PROJECT PAPER (PP

36p.

CENTRAL HELMAND DRAINAGE AND IRRIGATION IMPROVEMENT

HELMAND-ARGHANDAB VALLEY

306-11-120-146

KABUL, AFGHANISTA
February 14, 1975

PROJECT PAPER (PP)
CENTRAL HELMAND DRAINAGE & IRRIGATION IMPROVEMENT

TABLE OF CONTENTS

TABLE OF CONTENTS

APPENDICES

PART I. SUMMARY

A. Summary Information

1. Project Title: Central Helmand Drainage and Irrigation Improvement

2. Project Number: 306-11-120-146

3. Cooperating Country: Afghanistan
   Executing Agency: Helmand-Arghandab Valley Authority

4. Obligation Span: FY 1975 - FY 1976

5. Implementation Span: FY 1975 - FY 1977

B. Project Purpose

Project purposes have been divided into two phases. Phase I project purposes, discussed in this Project Paper and for which approval and financing are sought, include: (1) construction of 100 kilometers of farm drains and improvement of 80 kilometers of major drains; (2) assessment and revision of drainage plans for providing adequate farm drainage in Marja, Nad-i-Ali, Shamalan, and Darweshan areas of the Helmand-Arghandab Valley. This will be enough to improve the drainage on 4,000 acres and will directly affect over 37,600 people in the first phase. By the completion of Phase II, drainage will be improved for 170,000 acres. Based on current population estimates of the Helmand-Arghandab Valley, approximately 259,000 people will be benefitted either as working laborers or because of the resulting effect of increased crop yields. Concurrently, the revision of the Master Drainage Plan for completing the drainage systems will be completed and an improved maintenance capability of HAVA will be effected.

C. Financial Requirement

1. Helmand-Arghandab Valley Authority Inputs - Reference Appendix E

The following is a summary of HAVA inputs: ($ million)

FY 75	FY 76
1.54	1.82

2. USAID (Phase I) Inputs

	Fiscal Year ($ U.S. Thousand)	
	75	76[a/]
a. Personnel	439	627
Direct-Hire	(7)	(67)
Project Manager (Agr. Engr.)	7	60
1 - Local Hire U.S. Secretary		7
Contract	(152)	(140)
Spare Parts Specialist	12 (2 MM)	
2 - Mechanics	140 (24 MM)	140 (24 MM)
PASA	(280)	(420)
Drainage Design Engr.	210 (36 MM)	70 (12 MM)
Drainage Engr. Field	70 (12 MM)	280 (48 MM)
1 - Soils Lab. Technician (1x12MM)	-	70
b. Commodities	376	-
Spare parts	250	-
Soils lab supplies & equip	10	-
Vehicles	116	-

a/ It is projected that a loan of approximately $2.9 million will be needed in FY 76 to finance heavy equipment, improvement, and construction of drains.

c. Other Cost	185	373
Logistic	10	173
Fixed Cost Reimbursement	175	200
Total Obligations	1,000	1,000

PART II. RATIONALE/JUSTIFICATION

During the past several years, the amount of irrigated land in the Helmand-Arghandab area has been increasing but sufficient attention has not been paid to drainage. Consequently, water-logging and salinization have now become major problems which are decreasing agricultural production. The previous GOA policy of placing priority on expanding irrigation facilities has resulted in construction of very few drains or permanent water control structures.

The GOA has decided that the best use of current resources is to improve the existing irrigation system by providing adequate drainage and installing water control structures. This is necessary if the food and fiber production in Afghanistan is to increase to a level necessary to meet the rising needs of the country. This new policy has the approval of several donors who have made surveys of the irrigation systems in Afghanistan. Numerous reports of AID personnel have also emphasized the necessity of providing adequate drainage.

