255 | 43,220 | 39,254 |

a/ Discounted at 10 percent, the present worth of this income stream would be afs 298,375 for farms on which farm drains will be constructed in year 1 and afs 271,250 and afs 246,591 respectively for those constructed in years 2 and 3.

TABLE 2.1 -- Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Nad-i-Ali/ Upper Boghra Target Farms*

| Crop | Percent of Cropped Land (%) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farmgate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 65.0 | 3.33 | 0.69 | 2.30 | 14,605 |
| Cotton | 31.8 | 1.63 | 0.55 | 0.89 | 11,659 |
| Single | (26.6) | (1.36) | (0.57) | (0.77) | (10,087) |
| Double | ( 5.3) | (0.36) | (0.42) | (0.12) | ( 1,572) |
| Corn | 8.4 | 0.43 | 0.23 | 0.10 | 600 |
| Mung Beans | 5.1 | 0.26 | 0.21 | 0.05 | 243 |
| Misc | 0.6 | 0.03 | 0.40 | 0.01 | 55 |
| Clovers | 2.5 | 0.13 | 7.00 | 0.89 | 605 |
| Vegs | 2.3 | 0.12 | 0.28 | 0.03 | 68 |
| Fruits | 4.5 | 0.23 | 5.48 | 1.26 | 5,355 |
| | | | | | 33,190 b/ |
| Total | 120.3 | 6.16 | | | |
| Double Cropped | 20.3 | 1.04 | | | |
| Cropped Land | 100.0 | 5.12 | | | |
| Other Use | 4.5 | 0.23 | | | |
| Idle | 4.1 | 0.21 | | | |
| Owned a/ | 108.6 | 5.56 | | | |

* Source: Computed from survey data and prices of Annex H.1

a/ Excludes "forest land"

b/ Net income from livestock totaled afs 4,545.

TABLE 2.2 -- Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Nad-i-Ali/ Upper Boghra Control Farms*

| Crop | Percent of Cropped Land (%) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farmgate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 61.7 | 3.33 | 2.26 | 7.53 | 47,816 |
| Cotton | 33.9 | 1.83 | 1.24 | 2.28 | 29,868 |
| Single | (28.7) | (1.55) | (1.37) | (2.12) | (27,772) |
| Double | ( 5.2) | (0.28) | (0.58) | (0.17) | ( 2,227) |
| Corn | 6.9 | 0.37 | 1.05 | 0.39 | 2,340 |
| Mung Beans | 3.1 | 0.17 | 0.29 | 0.05 | 243 |
| Misc. | 0.2 | 0.01 | 1.82 | 0.02 | 110 |
| Clovers | 2.6 | 0.14 | 15.28 | 2.12 | 1,442 |
| Vegs | 6.5 | 0.35 | 1.47 | 0.51 | 1,155 |
| Fruits | 6.5 | 0.35 | 6.57 | 2.29 | 9,733 |
| Total | 121.3 | 6.55 | | | 92,707 1/ |
| Double Cropped | 21.3 | 1.15 | | | |
| Cropped Land | 100.0 | 5.40 | | | |
| Other Uses | 9.6 | 0.52 | | | |
| Idle | 6.3 | 0.34 | | | |
| Owned | 115.9 | 6.26 | | | |

* Source: Computed from survey data and values in Annex H.1.

1/ Livestock provided additional net income of afs 8,150.

TABLE 2.3 -- Production Costs, Average per Farm, Nad-i-Ali/ Upper Boghra Target Farms*
(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 9,296 | 1,437 | 3,461 | 3,266 | 17,460 |
| Cotton | 4,906 | 2,731 | 1,641 | - | 9,278 |
| Corn | 392 | | 258 | 142 | 792 |
| Mung Beans | | | 122 | 34 | 156 |
| Misc. | | | 15 | 10 | 25 |
| Clovers | | | 104 | 70 | 174 |
| Vegs | | | 79 | 25 | 104 |
| Fruits | | | | | |
| Total | 14,594 | 4,168 | 5,680 | 3,547 | 27,989 |
| Gen Farm | - | 133 | - | 4,329 a/ | 4,462 |
| Total | 14,594 | 4,301 | 5,680 | 7,876 | 32,451 |

* Source: Computed from survey data and costs of Annex H.1.

a/ Misc: Afs 1,802 interest, afs 815 equipment, afs 345 taxes, afs 667 donkeys and afs 700 other.

TABLE 2.4 -- Production Costs, Average per Farm, Nad-i-Ali/Upper Boghra Control Farms*
(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 17,152 | 3,166 | 3,459 | 3,267 | 27,044 |
| Cotton | 8,927 | 4,817 | 1,975 | - | 15,719 |
| Single | | | (1,612) | - | (1,612) |
| Double | | | ( 363 ) | - | ( 363 ) |
| Corn | 949 | | 266 | 122 | 1,337 |
| Mung Beans | 113 | | 78 | 22 | 213 |
| Misc. | | | 13 | 3 | 16 |
| Clovers | | | 142 | 76 | 218 |
| Vegs | | | 153 | 74 | 227 |
| Fruits | | | - | - | - |
| Total | 27,141 | 7,983 | 6,086 | 3,564 | 44,774 |
| Gen Farm | - | 300 | - | 6,940 a/ | 7,240 |
| Total | 27,141 | 8,283 | 6,086 | 10,504 | 52,014 |

* Source: Computed from sample data and costs of Annex H.1.

a/ Misc: Afs 388 land taxes, afs 2,060 equipment, afs 2,603 interest, afs 989 donkeys and afs 900 other.

TABLE 2.5 -- Bazgar's Share in Farm Production, Gross and Net, Control and Target Farms, Average per Farm, Nad-i-Ali/Upper Boghra*

(afghanis)

| Crop | Control Farms | | | | Target Farms | | | |
|---|---|---|---|---|---|---|---|---|
| | Gross Share | Costs | | Net Share | Gross Share | Costs | | Net Share |
| | | Fertilizer | Labor | | | Fertilizer | Labor | |
| Wheat | 5,030 | 675 | 1,100 | 3,255 | 832 | 188 | 93 | 551 |
| Cotton | 4,471 | 557 | 300 | 3,584 | 982 | 75 | 50 | 857 |
| Corn | 158 | | | 158 | 53 | | | 53 |
| Mung Beans | - | | | | 41 | | | 41 |
| Misc. | 26 | | | 26 | | | | |
| Clovers | | | | | | | | |
| Vegs | | | | | | | | |
| Fruits | | | | | 172 | | | 172 |
| Total | 9,685 | 1,232 | 1,430 | 7,023 | 2,080 | 263 | 143 | 1,674 |
| Average per Sharecropper a/ | | | | 8,100 | | | | 5,020 |

* Source: Computed from survey data and prices in Annex H.1

a/ Control farms averaged 0.867 sharecroppers per farm and target farms averaged one-third.

TABLE 2.6 -- Projected Time-Flow of Financial Benefits and Costs of Farm Drain Construction on Average Target Farm, Nad-i-Ali/ Upper Boghra

(afs/farm)

| Year | Gross Income from Crops | Total Prod. Costs Crops | Net Income from Livestock | Net Farm Income | Farm Net Income of: Share-croppers | Farm Net Income of: Owner-Operators | Change in Net Income a/ Owner-Operator |
|---|---|---|---|---|---|---|---|
| 0 | 33,190 | 32,450 | 4,545 | 5,284 | 1,674 | 3,610 | - |
| 1 | 52,732 | 37,883 | 4,812 | 19,661 | 3,490 | 16,171 | 12,561 |
| 2 | 67,389 | 41,959 | 5,345 | 30,776 | 4,853 | 25,923 | 22,313 |
| 3 | 77,160 | 45,274 | 6,146 | 38,032 | 5,761 | 32,271 | 28,661 |
| 4 | 82,046 | 47,232 | 7,213 | 42,027 | 6,215 | 35,812 | 32,202 |
| 5 | 82,046 | 47,232 | 7,213 | 42,027 | 6,215 | 35,812 | 32,202 |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| 20 | 82,046 | 47,232 | 7,213 | 42,027 | 6,215 | 35,812 | 32,202 |

a/ From Year 0. Discounted at 10 percent, the present worth of this net income stream is afs 245,465 for farms on which farm drain will be constructed in year 1; afs 222,153 for those constructed in year 2; and afs 202,864 for those built in year 3.

TABLE 3.1 -- Land Use, Cropping Pattern, Production and Gross Income from Crops, Average per Farm, Darweshan Target Farm*

| Crop | Percent of Cropped Land (%) | Area (Ha) | (MT/ha) | Production (MT) | Farmgate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 57.9 | 3.58 | 1.34 | 4.81 | 30,544 |
| Local | (31.7) | (1.96) | (1.32) | (2.58) | (16,383) |
| Improved | (26.2) | (1.62) | (1.38) | (2.23) | (14,161) |
| Cotton | 38.2 | 2.36 | 0.88 | 2.07 | 27,117 |
| Single | (33.7) | (2.08) | (0.94) | (1.95) | (25,545) |
| Double | ( 4.6) | (0.28) | (0.42) | (0.12) | ( 1,572) |
| Corn | 5.7 | 0.35 | 1.10 | 0.39 | 2,340 |
| Mung Beans | 1.6 | 0.10 | 1.61 | 0.06 | 291 |
| Misc. | 1.6 | 0.10 | 0.73 | 0.07 | 385 |
| Clovers | 2.7 | 0.17 | 43.38 | 7.37 | 5,012 |
| Vegs | 3.7 | 0.23 | 3.96 | 0.91 | 2,061 |
| Fruits | 2.3 | 0.14 | 2.37 | 0.33 | 1,403 |
| | | | | | 69,153 a/ |
| Total | 113.6 | 7.02 | | | |
| Double Cropped | 13.6 | 0.84 | | | |
| Land Cropped | 100.0 | 6.17 | | | |
| Other Uses | 1.6 | 0.10 | | | |
| Idle | 14.8 | 0.91 | | | |
| Shared-Out | 2.8 | 0.71 | | | |
| Garrowed-out | 9.4 | 0.58 | | | |
| Owned | 128.6 | 7.94 | | | |

* Source: Computed from survey data and values in Annex H.1. Excludes newly settled farms.

a/ In addition, net income from livestock amounted to afs 9,904.

TABLE 3.2 -- Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Darweshan Control Farms*

| Crop | Percent of Cropped Land (%) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farmgate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 69.8 | 5.96 | 1.77 | 10.52 | 66,802 |
| Local | (42.5) | (3.63) | (1.60) | (5.80) | (36,830) |
| Improved | (27.2) | (2.32) | (2.03) | (4.72) | (29,972) |
| Cotton | 25.5 | 2.18 | 1.27 | 2.76 | 36,156 |
| Single | (19.6) | (1.67) | (1.38) | (2.31) | (30,261) |
| Double | ( 5.9) | (0.50) | (0.90) | (0.45) | ( 5,895) |
| Corn | 3.2 | 0.27 | 2.04 | 0.55 | 3,300 |
| Mung Beans | 3.7 | 0.32 | 0.78 | 0.25 | 1,213 |
| Misc. | 1.1 | 0.09 | 1.00 | 0.09 | 495 |
| Clovers | 2.3 | 0.20 | 45.00 | 9.00 | 6,120 |
| Vegs | 1.2 | 0.10 | 10.00 | 1.00 | 2,265 |
| Fruits | 4.9 | 0.42 | 13.57 | 5.70 | 24,225 |
| Total | 111.7 | 9.54 | | | 140,576 a/ |
| Double Cropped | 11.7 | 1.00 | | | |
| Cropped Land | 100.0 | 8.54 | | | |
| Other Uses | 4.8 | 0.41 | | | |
| Idle | 2.2 | 0.19 | | | |
| Shared-Out | 1.2 | 0.10 | | | |
| Rented-Out | 0.2 | 0.02 | | | |
| Garrowed-Out | 1.6 | 0.14 | | | |
| Owned | 107.4 | 9.17 | | | |
| Garrowed-In | 2.7 | 0.23 | | | |

* Source: Computed from survey data and prices of Annex H.1.

a/ Net income from livestock averaged afs 12,477 per farm.

TABLE 3.3 -- Production Costs, Average per Farm, Darweshan Target Farms*
(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 3,150 | 572 | 3,741 | 3,130 | 10,623 |
| Cotton | 5,043 | 6,226 | 2,388 | - | 13,657 |
| Corn | 29 | - | 122 | 116 | 257 |
| Mung Beans | - | - | 93 | 13 | 106 |
| Misc. | - | - | 91 | 34 | 125 |
| Clovers | - | - | 180 | 92 | 272 |
| Vegs | - | - | 175 | 49 | 224 |
| Fruits | - | - | - | - | - |
| Total | 8,222 | 6,798 | 6,780 | 3,464 | 25,284 |
| Gen Farm | - | 45 | - | 4,675 a/ | 4,720 |
| Total | 8,222 | 6,843 | 6,780 | 8,139 | 29,984 |

* Source: Computed from survey data and costs of Annex H.1. Excludes newly settled farms.

a/ Misc: Afs 1,237 donkeys, afs 1,100 equipment, afs 882 interest, afs 456 taxes and afs 1,000 other.

TABLE 3.4 -- Production Costs, Average per Farm, Darweshan Control Farms*
(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 8,092 | 2,000 | 6,232 | 5,184 | 21,508 |
| Cotton | 5,270 | 5,260 | 2,073 | - | 12,603 |
| Corn | 31 | | 166 | 89 | 286 |
| Mung Beans | | | 222 | 42 | 264 |
| Misc. | | | 42 | 31 | 73 |
| Clovers | | | 124 | 108 | 232 |
| Vegs | | | 65 | 21 | 86 |
| Fruits | | | - | - | - |
| Total | 13,393 | 7,260 | 8,924 | 5,475 | 35,052 |
| Gen Farm | - | 55 | - | 9,385 a/ | 9,440 |
| Total | 13,393 | 7,315 | 8,924 | 14,860 | 44,492 |

* Source: Computed from survey data and cost data in Annex H.1.

a/ Misc: Afs 1,310 donkeys, afs 2,952 interest, afs 3,340 equipment, afs 583 land taxes, and afs 1.200 other.

TABLE 3.5 — Bazgar's Share in Farm Production, Gross and Net, Control and Target Farms, Average per Farm, Darweshan*
(afghanis)

| Crop | Control Farms | | | | Target Farms | | | |
|---|---|---|---|---|---|---|---|---|
| | Gross Share | Costs | | Net Share | Gross Share | Costs | | Net Share |
| | | Fertilizer | Labor | | | Fertilizer | Labor | |
| Wheat a/ | 10,303 | 90 | 24 | 10,189 | 4,096 | 90 | 2 | 4,004 |
| Cotton | 6,183 | 148 | 490 | 3,044 | 2,959 | 55 | 255 | 2,649 |
| Corn | 636 | | | 636 | 348 | | | 348 |
| Mung Beans | 102 | | | 102 | 29 | | | 29 |
| Misc. | 94 | | | 94 | - | | | - |
| Clovers | - | | | - | 868 | | | 868 |
| Vegs | 199 | | | 199 | 77 | | | 77 |
| Fruits | 831 | | | 831 | - | | | - |
| Total | 18,348 | 238 | 514 | 15,095 | 8,377 | 145 | 257 | 7,975 |
| Average per Bazgar b/ | | | | 11,700 | | | | 9,575 |

* Source: Computed from survey data and costs and prices of Annex H.1. Excludes newly settled farms.

a/ The net share of keshtegars was afs 604 for wheat and afs 406 for cotton for target farms and afs 384 for wheat on the control farms.

b/ For target farms, 0.833/farm; for control farms, 1.29/farm.

TABLE 3.61 -- Projected Costs, Yields, Production and Output Value, Average per Farm, Target Farm, Darweshan*

| Crop | Costs Control, (afs/Ha) | Target Farm Projections | | | | |
|---|---|---|---|---|---|---|
| | | Area (Ha) | Cost (afs) | Yield (MT/Ha) | Product (MT) | Product Value (afs) |
| Wheat | 3,609 | 3.58 | 12,920 | 1.77 | 6.34 | 40,237 |
| Cotton | 5,781 | 2.36 | 13,643 | 1.27 | 3.00 | 39,263 |
| Corn | 1,059 | 0.35 | 371 | 2.04 | 0.71 | 4,284 |
| Mung Beans | 825 | 0.10 | 83 | 1.61 | 0.16 | 781 |
| Misc. | 811 | 0.10 | 81 | 1.00 | 0.10 | 550 |
| Clover | 1,160 | 0.17 | 197 | 45.00 | 7.65 | 5,202 |
| Vegs | 860 | 0.23 | 198 | 10.00 | 2.30 | 5,210 |
| Fruits | - | 0.14 | - | 2.37 | 0.33 | 1,403 |
| Total | 3,674 | | 27,493 | | | 96,930 |
| Gen Farm | 990 | | 6,950 | | | |
| Total | | | 34,443 | | | |

* Excludes newly settled farms.

TABLE 3.62 -- Projected Time-Flow of Financial Benefits and Costs of Farm Drain Construction on Average Target Farm, Darweshan*
(afs/farm)

| Year | Gross Income from Crops | Prod. Costs Crops a/ | Net Income from Livestock | Net Farm Income | Net Farm Income of: Bazgars b/ | Net Farm Income of: Owner-Operators | Change in Net Income c/ Owner-Operator |
|---|---|---|---|---|---|---|---|
| 0 | 69,153 | 29,984 | 9,904 | 49,073 | 7,975 | 40,088 | - |
| 1 | 80,264 | 31,768 | 9,904 | 58,400 | 9,764 | 47,628 | 7,538 |
| 2 | 88,597 | 33,105 | 9,904 | 65,396 | 11,105 | 53,281 | 13,193 |
| 3 | 94,152 | 34,697 | 9,904 | 69,359 | 12,000 | 56,349 | 16,261 |
| 4 | 96,930 | 35,843 | 9,904 | 70,991 | 12,447 | 57,534 | 17,446 |
| 5 | 96,930 | 35,843 | 9,904 | 70,991 | 12,447 | 57,534 | 17,446 |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| 20 | 96,930 | 35,843 | 9,904 | 70,991 | 12,447 | 57,534 | 17,446 |

* Excludes newly settled farms.

a/ Assumes an increase in drain maintenance costs of afs 700 in both year 3 and 4.

b/ Net farm income of afs 1,010 accrued to keshtagars in 1975. We assume this to be constant.

c/ From Year 0. Discounted at 10 percent, the present worth of this net income stream is afs 135,115 for farms on which drains will be constructed in year 1 and afs 122,832 and afs 111,665 for farms on which drains will be constructed in years 2 and 3 respectively.

TABLE 4.1 -- Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Target Farm, Shamalan*

| Crop | Percent of Cropped Land ( % ) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farmgate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 55.3 | 2.10 | 1.38 | 2.89 | 18,351 |
| Local | (14.5) | (0.55) | (0.81) | (0.44) | ( 2,794) |
| Improved | (40.8) | (1.55) | (1.58) | (2.45) | (15,557) |
| Cotton | 41.3 | 1.57 | 0.74 | 1.14 | 14,934 |
| Single | (35.8) | (1.36) | (0.75) | (1.01) | (13,231) |
| Double | ( 5.5) | (0.21) | (0.65) | (0.13) | ( 1,703) |
| Corn | 18.2 | 0.69 | 0.85 | 0.59 | 3,540 |
| Mung Beans | 2.1 | 0.08 | 0.37 | 0.03 | 160 |
| Misc. | 1.3 | 0.05 | 0.47 | 0.02 | 110 |
| Clovers | 3.7 | 0.14 | 18.77 | 2.63 | 1,788 |
| Vegs | 4.7 | 0.18 | 2.67 | 0.48 | 408 |
| Fruits | 1.8 | 0.07 | 20.98 | 1.47 | 6,248 |
| Total | 128.4 | 4.88 | | | 45,539 a/ |
| Double Cropped | 28.4 | 1.08 | | | |
| Cropped Land | 100.0 | 3.80 | | | |
| Other Uses | 0.5 | 0.02 | | | |
| Idle | 10.8 | 0.41 | | | |
| Shared-Out | 5.8 | 0.22 | | | |
| Garrowed-Out | 1.1 | 0.04 | | | |
| Owned | 117.4 | 4.46 | | | |
| Garrowed-In | 0.8 | 0.03 | | | |

* Source: Computed from survey data and prices of Annex H.1.

a/ Income from livestock averaged afs 9,064 per farm.

TABLE 4.2 -- Land Use, Cropping Pattern, Production and Gross Farm Income from Crops, Average per Farm, Control Farm, Shamalan*

| Crop | Percent of Cropped Land (%) | Area (Ha) | Yield (MT/Ha) | Production (MT) | Farmgate Value (afs) |
|---|---|---|---|---|---|
| Wheat | 57.3 | 1.68 | 3.14 | 5.27 | 33,464 |
| Local | (3.8) | (0.11) | (2.28) | (0.24) | (1,524) |
| Improved | (53.5) | (1.57) | (3.20) | (5.03) | (31,940) |
| Cotton | 53.5 | 1.57 | 1.20 | 1.89 | 24,759 |
| Single | (26.6) | (0.78) | (1.83) | (1.43) | (18,733) |
| Double | (26.6) | (0.78) | (0.58) | (0.46) | ( 6,026) |
| Corn | 18.4 | 0.54 | 1.19 | 0.64 | 3,840 |
| Mung Beans | 0.3 | 0.01 | 1.14 | 0.01 | 50 |
| Misc. | 1.4 | 0.04 | 0.15 | 0.01 | 55 |
| Clovers | 7.2 | 0.21 | 31.17 | 6.52 | 4,434 |
| Vegs | 5.5 | 0.16 | 13.01 | 2.09 | 4,734 |
| Fruits | 2.7 | 0.08 | 14.97 | 1.26 | 5,355 |
| Total | 146.3 | 4.29 | | | 76,691 a/ |
| Double Cropped | 46.3 | 1.36 | | | |
| Cropped Land | 100.0 | 2.93 | | | |
| Other Uses | 3.8 | 0.11 | | | |
| Idle | 17.1 | 0.50 | | | |
| Shared-Out | 2.4 | 0.07 | | | |
| Garrowed-Out | 5.8 | 0.17 | | | |
| Owned | 128.7 | 0.77 | | | |
| Garrowed-In | 0.3 | 0.01 | | | |

* Source: Computed from survey data and prices of Annex H.1.

a/ Net income from livestock amounted to afs 12,372.

TABLE 4.3 -- Production Costs, Average per Farm, Target Farms, Shamalan*

(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seed, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 2,614 | 834 | 2,196 | 1,961 | 7,605 |
| Cotton | 2,374 | 1,281 | 1,586 | - | 5,241 |
| Corn | | | 622 | 288 | 850 |
| Mung Beans | | | 72 | 10 | 82 |
| Misc. | | | 52 | 17 | 69 |
| Clovers | | | 146 | 76 | 222 |
| Vegs | 129 | | 188 | 38 | 355 |
| Fruits | | | - | - | - |
| Total | 5,117 | 2,115 | 4,862 | 2,330 | 14,424 |
| Gen Farm | - | - | - | 3,919 a/ | 3,919 |
| Total | 5,117 | 2,115 | 4,862 | 6,249 | 18,343 |

* Source: Survey data and costs of Annex H.1.

a/ Misc: Afs 809, donkeys, afs 1,442, equipment; afs 275, taxes, afs 893, interest; and afs 500, other.

TABLE 4.4 -- Production Costs, Average per Farm, Control Farms, Shamalan*

(afghanis)

| Crop | Fertilizer | Labor | Tillage | Seeds, Misc. | TOTAL |
|---|---|---|---|---|---|
| Wheat | 6,450 | 500 | 1,761 | 1,628 | 10,339 |
| Cotton | 3,466 | 6,590 | 1,537 | - | 11,593 |
| Corn | | | 498 | 179 | 677 |
| Mung Beans | | | 9 | 1 | 10 |
| Misc. | | | 42 | 14 | 56 |
| Clovers | | | 200 | 144 | 334 |
| Vegs | 302 | | 168 | 34 | 504 |
| Fruits | - | | - | - | - |
| Total | 10,218 | 7,090 | 4,235 | 1,970 | 23,513 |
| Gen Farm | - | - | - | 5,347 a/ | 5,347 |
| Total | 10,218 | 7,090 | 4,235 | 7,317 | 28,860 |

* Source: Survey data and costs of Annex H.1

a/ Misc: Afs 889, donkeys; afs 2,182, equipment; afs 1,352, interest; afs 224, taxes; and afs 700, other.

TABLE 4.5 — Bazgar's Share in Farm Production, Gross and Net, Control and Target Farms, Average per Farm, Shamalan*
(afghanis)

| | Control Farms | | | | Target Farms | | | |
|---|---|---|---|---|---|---|---|---|
| | Gross | Costs | | Net | Gross | Costs | | Net |
| Crop | Share | Fertilizer | Labor | Share | Share | Fertilizer | Labor | Share |
| Wheat | 3,109 | 435 | 68 | 2,606 | 1,685 | 222 | 18 | 1,445 |
| Cotton | 3,468 | 245 | 245 | 2,476 | 1,336 | 56 | 15 | 1,265 |
| Corn | 570 | - | - | 570 | 421 | - | - | 421 |
| Mung Beans | - | - | - | - | 19 | - | - | 19 |
| Clovers | - | - | - | - | 71 | - | - | 71 |
| Total | 7,147 | 680 | 815 | 5,652 | 3,532 | 278 | 33 | 3,221 |
| Average per Bazgar a/ | | | | 6,729 | | | | 6,077 |

Source: Survey data and costs of Annes H.1 keshtagar's share was as follows (in afghanis):

| | Gross Share | Labor | Seed | Tillage | Net Share |
|---|---|---|---|---|---|
| A. Control Farms | | | | | |
| Wheat | 204 | 29 | 10 | 11 | 154 |
| Cotton | 827 | 754 | - | 51 | 22 |
| B. Target Farms | | | | | |
| Wheat | 812 | - | 87 | 97 | 628 |
| Cotton | 682 | - | - | 72 | 610 |

a/ Average number of bazgar/farm, control farms, was 0.84; target farms, 0.53.

TABLE 4.6 — Projected Time-Flow of Benefits and Costs of Farm Drain Construction on Target Farms, Average per Farm, Shamalan*

(afs/farm)

| Year | Crops: Gross Income | Crops: Total Costs | Livestock Net Income | Net Farm Income a/ | Net Farm Income: Bazgars | Net Farm Income: Owner-Operators | Net Change in Owner-Operator b/ |
|---|---|---|---|---|---|---|---|
| 0 | 45,539 | 18,342 | 9,064 | 36,260 | 3,221 | 31,801 | - |
| 1 | 68,430 | 35,415 | 9,815 | 42,830 | 4,962 | 36,630 | 4,829 |
| 2 | 85,598 | 48,218 | 11,318 | 48,698 | 6,268 | 41,192 | 9,391 |
| 3 | 97,043 | 57,504 | 13,572 | 53,111 | 7,139 | 44,734 | 12,933 |
| 4 | 102,766 | 62,522 | 16,578 | 56,822 | 7,574 | 48,010 | 16,209 |
| 5 | 102,766 | 62,522 | 16,578 | 56,822 | 7,574 | 48,010 | 16,209 |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| . | . | . | . | . | . | . | . |
| 20 | 102,766 | 62,522 | 16,678 | 56,822 | 7,574 | 48,010 | 16,209 |

* Source: Computed from Table 4 values.

a/ Includes afs 1,238 net income to keshtagars which is assumed constant.

b/ Discounted at 10 percent, the present worth of this income stream would be afs 119,555 for farms on which drains are constructed in year 1 and afs 108,686 and afs 98,806 respectively for those constructed in years 2 and 3.

## Values Added in Processing Seed Cotton*

Domestically processed seed cotton yields lint, linter, hulls (husks), cottonseed cake and crude oil, with the latter being further processed into edible oil and soap. The lint is both exported and consumed domestically to produce yarn and manufacture textiles. The country is not yet self-sufficient in cotton textile production but capacity continues to be added and self-sufficiency or better in textile production is supposed to be reached in the near future. Cotton fiber not utilized in domestic production is exported. Linter is both exported and consumed domestically. Most cottonseed cake is exported. A substantial amount of edible vegoil is imported; that produced domestically is consumed within the country. Hulls are used by the oil mill as fuel in manufacturing vegoil. Lint exported to countries other than Iran is priced f.o.b. Karachi; lint exported to Iran, and all the remaining commodities produced by the factory (gin/oil mill), are sold ex factory.

The appropriate prices on which to base the shadow prices of lint, linter and cake are their export prices. For lint, we use an f.o.b. price of $1300/MT. The average delivery cost from gin to Karachi is approximately $60/MT, with the foreign exchange component near $50. For linter, we use an ex factory price of $250/MT. Thus, gross foreign exchange earnings, adjusted for transport and handling costs from gin to port, for ginned cotton amount to $1250/MT.

A c.i.f. price of $600/MT for imported cottonseed oil is used. The imported oil will have to be distributed as will domestically produced oil and these distribution costs are assumed to be the same. Crude oil is refined and there is some weight loss in the process. At the same time, however, the process yields by-products which are used in the manufacture of soap. Soap, too, is imported. Rather, however, than attempting to make these adjustments, we will simply value crude oil production (rather than refined) at $600/MT to compensate for the import savings due to the utilization of the by-product "fats."

The hulls used for fuel at the oil mill substitute for imported diesel oil. The hulls should consequently be valued in terms of the foreign exchange saved on diesel fuel imports. This is estimated at $25/MT of hulls.[1/]

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* Most of the figures used in this section are based upon the records of the gin/oil mill at Lashkar Gah.

1/ Assumes Iran the source of diesel and a price of $97/MT at Meshed. An (economic) cost of afs 2.5/ton kilometer, or afs 2000/MT, transportation (plus petroleum Monopoly overhead) is assumed from Meshed to the Lashkar Gah area. The figure takes account of increased highway maintenance cost due to tanker-truck use. Seventy percent ($30/MT diesel) of the transport cost is a foreign exchange cost. The effective BTU equivalence at the oil mill is estimated to be 5 tons of hulls to one ton diesel. In addition to the foreign exchange savings, there is the local currency component of transportation -- afs 600/MT of diesel, or afs 120/MT hulls.