The strong interest of the Government in moving ahead on drainage and irrigation improvement project has been underlined by the request for U.S. assistance in the Helmand (Appendix E) made directly to the Secretary of State, to the AID Administrator and to the Assistant Administrator for NESA. As a result of this request, , in addition to drainage program needs, potential problems in the areas of project management and project support have been discussed at some length with senior members of the Afghan Government. All discussions have been positive and encouraging. For example, the Minister of Planning has pledged full support for budgetary needs as well as assistance in removing any bottlenecks which could impede the progress of the project, particularly in the areas of personnel and administrative procedures. The Governor of the Helmand, who is also the President of HAVA, has agreed fully on the importance of seeking and/or obtaining adequate trained staff to carry out the program outlined in this project. He also agrees to the

need for changes in the system of operation and maintenance to make it effective. Specifically, both the Governor and the Minister of Planning have agreed in principle that for most of the heavy equipment, the operation and maintenance will be carried out by the Helmand-Arghandab Constructio Unit (HACU). HACU is a semi-autonomous government corporation and one of the most effective institutions in the country. The Governor and his HAVA staff have shown increased awareness of the need for close contact with the farmers who will participate in the program.

Because of the above and the concrete cooperation on the Afghan side in developing this project proposal, we are encouraged to believe that the Government not only wants the USG to play a major role in completing the drainage and irrigation work in the Helmand Valley, but is willing to address many of the major administrative, management, and budget problems which have retarded its development in the past.

PART III. PROJECT DESIGN

A. PROJECT DESIGN

Sector Goal (the broader objective to which this project contributes)
To increase food and fibre production in Marja, Nad-i-Ali, Shamalan and Darweshan areas of the Helmand Arghandab Valley and raise the standard of living of the valley inhabitant with the resulting increased farming incomes.

Measures of Goal Achievement

- Increased Production: From 1974 to 1980

	From	To
Wheat	2000 Kg/ha	4500 Kg/ha
Corn	2342 Kg/ha	5000 Kg/ha
Cotton	1026 Kg/ha	2272 Kg/ha

- Benefit Rural People:

FY 76	37,600
FY 77	85,000
FY 78	141,000
FY 79	200,000
FY 80	259,000

- Increase farm family annual income (constant prices):

From $516* To $1085
*Based on 1976 Farm Economic Survey

Assumptions for the achievement of the Sector Goal are: (1) increased farmer income will contribute significantly to raising valley inhabitants' standard of living; (2) no major plant disease or insect epidemic will develop to reduce expected crop yields; (3) HAVA farmers and their families desire an improved standard of living; (4) farmers are willing to participate in the drainage improvement and extension program.

PHASE I. Project Purpose (Obligation in FY 75 and FY 76)

To begin the expansion of the farm drainage systems in Marja, Nad-i-Ali, Shamalan and Darweshan areas of the Helmand-Arghandab Valley and develop a feasible Drainage Plan for these areas.

Conditions that will indicate achievement of project purpose.

-100 Kilometers of Farm Drains constructed.
-80 Kilometers of major drains improved.
-Master Drainage Plan developed.

Project Outputs necessary for the achievement of Phase I purpose are: Construction of 100 kilometers of farm drains and improvement of 80 kilometers of major drains.	Magnitude of Outputs - Construction program on schedule. - Drain design/specifications prepared and joint agreement between HAVA and USAID. - Agreement on fixed amount of cost for constructing one kilometer of farm drains and improving one kilometer of a major drain. - HAVA construction contract with HACU.
Assessment and revision of master drainage plan for providing adequate farm drainage in Marja, Nad-i-Ali, Shamalan and Darweshan	- Topographic map of project area - Drainage specification - Blueprints of drainage systems - Construction Schedule

Assumption for achievement Phase I project outputs: (1) Sufficient HAVA equipment can be repaired. (2) Farmers will participate in the drainage program. (3) GOA policy in regard to drainage continues. (4) Sufficient HAVA budget will be available.

PHASE II. Project Purpose (Projected obligations FY 76 through FY 80 not justified in this project paper):

To provide adequate drainage to reduce the salinity levels of the soil and improve the irrigation water utilization in Marja, Nad-i-Ali, Shamalan and Darweshan areas of the Helmand Arghandab Valley.