The manufacturing costs of producing lint, linter, cake, refined oil and soap amount to afs 2528/MT (at afs 50/$) of seed cotton and to afs 2820/MT when foreign exchange is shadow priced at afs 62.50/$. 1/

1/ Manufacturing costs — afs/MT of seed cotton input*

| | Financial | % FX | Accounting a/ |
|---|---|---|---|
| Wages b/ | 612 | 0 | 612 |
| Spare Parts c/ | 694 | 95 | 859 |
| Transport | 82 | 75 | 97 |
| Electricity | 200 (364) d/ | 65 | 423 |
| Depreciation e/ | 245 | 75 | 291 |
| Other f/ | 531 | 5 | 538 |
| | 2,364 (2528) d/ | 46.2 | 2,820 |

* Source: Records of Helmand Cotton Company.

a/ FX shadowed priced at afs 62.5/$.

b/ Wages are not shadow priced for these industrial workers.

c/ Exclusive of import duties.

d/ Subsidy added — 45 percent of costs. Depending on whom one uses as his authority, the subsidy for electricity runs between 40-50 percent of cost. The determination of what cost is can at best be only an approximation for the Kajakai case. One could argue that, at least for the next few years, since the use of electricity by the gin will cause no reduction in use by anyone else and the marginal cost of generation for the gin will be next to nothing, the social cost would be close to zero. However, the capacity was installed with the intention of servicing the gin and other users. We count the use of electricity by the gin as a social cost, the 65 percent FX cost being composed of salaries for expatraites, debt servicing, and parts and supplies, averaged over total generation.

e/ Since depreciation in this case is in large part a variable cost, it seems reasonable to include it as a social cost.

f/ Includes customs duties, social security contributions, medical services provided employees, administration costs, telephone and cable charges.

Table 1 below summarizes the gross foreign exchange value (adjusted for transport/distribution costs from point of final manufacture) of an additional MT of seed cotton due to the project. The table shows, for example, the foreign exchange value of lint to be $1250/MT ($1300-$50). Seed cotton yields 31 percent lint, so the lint in a metric ton of seed cotton has, when processed, a foreign exchange value of $387.50/MT of seed cotton. There is in addition a local currency cost incurred when transporting ginned cotton to ports. This amounts to afs 500/MT of lint or afs 155/MT of seed cotton. The lint contribution, then, of a ton of seed cotton is afs 19,220 at an exchange rate of afs 50/$ and afs 24,064 when foreign exchange is shadow priced at afs 62.50/$. Similarly for the other products.

Reducing the value of the commodities produced from seed cotton, by the manufacturing and farm to gin transport costs gives an estimate of the value added prior to delivery of cotton to the gin.

TABLE 1 — Estimate of Value Added Before Delivery of Cotton to Gin

| Product | (1) FX Value a/ ($/MT) | (2) Product Weight b/ | (3) (1) x (2) ($/MT) c/ | (4) LC Adjustment (afs/MT) d/ | (5) Contribution to Value of 1 MT Seed Cotton afs 50/$ (afs/MT) | (6) Contribution to Value of 1 MT Seed Cotton afs 62.5/$ (afs/MT) |
|---|---|---|---|---|---|---|
| Lint | 1,250 | 0.310 | 387.50 | -155 | 19,220 | 24,064 |
| Linter | 250 | 0.015 | 3.75 | - | 188 | 234 |
| Husks | 25 | 0.205 | 5.13 | + 25 | 281 | 345 |
| Cake | 180 | 0.330 | 59.40 | - | 2,970 | 3,713 |
| Oil | 600 | 0.130 | 78.00 | - | 3,900 | 4,875 |
| Waste | - | 0.010 | - | - | - | - |
| Total | | 1.000 | 533.28 | -130 | 26,534 | 33,200 |
| Less Mfging Costs | | | 23.36 | 1360 | 2,528 | 2,820 |
| Less Farm to Gin transport Cost | | | 4.50 | 675 | 900 | 956 |
| | | | 505.42 | 2165 | 23,106 | 29,424 |

a/ Gross except transportation and distribution costs after manufacture are removed.

b/ Typical product yield, in relative terms, of a MT of seed cotton.

c/ of seed cotton.

d/ of seed cotton.

Output Prices Used by a 1975 Study

| Crop | Prices (afs/MT) Farm Gate | International |
|---|---|---|
| Improved Wheat | 5,887 | 18,069 |
| Seed Cotton | 14,718 | 33,497 |
| Corn | 4,302 | 7,239 |
| Mung Beans | 5,208 | - |
| Alfalfa/Clover | 908 | - |
| Orchard/Vineyard | 5,661 | - |
| Vegetables | 2,038 | - |
| Melons | 1,585 | - |
| Sesame | 13,133 | - |

For its economic analysis, this study used international prices for three commodities — wheat, cotton and corn. Foreign exchange was not shadow priced — the free rate of afs 57/$ was used. International Engineering Company, Inc., Agricultural Development Plan, Upper Helmand Valley, Afghanistan, 220 Montgomery St., San Francisco, Calif. March 1976, p. 4 - 28. Prepared for the Asian Development Bank.

## One Approach to Estimating the Shadow Exchange Rate *

A unit change in foreign exchange receipts made available by a project will be distributed between an increase in imports and a decrease in exports in proportion to the relevant elasticities of demand for, and supply of, foreign exchange. In turn, for small changes, the domestic value of each unit of import (export) increase (decrease) will equal the original exchange rate times the average rate of tariff (subsidy). The total value of the increased availability of foreign exchange to the economy equals the sum of the domestic values of the import increase and export decrease. This can be derived as the weighted average of the rates of the protection of imports and exports, the weights being the relevant elasticities.1/

The following formulae are suggested for estimating the shadow price of foreign exchange2/ under the assumption that trade distortions will be maintained during the life of the project:

$$(1) \qquad \epsilon_f = \frac{\epsilon_x (\eta_x - 1)}{\epsilon_x + \eta_x}$$

$$(2) \qquad d'' = \frac{\sum_i \epsilon_f X_i (1+S) + \sum_i \eta_m M_i (1+T)}{\sum_i \epsilon_f X_i + \sum_i \eta_m M_i}, \text{ where}$$

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* Bela Balassa, "Estimating the Shadow Price of Foreign Exchange in Project Appraisal," Economic Staff Working Paper No. 142, IBRD and IDA, February 1, 1973.

1/ Ibid., pp. 25 - 26.

2/ Ibid., p. 18 and p. 26. Formula (2) applies in the case of initial equilibruim in the balance of payments where equilibruim means that under the present system of trade distortions there are no unintended reserve losses or gains or temporary capital movements.

d'' = the marginal value of foreign exchange, expressed as a multiple of the actual rate.

$\epsilon f$ = the elasticity of supply of foreign exchange.

$\epsilon x$ = the elasticity of domestic export supply.

$\eta x$ = the elasticity of foreign demand.

$\eta m$ = the elasticity of domestic import demand.

M = value of imports

X = value of exports

T = ad volorem rates of import tariffs

S = rate of export subsidies

The elasticity of supply of foreign exchange ($\epsilon_f$) will depend upon the elasticity of domestic export supply ($\epsilon_x$) and the elasticity of foreign demand for exports ($\eta_x$). The latter in turn will depend upon the elasticity of world demand for the commodity in question, the supply elasticity of competing suppliers and the country's share in the world market.1/ If competing suppliers do not reduce their exports in response to a fall in price, the elasticity of demand for a country's exports ($\eta_x$) will equal the world demand elasticity for the commodity ($\eta_{xw}$) divided by the country's share in the market (k). Such a supplier response is assumed here.

As long as k is small, as is the case for Afghanistan's share of aggregate exports in the world market, $\eta_x$ will be relatively large. Consequently, the elasticity of supply of foreign exchange is very insensitive to $\eta_x$. There can

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1/ For commodities not subject to preferential trading, bilateral agreements or export quotas abroad. All elasticities are defined so as to be positive.

accordingly be large errors in the estimate of $\eta_x$ without affecting $\epsilon_f$.[1/]

An attempt was made to estimate the domestic export supply elasticity ($\epsilon_x$). As one would reasonably expect it to be, the elasticity was low, probably a maximum of 0.5.[2/] Because, for most exports, Afghanistan's share is so small relative to the world's total, it is safe to assume that the elasticity of foreign demand for Afghan imports ($\eta_x$) is large. The elasticity of domestic import demand ($\eta_m$) is low, however, perhaps between 0.5 and 0.7. The values for exports (f.o.b.), imports (c.i.f.), import duties and export taxes for the past three years are shown below.[3/] Given these estimates and using average rather than marginal values, the estimate of d" is 1.16.[4/]

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1/ For example, suppose that 1/k = 200 and $\epsilon_x = 0.6$. Take an estimate of $\eta_{xw}$ of 0.5 and one of 10. In the first instance $\eta_x = 100$ and in the second, 2,000. The estimate of $\epsilon_f$ in the first instance is 0.6(99)/100.6 = 0.59, and the estimate of $\epsilon_f$ in the second instance is 0.6 (1999)/2000.6 = 0.60.

2/ In view of the fact that exports are mostly agricultually based and subject to a land constraint, unless there is specific information indicating otherwise, "it is recommended that fairly low values be used for the domestic supply elasticities." Lynn Squire and Herman G. van der Tak, Economic Analysis of Projects, A World Bank Research Publication, The John Hopkins University Press, Baltimore and London, 1975 (p. 124).

3/

| | $ millions | | Afs millions | | Afs millions Trade Taxes | |
|---|---|---|---|---|---|---|
| Year | Exports | Imports | Exports | Imports | Import | Export |
| 1352 | 159.4 | 183.1 | 9723 | 11,169 | 2497 | 216 |
| 1353 | 216.7 | 242.5 | 12352 | 13,823 | 3868 | 1213 |
| 1354 | 230.0 | 258.9 | 12650 | 14,240 | 4120 | 483 |

| Year | M/X | X taxes/X | M taxes/M |
|---|---|---|---|
| 1352 | 1.15 | 0.02 | 0.22 |
| 1353 | 1.12 | 0.10 | 0.28 |
| 1354 | 1.13 | 0.04 | 0.29 |

4/ That is,

$$d'' = \frac{(0.5)(1)(1-.04) + (0.6)(1.13)(1+.3)}{(0.5)(1) + (0.6)(1.13)} = \frac{1.361}{1.178} = 1.16$$

There are some adjustments that probably should be made. Over the next five years, one can expect the M/X ratio to increase,[1] perhaps averaging 1.2 - 1.25. The domestic export supply and import demand elasticities should increase some, but probably by a negligible amount. The ratio of export taxes to exports will likely fall, perhaps with taxes being replaced by some small subsidies. The ratio of import tariffs to imports will also likely fall. The changes that one might expect would alter the estimate of d" very little however.[2] The fact is, d" is rather insensitive to relatively large changes in the elasticities.[3]

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1/ Because of increasing capacity to utilize increasing amounts of project assistance which is likely to grow more rapidly than export earnings.

2/ Thus,

$$d'' = \frac{.7\,(1.05) + 0.8\,(1.25)\,(1 + 0.25)}{0.7 + 0.8\,(1.25)} = 1.17$$

3/ For example:

| $\eta_x$ | $\epsilon_x$ | $\epsilon_f$ | Value of d" when* $\eta_m = 0.2$ | $\eta_m = 0.6$ | $\eta_m = 1.5$ |
|---|---|---|---|---|---|
| 10,000 | 0.2 | 0.20 | 1.16 | 1.21 | 1.23 |
| 10,000 | 0.5 | 0.50 | 1.12 | 1.17 | 1.21 |
| 10,000 | 1.5 | 1.50 | 1.08 | 1.12 | 1.16 |
| 100 | 0.2 | 0.20 | 1.16 | 1.21 | 1.23 |
| 100 | 0.5 | 0.49 | 1.12 | 1.17 | 1.21 |
| 100 | 1.5 | 1.46 | 1.08 | 1.12 | 1.16 |
| 20 | 0.2 | 0.19 | 1.16 | 1.21 | 1.23 |
| 20 | 0.5 | 0.46 | 1.12 | 1.17 | 1.21 |
| 20 | 1.5 | 1.33 | 1.08 | 1.12 | 1.17 |

* with M/X = 1.25; S = 0.05 and T = 0.3.

ANNEX I.1

# Helmand Arghandab Valley Authority

## (HAVA)

## CHARTER

For the purpose of securing for the Nation the economic, social and other benefits to be gained from an integrated development of the land, water, electric power and industrial potential of the Arghandab and Helmand River systems; for providing central direction to the complex continuing effort required to secure satisfactory returns from the substantial financial investment already made and still to be made in this project; for planning and executing programs for a coordinated development of this regions's agriculture, industrial and electric power; for proposing legislation and through other means to seek new, improved and acceptable methods whereby Government and private investors can work together in encouraging Afghan free enterprise investment in agricultural and industrial development; and for conserving and developing all the resources of this region in such a way as to provide firm foundations for sustained, accelerating economic advances, and for the people of this region to find vastly greater scope for the excercise of their initiative.

BE IT reaffirmed that the Helmand Valley Authority shall continue to be the authorized instrument of the Government of Afghanistan for carrying out these purposes, as previously authorized by Royal Decree number 3106-4507, dated 13/8/1331, and that the Government of Afghanistan delegate to the Helmand Valley Authority for a period of ten years such of the powers assigned its separate ministries under Article 108, Chapter 8, of the Constitution as may be necessary to accomplish the above purposes and operate in the manner specified hereunder.

Chapter I, Helmand Valley Authority Functions:

Article 1. The Helmand Valley Authority has been founded and established as an autonomous agency of the Government of Afghanistan on the basis of Article 108, Chapter 8 of the Constitution.

Article 2. The Helmand Valley Authority is established to plan and direct execution of the following functions:

1. To maintain and manage the properties owned by the Government of Afghanistan in the project area;

2. To control floods, conserve and develop the area's water and land resources, and plan for the rational development of its electric power and industrial potential;

3. To operate and maintain the dams, canals, drains, mechanical structures, roads and other establishments of the Helmand and Arghandab irrigation systems and associated works;

4. To construct dams, canals and drains, build structures, level lands, and do other work needed to improve and further develop the Arghandab and Helmand irrigation system;

5. To place settlers on government-owned land, and to provide them with necessary assistance;

6. To expand agricultural and livestock production, improve community and village living, and afforest land allotted for the growing of trees;

7. To conduct creative research and feasibility studies, propose legislation, and take other action that will determine economic development potential, to result in new industrial enterprises with their allied electric power, transportation and marketing facilities.

8. To provide facilities for the public and private financing of industrial companies, public works, agricultural development and service operations, and to take other action encouraging private investment in these areas.

9. To augment health and education programs within the existing provincial health and educational systems, consistent with laws and regulations of the Government of Afghanistan, as required to improve the welfare of the people and accelerate the areas's development;

10. To pool efforts and to work in close cooperation with the Ministry of Planning and other administration units of the Government of Afghanistan in all related works within the project area;

11. To construct houses, establish workshops and erect other buildings in the project area as the program may demand;

12. To create and develop urban and rural community development projects with the public organizations and utilities required of fast growing population centers.

13. The direct execution of all other functions required for the discharge of responsibilities assigned the Helmand Valley Authority.

Article 3. The "project area", as referred to in this document, embraces all lands and integral communities which are or are expected to be served by the existing irrigation systems of the Arghandab and Helmand Rivers and their tributaries, or by future additions to these systems.

Article 4. Activities for development of the financial, economic, agricultural, industrial, educational and health affairs in the Helmand Region and its districts may be carried out after ratification and approval of this law by the Government.

## Chapter II. Organizational Structure

Article 5. The organization of the Helmand Valley Authority shall include the following elements:

1. Office or the Central President

   a. The General President
   b. Vice President and Deputy
   c. General Directorate of Liaison and Secretariat
   d. General Directorate of Planning and Statistics

2. Technical Department (Engineering, Operation and Maintenance;)

3. Department of Agriculture and Rural Development

4. Department of Industries and Power

5. Department of Social Services

6. Administrative Department

7. Board of Afghan and foreign advisors.

8. Helmand Valley Authority Staff Council

9. Board of Economic Advisors

Article 6. The following six enterprises will be formed into private corporations operating under their own charters and management, under the general direction of the General President and within the Department of Industries and Power:

1. The Helmand Construction Unit
2. The Building Unit
3. The Cotton Ginning Plant
4. The Dairy Plant
5. The Bost Hotel
6. The Alabaster and Woodworking Plant

## Chapter III. Office of the General President

### Article 7. The General President

1. The General President of the Helmand Valley Authority is the chief executive and has complete authority over the planning and execution of all affairs of the Helmand Valley Authority, and is responsible for his actions to the Prime Minister.

2. The General President has authority to authorize and permit in writing advance and final payments for commodities and services within the approved budget.

3. The General President is authorized to revise the organization of the Helmand Valley Authority as necessary to insure its maximum effectiveness and efficiency under changing conditions.

### Article 8. The Vice President and Deputy

1. The Vice President of the Helmand Valley Authority shall act in the name of the General President in carrying out such authority and duties as are entrusted to him by the General President.

2. In the absence of the General President the Vice President will act in his behalf and is his legal representative.

Article 9. General Directorate of Liaison and Secretariat

1. The General Directorate of Liaison and Secretariat shall be in charge of all official and personal correspondence of the General President, and shall establish and maintain liaison with all the constituent offices and departments.

2. This Directorate also shall forward to the appropriate offices and departments, for their action, all agreements and contracts with foreign companies after approval by higher Government authority.

Article 10. General Directorate of Planning and Statistics

1. The duties of the General Directorate of Planning and Statistics are as follows:

a. To establish broad guidelines for economic and social planning within the separate departments, to review such plans, and to bring them together into overall short and long-range integrated plans for the economic and social development of the project area, tailored to total personnel and budget capabilities.

b. To integrate and effect coordination between the overall economic planning done under this General Directorate and the land development planning done under the Technical Department.

c. To maintain liaison with the Ministry of Planning in these matters.

d. To prepare information related to development budgets, and to maintain liaison with the Ministry of Finance in this connection.

e. To compile and publish statistical data collected by the separate departments, related to agriculture, industry, health, education and construction, and to assist the separate departments in devising means to assure accuracy in the statistics gathered.

f. To handle all correspondence connected with contracts employing foreign technicians, to forward approved plans and programs to the interested offices and Departments of the Helmand Valley Authority, and to maintain liaison with all foreign advisors and the Board of Afghan and Foreign Adivisors.

2. These duties will be carried out under the following:

a. Planning Section
b. Statistics Section

## Chapter IV. The Department of Engineering, Operation and Maintenance (The Technical Department)

Article 11. The Technical Department is responsible for performance of the following duties:

1. To establish a project development planning section to be responsible for:

a. Carrying out investigations and studies to determine the engineering and economic feasibility of land development through irrigation, on the basis of: (1) quality of lands with respect to soils, topography and drainage; (2) engineering works required and related costs; and (3) anticipated eronomic returns.

b. Providing the Engineering Section of the department with plans for development, and recommendations for establishing criteria and guidelines for preparation of detailed designs for construction and formulation of specifications.

c. Maintaining liaison and providing cooperation and support to agencies or contractors which perform planning work through agreements or contracts in accordnce with established programs.

2. To plan and implement an orderly program for maintaining the dams, canals, drains, roads and other establishments of the Arghandab and Helmand irrigation systems.

3. To plan and regulate water deliveries and perform other functions assential to a sound operation of the dams and irrigation systems in the project area.

4. To establish and operate shops and a central parts warehouse for the maintenance and repair of all forms of equipment used in these operations.

5. To provide all field and office engineering, and to design and prepare specifications for construction of dams, and leveling, irrigation work, drainage systems, buildings and roads.

6. To take measures to assure quality control and field inspection of all construction and development work.

7. To provide for the architectural work of building construction projects, and for inspection to assure performance according to specifications

8. To prepare recommended budgets for necessary work under the above and establish a cost engineering section to provide for adequate cost records.

Article 12. For the execution of these responsibilities the Technical Department shall have in its organization the following:

1. General Directorate of Operation and Maintenance
   a. Director of Operations
   b. Director of Maintenance
   c. Director of Shop (shop superintendent)

2. General Director of Engineering
   a. Director of Design and Surveys
   b. Director of Construction, supervision and inspection
   c. Director of Cost Engineering and progress control

3. General Director of Planning
   a. Director of Engineering (field and office)
   b. Director of Soil (land classification)
   c. Director of Drainage
   d. Director of Hydrology
   e. Director of Economic (report and financial analysis)

4. General Director of Architectural Design
   a. Director of Design
   b. Director of Inspection

5. Liaison and Secretariat

## Chapter V. The Department of Agriculture and Rural Development

Article 13. The Department of Agriculture and Rural Development is responsible for the following duties:

1. To place settlers on government-owned land as deemed necessary for its full utilization, and to provide them with training and other necessary assistance.

2. To conduct studies for obtaining statistical data and other information on cultural, social and economic factors in the Helmand Region rural situation, bearing on programs to improve agriculture and rural community living.

3. To plan and execute experimental programs designed to develop improved practices and materials for solving problems and expanding the production of agriculture and animal industry, adapted to local conditions.

4. To manage the mechanized farm, and to develop with other suitable organizations practical farm tools, implements and machinery, acceptable to the farmer.

5. To develop a program of extension promoting acceptance and widespread use of the improved practices, materials and equipment, together with appropriate institutional arrangements.

6. To expand education, to improve health conditions, and to undertake other suitable activities for improving village and community living in cooperation with the General Directorate of Social Services and other interested bodies of the Helmand Valley Authority.

7. To establish farm organizations, based on cooperative principles, through which farmers will participate in carrying out the above activities and which at the village level, will perform such other functions as extending credit and serving as local units in broader systems for marketing agricultural and animal products.

Article 14. For the execution of the above responsibilities the Department of Agriculture and Rural Development shall have the following organizational units:

1. General Directorate of Settlers
2. General Directorate of Agricultural Experimentation
3. General Directorate of Extension
4. General Directorate of Agricultural Lands
5. General Directorate of Agricultural Economics and Rural Social Services
6. Directorate of Animal Industry
7. Directorate of Farm Tools, Implements and Machinery
8. Secretariat and Liaison

ANNEX 1.1



## Chapter VI. The Department of Industries and Power

Article 15. The Department of Industries and Power shall be responsible for the following functions:

1. Under the general direction of the General President to operate and arrange for ultimate disposal to private investors of enterprises now operated by the Helmand Valley Authority;

2. To make feasibility studies, propose legislation and take other actions leading to the development of sound industries and allied marketin transportation, water and other facilities in the project area;

3. To participate with the Ministry of Industry and Mines in making decisions on all projects in electric power and industries to be established in the project area under government financing, and to execute such projects;

4. To promote the development of free enterprise, with or without government financial participation;

5. To work with appropriate authorities of the government of Afghanistan in developing charters for economic enterprises, such as public works electric power, banking, and private industrial ventures.

6. To assist investors in the preparation of charter and covenants for new enterprises and in following through on steps necessary to obtain the required approval, in accordance with the laws of Afghanistan.

7. To supervise administration of existing electric power facilities, and to study possibilities for further expansion.

8. To take action putting electric power generation, distribution and sale in the project area on a sound business basis, with an adequate rate structure, and operating under its own by-laws and organization;

9. To act as a regulatory agency, inspecting and enforcing regulations necessary to protect the public interest in industry and allied fields.

10. In cooperation with the Education Section of the Department of Social Services to establish programs for training personnel in management and other skills required for the proper functioning of industrial and power enterprises.

Article 16. For the execution of these functions the Department of Industries and Power shall have the following organizational units:

1. General Directorate of Planning, Development, Promotion and Registration.

2. General Directorate of Special Enterprises

3. General Directorate of Industrial Power

4. Directorate of Education and Training

## Chapter VII. Department of Social Services

Article 17. The Department of Social Services shall be responsible for the following functions:

1. To plan and arrange for implementation of all programs of health and education undertaken by the Helmand Valley Authority, augmenting, as found necessary, the existing health and education activities undertaken by the Provincial Governments or Ministries.

2. To manage and control the Bost Hospital, clinics and the Bost High School.

3. To cooperate with the Department of Agriculture and Rural Development in programs to improve health conditions and advance education in rural communities.

Article 18. The organization of the Department of Social Services shall include the following:

1. Directorate of Public Health
2. Directorate of Education
3. Directorate of Vocational Training

## Chapter VIII. The Administrative Department

Article 19. The function of the Administrative Department is to provide centralized administrative serv ices to the offices and other departments of the Helmand Valley Authority, in the general areas of accounting, personnel, budget, supply management, building management, archives, and transportation.

Article 20. Responsibilities under this function will be carried out through the following General Directorates and Directorates:

1. General Directorate of Accounting
   a. Payroll Section
   b. Pre-Audit Section
   c. Payment Section
   d. Posting Section
   e. Budget Section
   f. Revenue Section
   g. Cost Accounting Section

(J.G. White Team Comments: (a) The title "General Directorate of Accounting" follows usage established in the Government Administrative Manual. A more descriptive title would be "General Directorate of Finance", (b) It is understood that the government Administrative Manual includes a Budget Section under the General Directorate of Accounting, as it is placed here. In view of the major importance of the budget function in the Helmand Valley Authority, we recommend consideration of establishing it as a separate "General Directorate of the Budget" within the Administrative Department.)

2. General Directorate of General Services

(J.G. White Team Comments: The above title follows usage established in the Government Administrative Manual. The title "General Directorate of Supply Management" might be more desirable because of the great importance of Supply Management.)

   a. Procurement Section
   b. Stock Control Section (Property Accounting)
   c. Warehousing Section
   d. Fixed Property Management Section

3. General Directorate of Transportation
4. Directorate of Personnel
5. Directorate of Files and Archives
6. Directorate of Buildings and Grounds
7. Directorate of Publications and Reproductions
8. Directorate of Audits

Chapter IX. The Helmand Valley Authority Staff Council

Article 21. The Helmand Valley Authority Staff Council shall function under the guidance of the General President, and shall include the following members: The Vice President and Deputy; the Head of the Department of Engineering,

Operation and Maintenance; the Head of the Department of Agriculture and Rural Improvement; the Head of the Department of Industries and Power; the Head of the Department of Social Services; the Head of the Administrative Department; the General Director of Planning and statistics; and the General Director of Liaison and Secretariat, who also shall serve as the Council's Secretary.

Article 22. The duties of the Helmand Valley Authority Staff Council are as follows:

1. To study and scrutinize reports and recommendations submitted by advisors.

2. To study and approve by-laws, charters and regulations for the internal use of the Helmand Valley Authority.

3. To study plans and programs of anticipated work in matters which are the concern of the Helmand Valley Authority.

4. To study and scrutinize changes in organization, and in duties of the Helmand Valley Authority departments.

5. To scrutinize and approve annual budgets of the Helmand Valley to be submitted to higher authority in accordance with the budgetary laws of Afghanistan.

6. To study possibilities for the investment of private capital in private industrial ventures in the project area.

7. To review matters affecting the basic policies and broader plans of the Helmand Valley Authority.

8. To study matters and education programs, and to define the policy of the Helmand Valley Authority in regard to scholarships, fellowships, sending officials abroad, and in regard to matters on education in the project area.

9. To study matters concerning settlers.

10. To study documents and reports relating to services of foreign agencies in the project area.

11. To establish regulations concerning housing, means of transport, power and water facilities.

12. To approve contracts for purchasing, renting, mortgaging, and construction actions that are brought before the Council by the General President.

## Chapter X. The Board of Afghan and Foreign Advisors

Article 23. The Board of Afghan and Foreign Advisors shall consist of technicians and other competent experienced persons, both Afghan and foreign, who under the guidance of the General President as advisors shall investigate and study pertinent matters in order to improve the technical, agricultural, administrative and accounting activities. They shall submit their reports and recommendations to the General President. The Board of Afghan and Foreign Advisors do not possess executive and administrative powers.

Article 24. They are responsible for the following:

1. To advise on the preparation of development plans and projects under the various departments of the Helmand Valley Authority.

2. To consult and exchange ideas with heads of the Helmand Valley Authority departments and related enterprises concerning improvement of their functions.

## Chapter XI. The Board of Economic Advisors

Article 25. A Board of Economic Advisors shall be established for the following purposes:

1. To consult with the people of the Valley on matters related to health, education, agriculture, irrigation, establishing villages, meetings of villagers, establishing cooperatives, and building schools.

2. To invite the cooperation of the people in efforts to increase production and establish a favorable climate for cooperation between people and the government, using films, plays and publicity materials.

Article 26. The Board of Economic Advisors shall be made up of the following:

1. A representative from agriculture
2. A representative from education
3. A representative from public health
4. A representative from Operation and Maintenance
5. The Sub-Governors of provincial governments of the project area.

## Chapter XII. The General Directorate of Audits

Article 27. The General Directorate of Audits, acting in accordance with pertinent laws and by-laws, is charged with the responsibility of auditing all financial and accounting documents of the Helmand Valley Authority prior to year 1344 and of completing this audit by the end of year 1345.

Article 28. Points of which to be assured are:

1. That there shall be no fraudulent representation of facts in the documents;

2. That the expenditures have been made within the specified codes;

3. That expenditures of funds are in accordance with the proper chapters and articles in the budget.

4. That financial actions shall be in accord with regulations of the Helmand Valley Authority Charter dated 3/8/31.

Article 29. The General Directorate of Audit is required to scrutinize and complete its reports on the accounting and financial matters of the Helmand Valley Authority, prior to establishment of the Helmand Valley Authority, on the basis of consecutive fiscal years in periods of 18 months. Upon completing this audit work for the aforementioned fiscal years, the General Directorate of Audit shall submit copies of the report--compiled on the basis of observation, study and scrutiny--to the Ministry of Finance, the Department of Audits in the Prime Minister's Office, and to the Helmand Valley Authority. The General Directorate of Audits will then be disbanded and removed as an element in the Helmand Valley Authority Organization.

Article 30. All offices and departments of the Helmand Valley Authority are charged with the responsibility of executing the provisions mentioned hereabove.

ANNEX I . 2

21 May 1966

# ORGANIZATIONAL PLAN AND FUNCTIONAL ASSIGNMENTS OF STAFF MEMBERS OF THE HELMAND-ARGHANDAB VALLEY AUTHORITY

## CHAPTER -1-

### Article No. 1

Based on the Proposal No. 1134 dated 9-15-1344 ( 12-6-1965), of the H.V.A. Dept., and Approval No. 1517 dated 9-20-1344 ( 12-11-1965) of the Council of Ministers which has received Royal assent, and in accordance with Decree No. 1193 dated 9-21-1344 ( 12-12-1965), the Helmand and Arghandab Valley Authority as an organ of the Government organization has been established to carry out the regional development plans and has to carry out the following duties:

A. To carry out the various developmental plans of the Helmand Valley taking into consideration the revenue operation and to make use of the capital invested and to be invested.

B. The administration of regulations and the unification of the developmental affairs of the Helmand and Arghandab Valley.

C. To carry out and regulate the profitable activities and the enterprises totally or portionally being or to be invested by Government in Helmand Valley.

D. Maintenance of the dams, canals, drainages and roads, etc., and other installations of irrigation system constructed before or to be constructed in future.

E. Improvement and extension of agricultural activities for the development of agriculture and cattle breeding while keeping in view the great advantage offered by the vast land and water resources or the objectives for the increased agricultural produce in the Valley.