Conditions that will indicate achievement of project purpose:

- Additional Farm Drains:

	Kilometers
FY 77	185
FY 78	590
FY 79	1,005
FY 80	1,730

- Main Drains and laterals

FY 77	191
FY 78	351
FY 79	453
FY 80	544

- Irrigation Plan for determining water needs for each farm

- Irrigation schedules

Assumptions for the Achievement of Phase II project purpose are: (1) Farmers in the project area desire to improve their farms and protect them from further deterioration due to salinization; (2) farmers will be receptive to a program to improve their irrigation systems; (3) farmers will respond to monetary incentives; (4) GOA will continue its policy of providing required resources to improve existing irrigated areas.

B. Two Major Project Phases

This project justifies expenditures for Phase I, a period of 17 months. (FY 75 - 2 months and FY 76 - 15 months)

Phase I has the following components, the fourth of which is essential for the implementation of Phase II and the sixth is being tested in Phase I for extended use in Phase II.

(1) Construction of 100 kilometers of farm drains in the present irrigated area.

(2) Rehabilitation of 80 kilometers of major drains.

(3) Improvement of HAVA ability to correct drainage problems in the project area.

(4) Assessment and revision of master drainage plan for providing adequate farm drainage in Marja, Nad-i-Ali, Shamalan and Darweshan.

(5) Rehabilitation of HAVA's heavy equipment.

(6) Utilization of the fixed cost reimbursement procedure.

Phase II is envisioned to be a program that will have a project life of four to five years which upon its completion the drainage systems in Marja, Nad-i-Ali, Shamalan and Darweshan areas of the Helmand-Arghandab Valley will be completed. This phase has a projected cost of $18 to $19 million, approximately $10 million in U.S. loans and $4 million in U.S. Grants, with the remaining $4 to $5 million coming from GOA resources.

1. Construction of Farm Drains. It is expected that about 100 kilometers of farm and lateral drains will be constructed during the first phase of this project. It is also expected that this work will be very labor intensive and will be done in those areas where the major drains already exist, are working well, and do not appear to need realignment. Areas in Nad-i-Ali, Marja, and Darweshan as well as smaller areas in the Shamalan would lend themselves to this part of the project. It is expected that practically all of this work can be done without power equipment and that farmers in the area would be employed to do the hand work. The staff of HAVA, with the assistance of the AID-supplied technicians, will do the design work and supervise its implementation. In order to encourage the farmers to continue the drains on their farms through individual fields as needed, a system will be worked out for reimbursing them for a part of their labor of constructing the farm drains.

2. Rehabilitation of Major Drains. About 80 kilometers of major drains will be rehabilitated during the first phase of this project. This work will be done with a combination of hand and machine labor using existing over-age equipment which will be rehabilitated for the purpose. However, farm labor will be employed on an off-season basis to help widen, deepen and clean drains as needed. The deepening of the major drains is required to give the drains more latitude for correctly installing laterals and on-farm drains.

3. HAVA Ability to Correct Drainage Problems. As a result of this project, it is expected that HAVA's ability to correct drainage problems will be improved, not only because they will have on-the-job training in doing such work, but it appears that the Government has now agreed to a policy of installing drains and completing the existing irrigation system rather than of extending the irrigation system to new areas. An important element of drainage improvement, besides the policy issue and the on-the-job training, is the fact that HAVA will learn to work with farmers better and to discuss with them their problems. Most importantly, HAVA will improve its ability to recognize problems when they first appear. It is likely that in most of the areas, whether drainage problems are plainly evident or not, there is some deterioration of yields due to this factor. We expect that experience gained in this project will assist the HAVA officers in identifying areas that are beginning to deteriorate before they become a serious problem.

4. Revision and Up-Dating of Master Drainage Plan. Three people experienced in developing drainage systems will work for from six to nine months reviewing the drainage plan developed in the late 1950's. Since that time, the area being irrigated has been extended, some of the areas which were thought to have excellent underground drainage, have now been found to be sealed. Other areas do not have the depth of soil that had been anticipated. Also, water has been extended to "out of project" areas and additional waste water has been dumped into the drains, over-taxing them beyond their designed capacity. As a result, the plan needs to be reviewed, checked out on the ground to make sure that it is still relevant, changes made as necessary and extended to those areas where water has been introduced, or where problems are developing even though not in the project area. This plan then would be used in the Second Phase follow-on project as the basis for extension of the drainage system to every farm and field in the area.