F. Completion of progressive and scientific study of agronomy and cattle management methods will result in better understanding appreciation in advancement of food grain production and cattle breeding in the Valley on modern line.

G. Establishment of community centers and to carry out the affairs pertaining to the development of the community and to develop the social and economical standard of life of the people in Helmand Valley.

H. To carry out the affairs pertaining to social services and to develop the medical and social life of the people of the Helmand Valley.

I. To establish industrial plants and to develop industrial affairs which should improve industrial production for the betterment of agricultural production.

J. To establish and to develop the electrical energy resources to such a standard which should develop industries for the betterment of the standard of life of the people.

K. To carry out and to implement the economical and social programs which in less time should result into the increment of revenue.

L. Provision of facilities and suitable conditions to encourage and to exhort the investment of private capital in the economical, agricultural and industrial activities in the Helmand Valley.

M. Construction of houses and other buildings in accordance with the requirements of the developmental programs in different fields in the Valley.

N. Distribution of lands to settlers and to provide facilities for the settling settlers to enable them to increase the agricultural production which in turn will result in the development of economic and social activities of the people.

O. To carry out all the functions assigned by the higher authorities of the Helmand Valley Authority.

Article No. 2

Its head office is located in Lashkar Gah (Bost) and the area of its activities will be the Helmand and Arghandab Valley.

Article No. 3

The Planning Ministry will act as liaison between the Council of Ministers and Helmand Arghandab Valley Authority.

## Chapter -2-

Article No. 4

The Helmand and Arghandab Valley Authority being an organ of the Government organization shall have a legal authority and shall be composed of the following staffs:

A. General President, Vice President, and the offices related to the office of the General President are: The Secretariat office, Liaison Office, Board of Advisors, Planning Office, Audits and Inspection Office and Area Superintendents and staff.

B. Engineering and Technical Department and its related branches.

C. Agriculture and Community Development Department and its related sections.

D. Administration Department and its related divisions.

E. Power, Industry and Commerce Department and its related sections.

F. Social Services Department and its related sections.

Article No. 5

The General President, who has first class discretion for the evaluation and application of the plans for the project, under the applicable regulations, is to be appointed by the Prime Minister with the assent of H.M. the King. Prior to the preparation and presentation of annual budget for his Presidency, the General President is empowered to include necessary changes and or additions in proportion to the volume of the work.

Article No. 6

Vice President has to carry out the functions assigned to him by the General President and in absence of the General President the Vice President shall be the Acting General President and has to carry out the functions of the General President and is responsible for the function he had carried out in the absence of the General President.

Article No. 7

Chief of the Secretariat and Liaison Office has to carry out both the official and private correspondence of the General President and should keep good relationship with related offices. Also he should collect the informations and publications concerning the H-AVA and to arrange the meetings as well as making preparation for banquets and besides that he is the Secretary of the administrative sessions.

Article No. 8

Chief of the Planning Office is responsible for the execution of the following jobs:

A. Preparation of general developmental programs and collection of different economic and social programs.

B. Keeping good relation with Ministry of Planning in connection with planning and collection of statistical data.

C. Preparation of data regarding developmental budget while taking in view the instructions issued by the Ministry of Planning to H-AVA.

D. Collection and preparation of the statistics pertaining to developmental activities in the field of agriculture, industry, social services, construction and publication of the said statistics.

E. Preparation of all the documents pertaining to the employment of the foreign experts and advisors to be employed in the H-AVA. This is the job to be carried out by the Planning, Statistics and Publications Offices.

Article No. 9

The Board of Advisors is composed of the experienced technical personnel who under the General President make studies, research, and investigation of the different problems brought up in technical office, agriculture, administration, finance, etc. The Board will submit their recommendations to the Office of the General President.

Article No. 10

Audit and Inspection Office: This is the office in charge of the regular inspection of the accounting and executive matters and from time to time it should inspect the revenue account as well as the expenditure and should prepare their report and submit the same to the General President's office. The inspection of the financial affairs of the related office and enterprises related to the H-AVA would be covering the following matter:

A. To check and compare the financial, administration and accounting affairs.

B. To check and inspect affairs pertaining to the revenue, expenditures, payments and financial reports.

C. To check and inspect the expenditures and compare the same with the related programs and projects.

NOTE: In accordance with Article No. 11, Chapter 3, of the General Essay or Constitution of Inspection, members of the Audits and Inspection Office are charged with the inspection duty.

Article No. 11.

Area Superintendents and staff, as representatives of the General President, are compelled to supervise the different activities of the different areas in their determined fields and they are charged with all the affairs of their assigned projects.

## Chapter -3-

## Engineering and Technical Department

Article No. 12

The Engineering and Technical Department is charged with the following affairs:

A. To prepare and carry out complete programs of maintenance of dams, canals, drainages, roads, and other installations pertaining to the Helmand and Arghandab Valley.

B. Supervision and to look after all the engineering and constructional projects dealing with construction of dams, canals, roads and affairs pertaining to the leveling of lands, etc., which is to be carried out by both foreign and local contractors.

C. To look after the contractors specially for the implementation of the constructional specifications of the maps and designs which have been agreed upon.

D. Making contacts with different contractors or construction companies (both local and foreign) dealing with construction of dams, canals, roads, drainages and leveling of lands.

E. Planning of projects pertaining to the construction of dams, canals, roads, and other installations and to submit the same to the admin. council of the General President for necessary research and approval.

F. Preparation of maps, designs and other technical specifications for th construction of dams, canals, drainages, roads, buildings and land leveling wit consultation of the technical advisors.

G. Planning of irrigation program and preparation of programs of water distribution to the area of project.

H. To carry out the affairs pertaining to the mechanical work shops established for the repair and maintenance of vehicles and equipment of H-AVA.

I. Planning of programs to supply parts required for the heavy machineries and vehicles of the H-AVA.

J. Maintenance and repairs of the buildings and property owned by H-AVA

K. Maintenance and repairs of the buildings and facilities of public utility located at Lashkar Gah ( Bost).

Article No. 13

In order to carry out the jobs and functions cited above, the Engineering and Technical Department has been composed of the organizations as below:

A. Office of the Technical and Engineering Chief.

B. Operations & Maintenance Division

C. Engineering Office Division

D. Land Development Division

E. Architecture Division

## Chapter -4-

## Agriculture and Community Development Department

Article No. 14

The Agriculture and Community Development Department has to carry out the following duties:

A. Planning and implementation of the expanding programs which is covering the usage of agricultural tools and equipment and introduction of the same to the farmers and animal breeders of the area.

B. Exclusive efforts be made in the establishment of agricultural cooperatives with a view to the derive full benefits from agricultural machineries and agricultural credits to enhance on favorable terms farm and animal breeders and for the cultivators.

C. Plan and launching of programs for agricultural research and development to produce different and better type of seeds and animal breeds. The basic purpose scheme is to bring within reach of the present farmers, at reasonable and easy terms, the fruit of research and experimentation with improved implements and chemicals so that he benefits to the fullest from it.

D. Preparation of data and statistics pertaining to cultural, social and economical factors to the extent that such studies and researches should be beneficial for the progress of economic developmental program as well as for the establishment of community development centers.

E. Establishment of community development centers for the betterment of medical and educational and agricultural activities, that is extension, research, cooperatives and other activities of a unity.

F. Managements and arrangement of machinery farms for the increment of production and for increase of seeds and establishment of such farms in the community development centers as well as to introduce agricultural machineries and chemicals which could be used by farmers.

G. Expansion of the affairs pertaining to the social services, establishment of medical and educational centers in accordance with the programs provided by the Ministry of Public Health and Ministry of Education

Article No. 15

In order to carry out the duties cited above, the Agriculture and Community Development Office has been composed of the organization listed below:

A. Extension Division

B. Settlement Division

C. Research Division

D. Animal Husbandry Division

E. Tractor Shop

## Chapter -5-

## Administrative Department

### Article No. 16

The Administrative Department has to carry out the following duties:

A. Preparation of annual budget of the H-AVA.

B. Keeping files and records of employment of the related personnel and contractors of the H-AVA.

C. Supply and distribution of the parts and equipment required by H-AVA.

D. Preparation and supervision of all financial and valuable documents of the H-AVA Department.

E. Employment of personnel, contractors and the execution of promotions and retirement of the related personnel in accordance with rules and regulations of the government employment constitution.

F. To supervise and file the documentations which are sent to the administrative section for filing by the departments concerned.

G. To check and look after the daily communications and correspondence.

H. To check and look after the transport affairs and to keep equipment in running condition.

I. To look after the buildings, offices, and warehouses as well as the maintenance of the said property.

J. To prepare and supply printed matters needed by the related offices.

### Article No. 17

In order to carry out the duties cited above, the administrative department has been composed of the following branches:

A. Accounting Division

B. General Services Division

C. Disbursement Division

D. Budget Division

E. Transport Division

F. Personnel Division

G. Files and Archives Division

H. Clearance Division

## Chapter -6-

## Power, Industry and Commerce Department

### Article No. 18

The Power, Industry and Commerce Department has to carry out the following duties:

A. Preparation of the regulations of projects of the H-AVA institutes and enterprises while taking in view the rules of H-AVA.

B. To look after the activities of the exploitation of the institutes and enterprises of the H-AVA in accordance with the rules stated in the constitution of the H-AVA.

C. Promotion and encouragement of the private capital for investment in the industrial institutes and enterprises of the H-AVA.

D. To study the economical possibilities and preparation of a project for the establishment of industrial institutes.

E. Promotion of investment of private capital in the fields of industry, agriculture and commerce, and provision of facilities and contacts with the higher authorities for the establishment of expansion of electric power resources and distribution of the same to customers.

F. Cooperation with higher authorities in the economical development of the enterprises of public utility, electric power, banking and industrial institutes.

G. Provision of assistance to individuals investing their capital for organizing enterprises, small projects and preparation of the constitution for the said enterprises, and submission of the same to the higher authority for their approval.

H. To arrange the affairs pertaining to the public services in the industrial plants.

I. To cooperate and help the General Services Office to progress in their related programs, that is educational, training, administration programs, as well as for the betterment of the condition of the related laborer or workers.

Note: The Power and Industry Division shall have a close contact with the Ministries of Mine and Industries and Ministry of Commerce, and should always take in view the instructions provided by the said Ministries.

Article No. 19

In order that the Power and Industry and Commerce Department should carry out its related functions, the said Department has been composed of the following offices:

A. Industry Division

B. Power Division

C. Commerce Division

## Chapter -7-

## Social Service Department

Article No. 20

The Social Services Department has to carry out the following functions:

A. Preparation and implementation of all educational and medical programs of the H-AVA and expansion of the said programs with the cooperation of the Ministries concerned.

B. To look after the affairs of the Lashkar Gah Hospital, Clinics and Lycees of Lashkar Gah ( Bost).

C. Provision of cooperation to the Agriculture and Community Development in planning their medical and educational programs and implementation of the same in community centers.

D. Provision of cooperation to the Power, Industry and Commerce Department regarding training of their workers, technical personnel and other personnel employed in the Power, Industry and Commerce Department.

E. Implementation of social services programs in the H-AVA.

Article No. 21

In order to carry out the functions cited above, the Social Service Department has been composed of the following divisions:

A. Public Health Division

B. Education Division

C. Training Division

## Chapter -8-

## Administrative Council

Article No. 22

The Administrative Council of the General Presidency of the H-AVA, which is holding their session under the leadership of the General President, is composed of the following members:

A. Vice President

B. Engineering and Technical Department Chief

C. Chief of Agriculture and Community Development Department

D. Administrative Officer

E. Social Services Officer

F. Chief of the Power, Industry and Commerce Department

G. Chief of the Planning and Statistics Office

H. Legal Advisors

I. Secretary who will also be the Secretary of the said Council

Article No. 23

The duties of the Administrative Council are as follows:

A. Study and recommendation of the report of the legal advisors.

B. The study and recommendation rules, regulations and other constitution dealing with daily affairs of the related offices of the H-AVA.

C. To study the plans and programs planned for the future of the H-AVA.

D. Study, scrutinizing and recommendation of the changes in the organization and changes brought up in the related offices of the H-AVA.

E. Scrutinizing and approval of the annual budget of the H-AVA which later on will be submitted for the approval of the higher authorities.

F. Study of the possibilities of the investment of private capital in the industrial institutes and enterprises of the H-AVA.

G. To check and scrutinize the affairs pertaining to the future plan of the H-AVA.

H. Study of educational and medical programs prepared for the H-AVA and the affairs dealing with H-AVA personnel and trainees to be sent for higher studies.

I. Scrutinizing and study of the reports received from foreign agencies.

J. Preparation of regulation regarding the use of the houses, means of transportation, electricity, water, and planning of the conditions regarding the said matters.

K. Recommendation of the contracts, regarding procurement of material, construction of buildings and installations which would be submitted to the said Council.

Note: In order to carry out the said duties and to recommend the same, the Administrative Council of the General Presidency is compelled to follow and observe all the rules and regulations of the Government and should act in accordance with said rules and regulations, and all their settlements regarding matters shall be in conformity with the written instructions provided by the Government.

## Chapter -9-

## Miscellaneous Commandment

### Article No. 24

This Constitution after being approved by the Council of Ministers and sanction of H.M. the King from Hamal 1, 1345, ( 3-21-1966), shall be effective.

### Article No. 25

When this new Constitution becomes effective, the old Constitution approved by the Council of Ministers in the year 1331 will become void.

### Article No. 26

The H-AVA is responsible to implement the rules and regulations of this constitution in all respects.

ANNEX J

# HELMAND CONSTRUCTION CORPORATION

## (HCC)
## CHARTER
## ARTICLE ONE

## ESTABLISHMENT AND OBJECTIVES

1. To establish a strong and viable national unit, for the capture of award and effective execution of construction works capable of completing important projects and utilizing the national talents on the basis of international competition inside as well as outside the country . . . . . ,

To win awards over international as well as local competitors; and complete with possible speed, the significant projects included in the programs of the Republic which require speed, freedom of action and organizational effectiveness . . . . . ,

To rapidly and orderly execute construction works related to water and power and other major projects from initial planning through successful implementation and derivation of the end results for the benefit of the national economy; and to bring about basic improvements in work methodology, management, system of bookkeeping, inspection and control of construction activities.. . . . . ,

and finally, to raise the caliber of local personnel in technical, administrative and financial fields, taking advantage of the presence of foreign specialists and other possible means from the standpoint of knowhow, quality of work and organizational capability in all disciplines to international standards . . . ,

a Government construction corporation, for water and power and other works, under the name of Helmand Construction Corporation called the Corporation in this Charter, is established to perform the following works according to the contents of the Charter:

a. Construction of storage dams, diversion dams, irrigation and drainage systems and other works related to land development.

b. Construction of facilities related to electric power.

c. Major repairs of irrigation and power facilities.

d. Construction of railroads, highways, bridges, airports, buildings and other important engineering facilities.

e. Miscellaneous technical works in connection with the above objectives.

2. The main headquarters of the Corporation is in Kabul and the secondary base is in Chah-i-Anjir of Helmand. The Corporation may also open up centers and liaison offices inside and outside of the country as required.

## ARTICLE TWO

## CAPITAL

1. The initial capital of the Corporation is Five Hundred Million Afghanis and the ulimate capital is Two Thousand Million Afghanis which can be increased when warranted upon approval of the General Assembly of the shareholders.

2. The capital of the Corporation is divided into equal shares worth One Hundred Thousand Afghanis each, all of which belong to the government.
The initial capital of the Corporation is provided by the following departments and institutions of the government :

| | | |
|---|---|---|
| a. Finance Ministry | 500 shares | ( 50 Million Afghanis) |
| b. Ministry of Planning | 500 shares | ( 50 Million Afghanis) |
| c. Public Works Ministry | 500 shares | ( 50 Million Afghanis) |
| d. Ministry of Commerce | 500 shares | ( 50 Million Afghanis) |
| e. Water and Power Authority | 3,000 shares | (300 Million Afghanis) |

3. The value of the movable and fixed property of the Helmand-Arghandab Construction Unit, after reassessment, will be included as shares of the government departments and institutions in the initial capital of the Corporation.

## ARTICLE THREE

## ORGANIZATION

1. The organization is composed of the following bodies :

   a. The shareholders General Assembly.

   b. The Supreme Council.

   c. The Executive Board.

   d. The Internal Audit Board (IAB)

## ARTICLE FOUR

## THE SHAREHOLDERS GENERAL ASSEMBLY

1. Ordinary meetings of the shareholders are held once a year in the space of four months after the end of the Corporation's fiscal year for the following purposes :

   a. Study of the annual reports of the Executive and Supervisory Boards and recommendations of the Supreme Council regarding the activities of the Corporation. The financial status of the Corporation as compared with the two previous years is also explained in this report.

   b. Study and passing of the balance and profit-loss statements and the division of the profit and loss according to the proposal of the Supreme Council.

   c. Appointment of the members of Internal Audit Board for a period not to exceed three years.

2. Special meetings of the General Assembly are held within 15 days of the request of the Executive Board and concurrence of the Supreme Council under the following conditions :

   a. When over 20% of the paid-up capital of the Corporation is lost or there is the probability of its loss.

   b. When a need for the amendment of the Charter arises.

   c. When reasons for dissolution of the Corporation have been developed according to its covenants.

3. A shareholder or his authorized representative participates in the General Assembly meetings; each share represents one vote. A shareholder or his authorized representative is invited in writing to participate in the General Assembly meeting. The date, place and agenda of the meeting is published ten days prior to the set date of the meeting.

4. The quorum of the ordinary and special meetings of the General Assembly is completed when two thirds of the paid-up capital of the Corporation is represented. In case the quorum is not complete, the matter is published and a second meeting is held within 10 days. The second meeting can be held with members representing at least one third of the paid-up capital of the Corporation.

5. The General Assembly elects the Chairman and the Secretary by majority votes.

6. Decisions of the meetings of the General Assembly are recorded in a special book of decision and are signed by the present members of the General Assembly and the Secretary.

## ARTICLE FIVE

## SUPREME COUNCIL

1. The Supreme Council is composed of the following members :

   a. Public Works Minister.

   b. Finance Minister.

   c. Planning Minister.

   d. Commerce Minister.

   e. General President of Water and Power Authority.

   f. President of the Executive Board.

   The minister concerned with the Water and Power works is acting as the Chairman of the Supreme Council.
   The Secretary is selected from the members of the Council in the first meeting for one year. The quorum for holding the meetings of the Council is four members. Decisions are validated by majority votes of the present members. Each member has the right of one vote. In case of tie of votes, whichever side the Chairman votes is final.
   Decisions of the Supreme Council are recorded in a special book by the Secretary and are applied after the signature of the Chairman and the present members of the Council.

2. The Supreme Council meets at least once in three months. Special meetings of the Council are held at the request of the Executive Board.

3. The Supreme Council has the following duties and authorities :

   a. Setting up the policy and general guidelines of the Corporation in line with the objectives of this Charter.

b. Appointment and/or dismissal of the Executive Board.

c. Approval of the By-laws and cevenants which are proposed by the Executive Board for the progress of the work of the Corporation.

d. Approval of agreements related to grants and loans to the Corporation proposed by the Executive Board and acquiring the approval of the Government.

e. Study of the balance and annual profit and loss statements and the reports of the Executive and Supervisory Boards and forwarding the same to the shareholders with their views and recommendations.

f. Approval of the opening and closing of liaison offices of the Corporation within the country and abroad upon the proposal of the Executive Board.

g. Approval of joint ventures with other organizations and Companies.

h. Decisions on matters proposed by the Executive and the Internal Audit Board.

## ARTICLE SIX

## THE EXECUTIVE BOARD

1. The Executive Board consists of one President and two Vice-Presidents in technical and administrative fields.

   a. The Executive Board is the authorized executive body of the Corporation and is reponsible to the Supreme Council.

   b. The Executive Board is appointed by the Supreme Council for a term of three years. Re-appointment of the Executive Board in part or total, is permissible.

   c. The members of the Executive Board of the Corporation cannot work in any other department or organization and cannot draw any other salary.

2. The Executive Board, among all other executive obligations, perform the following duties also :

a. Preparing the organization chart and budget of the Corporation and acquiring the approval of the Supreme Council.

b. Preparation of the general work plan of the Corporation and obtaining the approval of the Supreme Council.

c. Signing of construction contracts according to the By-laws of the Corporation.

d. Preparation of the annual balance of the Corporation and forwarding to the Supreme Council.

e. Drafting the By-laws and guidelines necessary for maintaining the activities of the Corporation and obtaining their approval from the Supreme Council. These By-laws are prepared in accordance with the requirements of free competition with local and foreign companies and compatible with the market conditions and needs of work which are adjustable from time to time.

f. Hiring and dismissal of local and foreign specialists and other skilled and unskilled workers of the Corporation commensurate with the volume and requirements of work; giving bonuses or disciplinary penalties to the workers of the Corporation; payment of salaries in line with the concept of competition and market conditions in accordance with the rules and regulations prepared by the Executive Board and approved by the Supreme Council.

g. Purchase of equipment and plants, vehicles, parts and materials needed by the Corporation according to the rules and By-laws approved by the Supreme Council as proposed by the Executive Board.

h. Applying the contents of this Charter and related By-laws of the Corporation.

i. Taking steps about the settlement of legal claims for and/or against the Corporation.

j. Requesting special meetings of the Supreme Council.

## ARTICLE SEVEN

## THE INTERNAL AUDIT BOARD (IAB)

1. The Internal Audit Board is composed of three members appointed by the General Assembly of the shareholders for a term of three years.

2. The Internal Audit Board cannot betray the contents of their inspection to other than the authorized sources.

3. The Internal Audit Board performs the following duties :

   a. Study and analysis of the annual balance and the activities report of the Corporation and forwarding their report to the Supreme Council.

   b. Check the financial matters of the Corporation at least once in each six months and submit their report to the Supreme Council.

   c. Study and evaluation of the financial status of the Corporation.

   d. Inventory of the cash of the Corporation each three months without previous notice.

   e. Evaluation of the receivable accounts of the Corporation.

   f. In the case of dissolution of the Corporation, the Internal Audit Board attends to the settlement and clearance matters of the Corporation.

4. The duties of the Internal Audit Board can be given totally or in part, to Certified Public or Chartered Accountants, acceptable to the Ministry of Finance, upon the arrangements of the Supreme Council.

5. The Internal Audit Board, in its work, is totally and individually responsible to the General Assembly and the Supreme Council.

6. The Internal Audit Board can, when necessary, request the special meeting of the General Assembly of the shareholders.

7. The Internal Audit Board has the right to participate in the special meetings of the General Assembly with no right to vote. It also can submit proposals to the Supreme Council.

## ARTICLE EIGHT

## FINANCIAL AND BOOKKEEPING MATTERS

1. The fiscal year of the Corporation is the calendar year of Afghanistan.

2. The yearly balance and report of the Executive Board, after certification of the Internal Audit Board, is submitted to the Supreme Council and General Assembly within four months after the end of the fiscal year.

3. The net profit of the Corporation is divided as follows :

   a. At least forty percent (40%) of the net profit is transferred to the general reserves of the Corporation until the amount of this reserve equals the amount of the approved capital of the Corporation.

   b. At least five percent (5%) of the net profit is transferred to a special reserve to compensate for the fluctuation of the value of foreign exchange and other unforeseen losses until the total of the amount transferred reaches twenty five percent (25%) of the basic capital of the Corporation.

   c. Two percent of the net profit is set aside for the betterment of the condition of the workers of the Corporation.

   d. The General Assembly, upon the proposal of the Executive Board and recommendations of the Supreme Council, decides about the division of the rest of the net profit of the Corporation.

4. Financial matters of the Corporation are carried out according to the accounting system compatible with the requirements of the construction work of the corporation at an international standard.

## ARTICLE NINE

## DISSOLUTION AND SETTLEMENT

1. This Corporation dissolves for one of the following reasons :

   a. Lack of possibilities to accomplish the assigned duties for positive reasons with the Supreme Council and the decision of the General Assembly regarding the dissolution of the Corporation.

b. Merging with other companies and organizations.

2. The method of settlement is set by the General Assembly of the shareholders.

3. The property of the Corporation, after payment of debts and expenses, is transferred to the government's account.

## ARTICLE TEN

## MISCELLANEOUS MATTERS

1. Since the basic purpose of the Corporation is the construction of the Government projects on the basis of international bidding; hence equipment, vehicles and other plants, material and facilities that the Corporation imports are exempt from tax and custom duties.

2. The Corporation takes proper steps in training and raising the caliber of its workers through proper job guidance and training or special vocational training courses inside the country or abroad.

3. This Charter can be amended by the General Assembly of the shareholders upon the recommendations of the Supreme Council.

This Charter with all its (10) articles and (35) sections is approved hereby.

This Charter is approved and ratified by the Cabinet, January 6, 1976.
Jadya 16, 1354.

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ANNEX K

EXCERPTS FROM

# IN-DEPTH EVALUATION

# OF THE

# CENTRAL HELMAND DRAINAGE PROJECT (PHASE I)

(Project No. 306-11-120-146)

Conducted by an
Evaluation Committee
Composed of:

Ernest J. Barbour, Chairman, [illegible]
Donald W. Reilly, CDE Chief Engineer
Raymond Hooker, DP Economist
James Stephenson, Consultant
Andrew Evans, CO
George Carner, Rapporteur, DP

Completed July 31, 1976

PAR No. 76-11

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## II. SUMMARY CONCLUSIONS

1. Substantial progress has been made in establishing a close workin relationship among HAVA, SCS and USAID, particularly in the last five months. This conclusion is based on the following facts:

a. substantially shared perceptions on roles prevail;

b. reasonable agreement exists on objectives, although priorities seem to differ, especially with regard to main vs. farm drain construction, machine vs. labor emphasis, and physical construction vs. master planning;

c. promised technical manpower resources have been delivered; and

d. most key problems have been identified and discussed among project parties, even though all have not yet been resolved.

2. This relationship, however, has so far produced limited results in terms of physical outputs or master plans for Phase II.

3. A continued closer HAVA, SCS and USAID relationship will require clarification and agreement upon respective priorities. HAVA's interest in maximum geographic spread and USAID/SCS's interest in

technically adequate farm drain spacing can and need to be reconciled.

4. While the Evaluation Committee is able to identify positive signs to indicate that preliminary work on Phase II Project Paper preparation is warranted, it concludes there is insufficient basis to recommend a go-ahead decision on Phase II until there is clear evidence that expanded physical output is likely and planning has clearly delineated implementable project content. The Committee believes that the following would constitute minimal evidence to support moving ahead with Phase II:

a. demonstration that HAVA (or HCC) can establish an effective system to recruit and manage a substantial farm drain work force (e.g., at least 500 workers per day);

b. demonstration of a harmonious and effective HAVA-HCC working relationship and of HCC capability to perform as evidenced by at least four draglines working simultaneously on the drainage project in at least two project areas;

c. preparation of jointly accepted master drainage, construction and equipment plans for Phase II; and

d. demonstration that field data are recognized as essential inputs to the project as evidenced by a fully operational soils laboratory which is adequately staffed and equipped.

## IV. MAJOR FINDINGS

### A. What Went Right

1. The project planning concepts and objectives remain sound. The inputs that have been provided by all parties, with some restructuring and improved allocation, appear adequate to achieve the desired outputs, though the original timetable has proved over-ambitious. The hypothesis that once these outputs are delivered a close HAVA-USAID working relationship will be cemented for expanded efforts appears still valid although it will be further tested during the remainder of Phase I. Finally, an expanded drainage effort, especially if directed at farm drain installation concurrently with main drain construction can be expected to reduce significantly water logging and salinity levels in the project area over time. A number of project assumptions, however, remain to be proven valid and a few have proved invalid.

2. HAVA participation in the project was expanded to include the entire Technical Department following the December 1975 reorganization. Originally the project had begun under the leadership of a HAVA soil scientist working with one engineer. When this limited involvement proved inadequate to meet project demands, HAVA management recognized the need

to provide additional resources. This was an important step in improving project implementation.

3. Flowing directly from 2 above and following a transition of review and revision of previous design work, a marked increase in design output has occurred in the last few months. Designs are ahead of actual construction. The challenge, however, will be for the design work to remain ahead of scheduled construction once the latter begins to accelerate.

4. Drain construction, which has been accomplished, has been of acceptable standards and according to specification.

5. Increasingly close communications and a developing team spirit now characterizes the HAVA and USAID working relationship. This is permitting early discussion and consideration of project issues and differences.

B. What Went Wrong

1. General project implementation has been delayed by lack of forceful, continuous, full time management on the part of USAID and of clearly-defined responsibilities among USAID project personnel. From the outset, the project experienced delays in recruitment of a PASA team

and a USAID project officer. Once on board, little effort was made to orient the SCS team on project objectives and USAID organization. In the absence of a Project Officer, the role of the Project Liaison Officer was far from clear and his extended absence shortly after the arrival of the SCS team contributed to confusion. It was unrealistic to assume (as done in the original design of the project) that the SCS team could become operational immediately nor without guidance. This problem went unresolved until the arrival of the Project Officer, since staff changes and absences in Kabul had required a shift of project management responsibilities from the Development Planning (DP) office to the Rural Development (RD) office, back to DP, then to the Capital Development and Engineering (CDE) office and finally back to RD.

The arrival of the Project Officer and his assignment to Lashkar Gah, along with increasingly frequent visits from Kabul staff helped to clarify objectives and relationships. However, the roles of the RD Division Chief in Kabul, who became the Project Officer, and the Project Officer who became the Project Advisor in Lash remain ambiguous. An additional element of uncertainty was added when the Project Liaison Officer position

was vacated, leaving two people to fill three roles.

A fundamental question is whether by virtue of its heavy engineering and construction character, this project is manageable with generalist skills alone, quite aside from the obvious engineering monitorship requirement. The Evaluation Committee is inclined to think that direct experience in construction projects and tight scheduling would facilitate effective management. Though it recognizes that this alone is no guarantee of project success. It sees than a Kabul Project Officer playing this virtually full time role and the Project Advisor in Lash playing the role of coordinator and providing day-to-day policy guidance. Whatever roles are decided upon and whoever plays them, however, it is imperative that these roles and relationships be clearly defined.

2. Only 10 percent of the interim farm drain construction target for May 1976 has been met, specifically because:

a. Though labor is presumably available for farm drain excavation, HAVA has encountered administrative problems in contracting large numbers of laborers. HAVA has only been able to mobilize a maximum of 150 laborers on any given day for farm drain excavation so far. This

was possible only after a hard excavation study requiring active SCS participation had been undertaken.

b. Farm drain designs were not available until the end of January 1976.

c. HAVA's Technical Department has emphasized main drain construction so much in its preoccupation with providing adequate outlets that implementation of farm drain construction has received secondary attention.

d. HAVA remains undecided as to the most efficient labor-machine mix.