5. Rehabilitation of Equipment. HAVA and HACU have a large amount of equipment — bulldozers, draglines, gradalls, blades, etc., that are very old and in need of repair, most of which is 25-30 years old. We expect to bring out one or two heavy equipment spare experts to look at this equipment, determine which equipment can be rehabilitated economically, and prepare lists of required spare parts. These experts will be, hopefully, from the factories manufacturing some of the equipment. They will then return to the U.S. and assist in locating and procuring the required spare parts. The most desperately needed parts will be air freighted to Afghanistan.

As the spare parts begin to arrive, two mechanics experienced in the repair and rehabilitation of such equipment would also arrive to assist in that work.

6. Use of the Fixed Cost Reimbursement. The construction of farm drains and the rehabilitation of existing major drains in Phase I will be the responsibility of HAVA. HAVA's ability to assume this responsibility will be tested by using a fixed cost reimbursement procedure. Reimbursement occurring only if agreed upon work is completed satisfactorily. HAVA will contract with HACU for equipment operation and maintenance.

AID will pay up to 70 percent of the total agreed upon cost of constructing and rehabilitating drains. However, in the case of on-farm drains, benefiting just one farmer, the percentage of reimbursement would be much lower, perhaps 25 to 50 percent. The purpose of the reimbursement procedur

is to induce the GOA and farmers to carry on the work as expeditiously as possible and supplement GOA scarce resources in a way that rewards performance.

C. Project Inputs - The Necessary Resources

The proposed inputs to this project together with HAVA resources are sufficient for the attainment of the Phase I purposes of (1) construction of 100 kilometers of farm drains and improving 80 kilometers of major drains; (2) assessing and revising the master drainage plan for providing adequate farm drainage in Marja, Nad-i-Ali, Shamalan, and Darweshan; and (3) rehabilitating a portion of HAVA's heavy equipment.

1. Technical Advisors. To accomplish the above targets, the following technical advisors will be needed:

a. Project Manager, who will coordinate the program and assist in assessing and revising the Master Drainage Plan;

b. One Design Engineer, jointly with his counterparts will be mainly responsible for locating, determining specifications, and supervising construction of farm drains;

c. Two Drainage Engineers with their counterparts will be working on assessing and finalizing the Master Drainage Plan.

d. One Drainage Engineer will be supervising the deepening and widening of 80 kilometers of major drains.

e. Spare Parts Specialist (short-term) who will determine which equipment in HACU could be rehabilitated for use in the program and write specifications for spare parts.

f. Two Mechanics who should arrive with the spare parts and assist HACU in rehabilitating the machines that will be used.

PART IV. IMPLEMENTATION AND EVALUATION

A. Implementation Schedule

1. First Phase: The project is divided into two phases. In Phase I there will be a three-man (PASA) team for nine to 12 months to review, update, revise, and complete HAVA's drainage plans, and one drainage engineer will supervise major drain improvements. There will be a heavy equipment/spare parts expert who will determine which machines of HACU can be rehabilitated and who will prepare a list of needed spare parts for them. It is planned to have two mechanics arrive with the spare parts who will assist HACU in rehabilitating the construction equipment. One PASA technician will be working on the farm drains, one direct-hire as project manager will coordinate project activities and assist in developing the master drainage plan.

2. Phase Two: Equipment for the construction of the major drains will be ordered. Personnel will arrive to work on the program as the equipment becomes available. It is envisioned that there will be, in addition to the one direct-hire technician, six PASA and two contract personnel in the following disciplines:

a. Drainage Engineer, who will work in the Office of Technical Engineering to finalize the details of the drainage plans.

b. There will be three drainage engineers, two of whom will lay out the major drains and supervise the construction and one of whom will be concerned with field drains.

c. One Irrigation Engineer who will do the planning and supervising for the water control structures.

d. One Soils Laboratory Technician, who will make physical and chemical analysis of the soil and water samples from the project area.

e. Two contract Mechanics, one will work in the field with 18 draglines and other heavy equipment. The other will support the heavy construction equipment and will work in the HACU workshops. Both of the mechanics will be doing on-the-job training as a part of their activities.