3. Only 28 percent of the interim main drain construction target for May 1976 has been met, specifically because:

a. Delays were experienced in developing approved designs and specifications in the early months.

b. Construction contract negotiations between HAVA-HCC have often been protracted and frequent misunderstandings over contract interpretation have arisen.

c. HCC's other commitments have at a minimum distracted HCC's management attention from early resolution of pressing problems affecting the drainage project.

d. Poor scheduling and utilization of available equipment have increased the time the equipment has been idle.

e. Long delays have been experienced in delivery of engines and spare parts (to have been supplied by AID), which would have increased equipment capacity and reduced down time. This has tended to obscure recognition of other fundamental reasons for slow progress on main drain construction (i.e., b, c and f).

f. There has been inadequate construction liaison and supervision between and by HAVA and HCC, due to: (1) the insufficient exercise of authority by HAVA field inspectors; (2) the delay in assigning a person full time in HAVA's Engineering Section to supervise construction; (3) differing work hours between HAVA and HCC; (4) casual adherence by HCC to HAVA drawings and specifications as witnessed by the fact that drawings are not available at field site; and (5) lack of contact between HCC and HAVA field construction counterparts.

g. SCS/HAVA/HCC have had disagreements over reasonableness of HCC costs.

4. Field data collection and analysis needs have been inadequately addressed. Field data have been collected on a minimum, immediate need basis and the soils laboratory has yet to become fully

operational. A qualified soil scientist has yet to be assigned to the laborator

5. The Fixed Amount Reimbursement (FAR) method of USAID project financing is imperfectly understood and often questioned by many parties, Afghan and American alike. The concern has been that actual costs may exceed estimated costs for drains completed under varying excavating conditions. No actual cost data (e.g., machine hour usage, quantity and type of soil excavated), however, has been accumulated in one place and analyzed for the purpose of refining cost estimates for future drain construction. Finally, given the absence of any reimbursement under FAR to date, FAR has not had the desired incentive effect.

6. Master planning for Phase II has been overshadowed by the heavy pressures on HAVA and SCS to demonstrate progress on physical construction. The almost concurrent need for master planning was not recognized until May 1976 when preliminary thinking in this direction was initiated by SCS and CDE. Clear definitions and delineation of appropriate scopes for Master Drainage, Construction and Equipment Plans needed for Phase II project development were generally agreed upon within USAID and SCS only in July. Although HAVA has been heavily involved with its 7 Year Plan, it has yet to focus upon detailed master drainage planning needs and organize itself to accomplish this task.

## VII. PHASE II PLANNING AND TIMETABLE

### A. Planning Recommendations

1. Preparation of a Master Drainage Plan, a 36-month Construction Plan and an Equipment Plan should begin immediately. These will define the scope and project content of Phase II.

2. Concurrently, work can begin on some of the standard sections of a USAID project paper for Phase II. A USAID project design committee should be appointed to coordinate the PP preparation. This committee's membership would not necessarily coincide with that of the project implementation committee, the establishment of which has been recommended earlier.

3. USAID/SCS and HAVA should jointly develop and agree upon drainage area selection and spacing criteria that reflect technical, socio-economic and political requirements. Other priorities (e.g., labor versus machine-intensive approach) as well as objectives for Phase II also must be discussed and agreed upon.

4. Pre-implementation steps for equipment procurement need to be examined by USAID/SCS/HAVA/HCC to determine how Phase II procurement can be expedited.

5. A farmer information and education program needs to be developed as an integral part of Phase II. Although farmers may have a general appreciation of the need for drainage, they do not know how the drainage project will

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4. Pre-implementation steps for equipment procurement need to be examined by USAID/SCS/HAVA/HCC to determine how Phase II procurement can be expedited.

5. A farmer information and education program needs to be developed as an integral part of Phase II. Although farmers may have a general appreciation of the need for drainage, they do not know how the drainage project will

affect their land, when a change will be noticeable, and what the magnitude of that change is likely to be. HAVA and USAID must squarely address this problem to ensure maximum farmer support and to lay the basis for an information delivery system which will ensure that optimum production benefits are derived from drainage.

6. Adequate maintenance of main and farm drains must be recognized as a sine qua non for successful drainage and improved production. Farmer responsibilities must be defined and agreed to by them in advance of drain installation. The GOA/HAVA must establish a policy and a schedule of operations to insure that drains will be adequately maintained. In this regard, the proposal to establish a Helmand Valley Operations and Maintenance Unit within HCC is considered a step in the right direction. In any event, these issues must be addressed in the design and negotiation of Phase II.

7. FAR procedures may need to be modified for Phase II depending on the experience with this financing method in Phase I and the outcome of the proposed AID centrally-funded research study of FAR.

8. HAVA and HCC should understand that expanded staff and physical resources will be required for Phase II, and begin planning for their provision. This should include plans for increased logistic support.

9. HAVA should consider the establishment of a socio-economic unit to perform basic research on project beneficiaries for use in project area selection and evaluation of project impact on farm production and income.

10. USAID will have to identify the in-house organization needed to provide adequate management and monitorship of an expanded Phase II.

B. Schedule of Key Events

| | Description | Responsibility | Estimated Completion Date |
|---|---|---|---|
| (1) | At least 4 draglines working in two project areas on Phase I construction | HAVA/HCC | 9/1/76 |
| (2) | Soil Laboratory fully operational | HAVA | 9/1/76 |
| (3) | Project area beneficiary analysis from Farm Economic Survey | USAID/DP | 9/1/76 |
| (4) | Benefit/Cost Analysis for Phase II ready | USAID/DP | 10/1/76 |
| (5) | Master Drainage, Construction and Equipment Plans | HAVA/SCS | 11/1/76 |
| (6) | Project Paper assembled | USAID | 11/15/76 |
| (7) | Labor contracting issue resolved and system of worker management operational | HAVA | 12/1/76 |
| (8) | Decision to GO AHEAD with submission of Project Paper (If items 1 - 7 above are met) | USAID | 12/1/76 |
| (9) | Loan authorized (if project accepted) | AID/W | 2/15/77 |
| (10) | Loan agreement negotiated and signed | GOA/USAID | 4/15/77 |
| (11) | Conditions precedent met and Letter of Commitment requested | GOA | 6/15/77 |
| (12) | Phase II start-up | | 8/1/77 |

ANNEX L

# CHECKLIST OF STATUTORY CRITERIA

## BASIC AUTHORITY

1. FAA ¢ 103; ¢ 104; ¢ 105; ¢ 106
   Is assistance being made

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| a. for agriculture, rural development or nutrition; | Yes. The assistance is being made to help Afghanistan improve agriculture, rural development and nutrition by reducing water logging and salinity. It will contribute directly to increasing food yields. |
| b. for population planning or health; | No. |
| c. for education, public administration, or human resources development; | No. |
| d. to solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development; | No. |
| e. in support of the general economy of the recipient country or for development programs conducted by private or international organizations. | No. |

## COUNTRY PERFORMANCE

### Progress Towards Country Goals

2. FAA ¢201 (b) (5), (7) & (8); ¢ 208

   A. Describe extent to which country is:

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| (1) Making appropriate efforts to increase food production and | (1) Rapid increase in agricultural production is a high priority of the |

The following abbreviations are used:
FAA - Foreign Assistance Act of 1961, as amended.
FAA, 1973 - Foreign Assistance Act of 1973.
App. - Foreign Assistance and Related Programs Appropriation Act, 1977.
MMA - Merchant Marine Act of 1936, as amended.
ISA - International Security Assistance and Arms Export Control Act of 1976.

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| improve means for food storage and distribution. | Afghan Government. This includes the introduction, extension and production of improved varieties of wheat and fertilizers in an effort to make the country self-sufficient in foodgrains. These efforts, coupled with favorable weather, led to a substantial decrease in wheat imports during the past 3-4 years. With U.S. assistance, the GOA has been seeking to improve its fertilizer distribution system and fertilizer usage has steadily increased. With assistance from ADB, the GOA will establish the Afghan Seed Company to increase quantity of high-yielding wheat seeds. The Seven-Year Plan states that a wheat reserve/price stabilization program will be implemented. Agreement between the GOA and other donors has been reached for initial assistance in this area. Agreement also reached with one donor to increase silo capacity for wheat storage. |
| (2) Creating a favorable climate for foreign and domestic private enterprise and investment. | Since the mid-1960's the development policy of Afghanistan has envisioned a mixed economy. Within this framework, the GOA has indicated that it allocates a significant role to private investment, particularly for small and medium enterprises. A Foreign and Domestic Private Investment Law, promulgated in 1967, has provided incentives to private investment and led to approval of over 350 small industries and the start-up of over 100 manufacturing operations in the past five years. A revised Investment Law has been promulgated in August 1974 with further incentives to private enterprise and investment. Current uncertain business environment is not conducive to private investment, however. |

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| (3) | Increasing the public's role in the developmental process. | The GOA has accorded high priority to the implementation of rural development programs designed to maximize benefits to the poorest segments of society and to utilize self-help efforts at the local level to the greatest possible extent. Many small rural works projects, including feeder roads, bridges and irrigation ditches were constructed over the past few years and are actively under construction now. Broad popular participation in development has been enunciated as a basic goal. |
| (4) | (a) Allocating available budgetary resources to development. | Afghanistan's budgetary resources are committed to social and economic development. |
| | (b) Diverting such resources for unnecessary military expenditure (See also Item No. 20) and intervention in affairs of other free and independent nations.) (See also Item No. 11) | Afghan arms acquisition is motivated by desire for defensive capability and internal security. The Government professes no offensive intentions and has not carried out any such intentions. |
| (5) | Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise. | GOA has begun to implement recent land reform law which specifies maximum land holdings. Progress will be slow as data needed for implementation has to be gathered and machinery to implement has to be developed. During Seven-Year Plan (1976/77-1981/83), a progressive land tax system will be introduced to provide disincentives for large holdings and provide additional Government income. Freedom of expression and press is limited. GOA policy envisions significant role for private enterprise but uncertain business environment now prevailing not conducive to increased activity by private sector. |

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| (6) Willing to contribute funds to the project or program. | Afghanistan will provide the local currency resources required for implementation of the loan. The Government of Afghanistan will pay for all local distribution costs as well as providing approximately two-thirds of the country's fertilizer needs from its own plant. See also V.F. of the Project Paper. |
| (7) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures. | The Government of Afghanistan is responding to the vital economic, political and social concerns of its people. It has a firm determination to come to grips with the economic problems of the country. |
| B. Are above factors taken into account in the furnishing of the subject assistance? | Yes. |

Treatment of U.S. Citizens and firms.

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| 3. FAA ¢ 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government? | Afghanistan is not known to be in violation of this section. |
| 4. FAA ¢ 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? | Afghanistan is not known to be in violation of this section. |

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| 5. FAA ¢ 620(o): Fisherman's Protective Act ¢ 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters,<br><br>a. has any deduction required by Fishermen's Protective Act been made?<br><br>b. has complete denial of assistance been considered by A.I.D. Administrator? | Afghanistan has not taken such action. |

Relations with U.S. Government and Other Nations

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| 6. FAA ¢ 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba. | We are not aware of any GOA non-compliance with this section. |
| 7. FAA ¢ 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? | The Secretary of State has determined that Afghanistan is not dominated or controlled by the international Communist movement. |
| 8. FAA ¢ 620 (d). If assistance is for any productive enterprise which will compete in the United States with United States enterprise, is there an agreement by the recipient country to prevent export to the United States of more than 20% of the enterprise's annual production during the life of the loan? | Not applicable. |
| 9. FAA ¢ 620(f). Is recipient country a Communist country? | No. |

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| 10. FAA ¢ 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or agression? | No. |
| 11. FAA ¢ 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? | No. |
| 12. FAA ¢ 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, in convertibility or confiscation, has the A.I.D. administration within the past year considered denying assistance to such government for this reason. | Afghanistan has instituted the investment guaranty program for the specific risks of expropriation, inconvertibility and war risks. |
| 13. FAA ¢ 620(n). Does recipient country furnish goods to Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from Viet-Nam. | We are unaware of any GOA noncompliance with this section. |
| 14. FAA ¢ 620(q). Is the government of the recipient country in default on interest or principal of any A.I.D. loan to the country? | No. |
| 15. FAA ¢ 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? | Afghanistan has not severed diplomatic relations with the United States. |
| 16. FAA ¢ 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the A.I.D. Administrator in determining the current A.I.D. Operational Year Budget? | Afghanistan is not delinquent in any obligations to the United Nations. |

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| 17. FAA ¢ 481. Has the government of recipient country failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? | No. | |
| 18. FAA ¢ 659. If (a) military base is located in recipient country, and was constructed or is being maintained or operated with funds furnished by U.S., and (b) U.S. personnel carry out military operations from such base, has the President determined that the government of recipient country has authorized regular access to U.S. correspondents to such base? | There is no U.S. military base in Afghanistan | |
| 19. FAA ¢ 666. Does the government of recipient country object to the presence of any officer or employee of the U.S. who is present in this country for the purpose of carrying out economic development assistance on the basis of the race, religion, national origin, or sex of such officer or employee? | No. | |
| 20. FAA ¢ 620A. If assistance is to a government, has it aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed an act of international terrorism? | No. | |
| 21. FAA ¢ 669. Has the country delivered or received nuclear enrichment or reprocessing equipment, materials or technology without, before delivery, reaching agreement to place such equipment, materials or technology under multilateral auspices and management when available and without agreeing with IAEA to use the IAEA safeguards system? | No. | |

22. FAA ¢ 620 (s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).

Afghanistan's military budget appears to be about 30% of the total budget. The Soviet Union and other Eastern bloc countries are the principal suppliers of military equipment for the Afghan armed forces. This equipment is purchased on long term credits at below "market prices". Some surface-to-air missiles, Mid 60's fighter bombers and guided anti-tank missiles are considered the sophisticated components of the Afghan military system. These weapons are available in limited quantities. Afghanistan is not known to be diverting development assistance to military expenditures. The Afghan military, both air force and army, totals 84,000 men on active duty. The size of this force and its equipment are considered consistent with the country's defense and internal security needs.

## CONDITIONS OF THE ASSISTANCE

### General Soundness

23. FAA ¢ 201 (d). Information and conclusion on reasonableness and legality (under laws of country and the United States) of lending and relending terms of the loan.

Not applicable.

24. FAA ¢ 201 (b) (2); ¢ 201 (e). Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to A.I.D. an application for such funds together with assurances

Yes, see Project Paper.

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| to indicate that funds will be used in an economically and technically sound manner? | |
| 25. FAA ¢ 201 (b) (2). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects. | Not applicable. |
| 26. FAA ¢ 201 (b) (1). Information and conclusion on availability of financing from other free-world sources, including private sources within the United States. | No other free-world sources, including private sources within the United States, have indicated an interest in financing the project. |
| 27. FAA ¢ 611 (a) (1). Prior to signing of loan will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the United States of the Assistance? | (a) Financial and other plans necessary to carry out the assistance are completed (b) the cost of the assistance to the United States is limited to the amount of the loan and grant. |
| 28. FAA ¢ 611 (a) (2). If further legislative action is required within recipient country, what is the basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of assistance. | Further legislative action is not needed. |
| 29. FAA ¢ 611 (e). If assistance is for Capital Assistance, and all U.S. assistance to project now exceeds $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project? | Yes. See Annex M of the Project Paper. |
| **Assistance's Relationship to Achievement of Country and Regional Goals** | |
| 30. FAA ¢ 207; ¢ 113. Extent to which assistance reflects appropriate emphasis on: (a) encouraging development of democratic, economic, | The assistance has the indirect effect of encouraging institutional development for the distribution of agricultural inputs and rural |

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| political, and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs; (e) other important areas of economic, political and social development, including industry, free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (f) integrating women into the recipient country's national economy. | development and contributes directly towards meeting Afghanistan's foodgrain needs. The assistance has no direct impact on integrating women into the economy. |
| 31. FAA ¢ 209. Is project susceptible of execution as part of regional project? If so, why is project not so executed? | The assistance is not directed at a regional problem. The U.S. is only one among a number of donors in Afghanistan. The Soviet Union, Germany, France, Peoples Republic of China, England, the United Nations, the World Bank, Asian Development Bank, and various voluntary agencies are important foreign assistance donors to Afghanistan. |
| 32. FAA ¢ 201 (b) (4). Information and conclusion on activity's relationship to, and consistency with, other development activities, and its contribution to realizable long-range objectives. | The proposed assistance would contribute to the development of the agriculture sector of the economy, a prime economic development objective of Afghanistan. It closely complements other developmental efforts underway in Afghanistan with U.S. and other donor assistance. |
| 33. FAA ¢ 201 (b) (9). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth. | Self-sufficiency in grain production is a major goal of Afghanistan and this project will definitely contribute toward the development of Afghanistan's rural economy and increased food production. |

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| 34. FAA ¢ 209. Information and conclusion whether assistance will encourage regional development programs. | See above paragraph 31. |
| 35. FAA ¢ 111. Discuss the extent to which the assistance will strengthen the participation of the urgan and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life. | The construction of drains will enable and encourage a greater number of rural poor farmers to increase foodgrain yields and help themselves toward a better life. |
| 36. FAA ¢ 201 (f). If this is project assistance, describe how such project will promote the country's economic developing taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development. | Increased agricultural production is essential to Afghanistan's economic development. In order to increase production and good yield per acre, irrigated lands must be drained. |
| 37. FAA ¢ 281 (a). Describe extent to which the assistance will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions. | Agricultural inputs are required for implementation of Afghanistan's agricultural and rural development strategy, since they facilitate obtaining increased food yields. Without adequate food levels participation of the rural population in democratic, private and local governmental institutions would be severely affected. |
| 38. FAA ¢ 281 (b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government. | The assistance recognizes the needs of the rural population and the desire for increased food production and incomes for producers, and their capacity to effectively utilize these inputs to achieve production and income goals. There is no direct effect on the use of the country's intellectual resources or on civic education and training in skills needed for increased civic participation. |

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| 39. FAA ¢ 201 (b) (3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities? | The construction of drains is designed to contribute to the maximum extent to the long-range economic development of Afghanistan. |
| 40. FAA ¢ 601 (a). Information and conclusions whether assistance will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions. | (a) in the first instance, trade would take place between the U.S. and Afghanistan since most purchases financed from the loan would have their source and origin in the U.S. In the longer term, the project may facilitate international trade by encouraging the export of agricultural products.<br><br>(b) Increased private farm activity will be directly encouraged.<br><br>(c) The assistance will have no direct effect on the development and use of cooperatives, credit unions and savings and loan associations.<br><br>(d) The assistance would have no measurable effect on monopolistic practices.<br><br>(e) Technical efficiency will be greatly improved through the existence of reliable drains.<br><br>(f) The assistance will have no direct affect on the strengthening of free labor unions. |
| 41. FAA ¢ 619. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate? | Not applicable. |

Loan's Effect on U.S. and A.I.D. Program

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| 42. FAA ¢ 201(b)(6). Information and conclusion on possible effects of assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving the U.S. balance of payments position. | It is expected that most of the equipment and commodities will be purchased in the United States. Little, if any, adverse effect on the U.S. balance of payments is anticipated. See also Section IV.D. |
| 43. FAA ¢ 202(a). Total amount of money under assistance which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources. | Assistance procedures are designated for procurement of equipment and commodities furnished by private sector sources. |
| 44. FAA ¢ 601(b). Information and conclusion on how the assistance will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise). | It is expected that most of the equipment and commodities will be furnished by United States private enterprise. The assistance will make private investment in Afghanistan more attractive and feasible in the future in development of related agribusiness. |
| 45. FAA ¢ 601(d). If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest? | It is not contemplated that engineering and professional services of U.S. firms will be required under this project. However, the services of the Soil Conservation Service (SCS) are being provided under an A.I.D. grant project. |
| 46. FAA ¢ 602. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services financed by the assistance. | Procurement procedures to be utilized under the assistance will permit equitable participation of U.S. small business. Normal small business notification will be required in the implementation of the assistance. |

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| 47. FAA ¢ 620(h). Will the assistance promote or assist the foreign aid projects or activities of the Communist-bloc countries? | No. |
| 48. FAA ¢ 621. If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs. | Technical assistance provided by SCS will be financed under the grant portion of the project. |

Loan's Compliance with Specific Requirements

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| 49. FAA ¢ 110(a); ¢ 208(e). In what manner has or will the recipient country provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be made? | A waiver of Section 110(a) is requested for this project in the Project Paper. Afghanistan is a relatively least developed country. Details on the GOA's contribution to the project are set forth in Section V(E) of the Project Paper. |
| 50. FAA ¢ 660. Will assistance be used to finance police training or related program in recipient country? | No. |
| 51. FAA ¢ 114. Will assistance be used to pay for performance of abortions or to motivate or coerce persons to practice abortions? | No. |
| 52. FAA ¢ 201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year? | Not applicable. |

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| 53. FAA § 201(d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter? | Not applicable. |
| 54. FAA § 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise. | Afghan private enterprise will be eligible to participate in drain excavation. |
| 55. FAA § 604(a). Will all commodity procurement financed under the assistance be from the United States except as otherwise determined by the President? | Commodity procurement financed under this assistance will be from the United States. |
| 56. FAA § 604(b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price? | Not applicable. |
| 57. FAA § 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will the agreement require that marine insurance be placed in the United States on commodities financed by the assistance. | Yes, an appropriate provision will be included in the agreement. |
| 58. FAA § 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? | All prices for agricultural inputs will be reviewed by the A.I.D. Commodity Management Division. |
| 59. FAA § 604(f). If assistance finances a commodity import program, will arrangements be made for supplier certification to A.I.D. and A.I.D. approval of commodity as eligible and suitable. | Not applicable. |

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| 60. FAA ¢ 608(a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items. | This requirement will be identified to the Government. |
| 61. FAA ¢ 611(b), App. ¢ 101. If assistance finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962? | Yes. Section IV. |
| 62. FAA ¢ 611(c). If contracts for construction are to be financed, what provision will be made that they be let on a competitive basis to maximum extent practicable. | Contract for construction will be with a Government corporation. No private sector capability exists in Afghanistan. |
| 63. FAA ¢ 612(b); ¢ 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the United States are utilized to meet the cost of contractual and other services. | The GOA will pay for a substantial portion of local currency expenses of the project. All of the assistance proceeds will be expended on foreign exchange procurement. Afghanistan is not an excess currency country. |
| 64. Section 30 and 31 of PL 93-189 (FAA of 1973). Will any part of the assistance be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, Vietnam, or Thailand? | No. |
| 65. Section 37 of PL 93-189 (FAA of 1973); App. ¢ 111. Will any part of this assistance be used to aid or assist generally or in the reconstruction of Vietnam? | No. |

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| 66. | ISA § 404. Will any part of this assistance be used for the purpose or with the effect of promoting or augmenting, directly or indirectly, the capacity of any nation, group, movement or individual to conduct military or paramilitary operations in Angola? | No. |
| 67. | FAA § 612(d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release? | No. |
| 68. | FAA § 620(g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property? | Neither this nor any previous assistance has been, or will be, used in this manner. |
| 69. | FAA § 620(k). If assistance is for construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed $100 million? | Not applicable. |
| 70. | FAA § 636(i). Will any assistance funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction? | No such use is contemplated. |
| 71. | App. § 103. Will any assistance funds be used to pay pensions, etc., for military personnel? | No. |
| 72. | App. § 106. Will any funds be used to pay UN assessments? | No. |
| 73. | App. § 107. Will any funds be used to carry out provisions of FAA § 209(d)? | No. |

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| 74. App. § 112. Describe how the Committee on Appropriations of the Senate and House have been or will be notified concerning the activity, program, project, country, or other operation to be financed by the assistance. | The assistance is included in the FY 1976 OYB which has been presented to Congress. Formal notification will be given to Congress in compliance with this provision. |
| 75. App. § 501. Will any assistance funds be used for publicity or propaganda purposes within the United States not authorized by Congress? | No. |
| 76. App. § 504. Is the country in default for a period in excess of one calendar year in payment or interest on any loan made to such country by the United States pursuant to a program for which funds are appropriated under the Appropriations Act? | No. |
| 77. MMA § 901 b; FAA § 640 C. (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed with funds made available under this assistance shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. | Provisions will be included in the Agreement for complying with this section with respect to the commodities financed under this assistance. |
| (b) will grant be made to loan recipient to pay all or any portion of such differential as may exist between U.S. and foreign-flag vessel rates? | No. |
| 78. FAA § 901. Has the country denied its citizens the right or opportunity to emigrate? | No. |

79. FAA § 115. Will country be furnished, in same fiscal year, either security supporting assistance, Indochina Post-war Reconstruction, or Middle East peace funds? If so, is assistance for population programs, humanitarian aid through international organizations, or regional programs? No.

80. FAA § 653 (b). Is this assistance within the country or international organization allocation for the fiscal year reported to Congress (or not more than $1 million over that figure plus 10%)? Yes.

81. FAA § 662. Will arrangements preclude use of funds for CIA activities? Yes.

82. App. § 506. Will any funds be made available to any international financial institution whose U.S. representative cannot obtain names and amounts for all loans and employee compensation of the institution? No.

83. FAA ¢ 116

(a) Has the Secretary of State made a determination that the recipient country does not engage in a consistent pattern of gross violations of internationally recognized human rights?

(b) If not, does this assistance directly benefit the needy people of the recipient country? Yes.

84. FAA ¢ 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing? No.

ANNEX M

**Afghanistan - Central Helmand Drainage (Phase II) Project**
**Certification Pursuant to Section 611 (e) of**
**the Foreign Assistance Act of 1961, as Amended**

I, Vincent W. Brown, 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 Government of Afghanistan to carry out an effective Central Helmand Drainage (Phase II) Project, do hereby certify that in my judgment Afghanistan has the financial and human resources capability to implement, maintain and utilize effectively the subject project.

Vincent W. Brown

Vincent W. Brown, Director
USAID/Afghanistan

Nov. 25, 1976

Date

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DRAFT

ANNEX N

(Ill. 3...)
App 9A, Ch 2, Ill. 1

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 NUMBER: 5

3. COUNTRY/ENTITY: AFGHANISTAN

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 306-0149

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

7. PROJECT TITLE (Maximum 40 characters): Central Helmand Drainage (Phase II)

8. PROJECT APPROVAL DECISION — ACTION TAKEN: A (A = APPROVED, D = DISAPPROVED, DE = DEAUTHORIZED)

9. EST. PERIOD OF IMPLEMENTATION: YRS. 03 QTRS. –

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 |
|---|---|---|---|---|---|---|---|---|
| (1) FN | 259 B | 064 | | 7,303 | | 4,415 | | 5,408 |
| (2) | | | | | | | | |
| (3) | | | | | | | | |
| (4) | | | | | | | | |
| TOTALS | | | | | | | | |

| A. APPROPRIATION | N. 4TH FY 80 O. GRANT | N. 4TH FY 80 P. LOAN | Q. 5TH FY — R. GRANT | Q. 5TH FY — S. LOAN | LIFE OF PROJECT T. GRANT | LIFE OF PROJECT U. LOAN |
|---|---|---|---|---|---|---|
| (1) FN | 212 | | | | 17,336 | |
| (2) | | | | | | |
| (3) | | | | | | |
| (4) | | | | | | |
| TOTALS | | | | | | |

11. PROJECT FUNDING AUTHORIZED (ENTER APPROPRIATE CODE(S)) 1 = LIFE OF PROJECT, 2 = INCREMENTAL, LIFE OF PROJECT: 2

C. PROJECT FUNDING AUTHORIZED THRU: 80

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED ($000)

| A. APPROPRIATION | B. ALLOTMENT REQUEST NO. — C. GRANT | B. ALLOTMENT REQUEST NO. — D. LOAN |
|---|---|---|
| (1) FN | 7,303 | |
| (2) | | |
| (3) | | |
| (4) | | |
| TOTALS | 7,303 | |

13. FUNDS RESERVED FOR ALLOTMENT

TYPED NAME (Chief, NRR/FM/PHD)

SIGNATURE

DATE

14. SOURCE/ORIGIN OF GOODS AND SERVICES: ☐ 000 ☐ 941 ☐ LOCAL ☐ OTHER

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

| FOR FMS/FMAS USE ONLY | 16. AUTHORIZING OFFICE SYMBOL | 17. ACTION DATE MM DD YY | 18. ACTION REFERENCE (Optional) | ACTION REFERENCE MM DD |
|---|---|---|---|---|

AID 1290-6 (7-70)

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ANNEX N

DRAFT
Nov. 22-76

# PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

## PART II

Name of Country/Entity: Afghanistan  Name of Project: Central Helmand Drainage

Number of Project: 306-0149

Pursuant to Part __. Chapter ___, Section ___ of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to Afghanistan the "Cooperating Country" of not to exceed 17,336,000 United States Dollars. The "Authorized Amount" is 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 GOA in: 1) expanding its drainage construction capabilities; 2) providing adequate drainage to 135 $km^2$ of farm land; 3) broadening farmer understanding and participation in the drainage effort; 4) advancing planning for a possible Phase III project, and 5) establishing an effective equipment maintenance and supply program for drainage construction equipment.

Of the authorized Amount, 6,670,000 dollars (Capital Grant) will be provided to the Cooperating Country to assist in financing certain Foreign Exchange costs of goods and services required for the Project.

I approve the total level of A.I.D. appropriated funding planned for this project of not to exceed 17,336,000 United States Dollars (Grant) of which $6,670,000 will be Capital Grant funded and $10,666,000 Development Grant funded including the

funding
/authorized above, during the period FY 1977 through FY 1980. I approve further increments during that period of Grant funding up to $ _____, subject to the availability of funds in accordance with A.I.D. allotment procedures.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and 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 in the Cooperating Country or in the United States except as waived under e. (1) below.

b. Prior to the initial disbursement of the Grant, the Grantee shall furnish, in form and substance satisfactory to A.I.D., a detailed procurement plan indicating commodities to be procured, the procuring agency, and the proposed arrangements for carrying out the procurement.

c. Prior to the initial disbursement of the Grant, the Grantee shall furnish, in form and substance satisfactory to A.I.D., contracting procedures relating to main and farm drain construction, designation of the Government agency to serve as the Project Directorate, evidence that the Project Directorate shall have adequate staff, evidence or assurances on the availability of funds, and a time-phased training program for A.I.D.-financed participants.

d. The Project Agreement will include appropriate covenants relating to selection criteria for main and farm drain construction work; assuring that equipment and supplies financed under the Grant are used for the Project and related land-betterment activities, and requiring GOA logistic support for A.I.D.-financed personnel.

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

(1) A waiver of origin and componentry requirements for the local cost financing component of the Project;

(2) A waiver of the 25 percent cost-sharing requirement of FAA Section 110(a).