The Tables below give an estimation of the total drainage requirements in the project area. For the HAVA proposed time schedule for this work, see Appendix B.

ESTIMATEL HAVA DRAINAGE REQUIREMENTS
MAIN DRAINS - Kilometers

Area	Total	Existing	Additional Needed	Improvement Needed
Nad-i-Ali	160	85	75	35
Marja	270	206	64	56
Shamalan	160	148	22	120
Darweshan	180	133	47	70
	780	572	208	281

FARM DRAINS - Kilometers

Area	Total	Existing	A dditional Needed
Nad-i-Ali	2100	82	2018
Marja	1330	308	1022
Shamalan	600	-	600
Darweshan	760	10	750
	4790	400	4390

B. Fixed Cost Reimbursement (FCR)

USAID/Afghanistan has had some success in using the Fixed Cost Reimbursement method to support pay for construction in Afghanistan's rural development program. Use of this concept has provided the rural area population participating in the program with a better income.

It is proposed that the Fixed Cost Reimbursement procedure be used in the project described in this paper. For the drain and control structure construction that will be done in the Helmand-Arghandab Valley, HAVA will prepare an estimate of the total cost and submit this estimate to the USAID for approval. The estimate will include costs for local materials, manufactured materials, cost of using equipment, transportation, labor, planning, construction supervision, inspections and miscellaneous services. This estimate will also

include 15 percent administrative overhead on personnel costs. A total agreed estimated cost will then be established for each projected subproject (cost per kilometer). From this total, overhead and voluntary labor contributions will be deducted. USAID, after reviewing and certifying these cost estimates, will agree to pay 70 percent of this final total upon completion of the work providing it conforms to agreed upon standards and specifications. The 70 percent figure (or other agreed upon percentage) will be the fixed amount for reimbursement upon successful completion of the project. Payment will be made by U.S. dollar check based upon the free market exchange rate for the U.S. dollar, as reported by the DAF Bank on the date the Director of USAID signs the agreement on the estimate.

USAID will use the project engineers who will inspect and certify that all construction has met design standards and is complete.

C. Progress Reporting Systems

There will be three progress reporting systems:

1. Team members will report daily and weekly on an unofficial, oral basis to the team leader. These reports will cover accomplishments, problems, possible solutions and other developments which the team leader should be aware of. In addition, the team members will prepare written reports of their activities for the team leader on a bimonthly basis.

2. The team leader will prepare a monthly written report in five copies to USAID/Kabul through the project manager. This report will have the following information in it:

a) significant activities: (progress, commodities, farmer cooperation, etc.);

b) pending issues or problems;

c) decisions and activities needed and by whom;

d) other items of interest;

e) progress in constructing farm drains and improving major drains.

3. Every three months and at the end of the project, HAVA officials will prepare a joint progress or terminal report with the team leader to appropriate officials of the Government of Afghanistan. These reports will be prepared in English and Dari. Ten copies of these reports will be provided to the USAID.

D. Evaluation Plan

At six and nine month intervals after project initiation, an evaluation of the project will be conducted jointly by the USAID and the GOA. These evaluations will be conducted in accordance with standard AID evaluation methodology. The results of the evaluation will be used to modify plans and implementation report at the termination of Phase I.

PART V. PROJECT ANALYSIS

A. Background

1. Development of the Proposal. Over the last year and a half, the Mission has been asked several times by Government of Afghanistan officials, including the President of the Republic, to help with further development of the Helmand Valley, During early 1974, the President of HAVA asked the USAID for help with a joint assessment of problems and development potentials in the Valley. This assessment was begun but when its early drafts got no attention in the Central Government, the effort came to a standstill. Later, in the year, however, the HAVA officials made it clear to the USAID that the problem of drainage in the Valley was beyond the capacity of the Government to solve and that U.S. assistance was very much desired.

The Mission asked for detailed plans which were slow in being produced, but when the Assistant Administrator visited the Helmand area earlier this year, the request was again made to him by the Government. While the Assistant Administrator was in Afghanistan, a joint Afghan/U.S. committee was set up to examine possibilities for U.S. assistance in the Valley. This project proposal grew out of the report of that committee. For further information on the project areas, please see the following reports: Helmand-Arghandab Valley - General Overview, Project Areas, Past and Present Irrigation, Cost Estimates for Completion, by Sanford Caudill, Irrigation and Planning Advisor USAID/Kabul, December 1974; Audit Report, Comprehensive Review of United States Assistance in the Helmand-Arghandab Valley Region (HAVR), Afghanistan, October 31, 1972, Office of the Auditor General, Area Auditor General - Near East, AID; Sector Analysis, Helmand-Arghandab Valley Region, An Analysis by Lloyd Baron and a Project Proposal by David Levintow, February 1973.

2. Cooperating Country Activity - Past, Present, and Future. The proposed project for providing adequate drainage and improving irrigation practices would include the irrigated areas of Marja, Nad-i-Ali, Shamalan and Darweshan in Helmand Province. HAVA has selected these four areas because of the serious problem of increasing salinization and the inter-relationship among their irrigation and drainage systems. The operation and management of the proposed project areas are linked together like a chain. There are also vacant areas in the project on which, with proper drainage, large numbers of landless farmers could be settled.

The project area is south and west of Lashkar Gah, the headquarters of HAVA.

The source of irrigation water for the first three areas is the Boghra Canal which is fed by a diversion on the Helmand River, downstream from Kajakai Dam. Morrison-Knudsen Afghanistan, Inc., completed the Boghra Canal, the Shamalan Canal, and the Nad-i-Ali and Marja irrigation complex in 1949. The Darweshan Canal which is served by the Helmand River was completed in 1953. The diversion capacity of the Boghra Canal is 2600 cfs and the Darweshan Canal is 1000 cfs. This is sufficient water ir irrigate 180,000 to 190,000 acres. However, to irrigate this acreage will require better water management than that now being practiced.

The quality of the irrigation water is good to excellent. Both Nad-i-Ali and Marja are relatively smooth areas lying on one of the major breaks between desert benches. Both slope generally to the south at an almost uniform grade of 0.001. The desert bench east of these two areas slopes toward the Shamalan and the Helmand River.

While the two areas appear relatively uniform, there are wide variations in the effective depth of the soils, in their content of gravel, gypsum, and lime, and the relative drainability of the underlying materials. Generally, the two areas are underlaid by conglomerate of gravel cemented with a matrix of calcium and other silicates. The conglomerate occurs at depths of five feet to 30 or more feet and is in discontinuous beds.

The soils of the Shamalan are alluvial. These alluvial soils are widely variable in texture, depth, and degree of waterlogging and salinization.

The Darweshan area begins on the left bank of the Helmand River about where the Shamalan area ends on the right bank. In general, the soils of the Darweshan are deeper than those of Marja, which are deeper than those of Nad-i-Ali. Most Darweshan soils are underlaid by gravel lenses that provide some natural drainage, but considerable man-made drainage is required.

Due to the flat topography of the area and the underlying material, the tracts began developing high water tables soon after irrigation began. With the high water table and without drainage, the soil root zone has become more and more saline. With the increase in salinity, crop yields have become lower and thousands of acres may have to be abandoned in a few years because the salinity is becoming so high.

The drainage problem was recognized almost as soon as Nad-i-Ali and Marja began to be irrigated. Within a few years almost half of the irrigated land of Nad-i-Ali was abandoned and the yields of Marja were being depressed by salinity. The fields of Shamalan and Darweshan were becoming lower and some of the land there was being abandoned. In 1953, drainage trials were started in Nad-i-Ali on 80 acres. The crop yields in the drainage area showed what could be done with adequate drainage. Corn yields, even with the low yielding varieties available at the time produced 75 bushels per acre as compared to nothing earlier. Wheat produced 80 bushels and cotton produced over 2,000 pounds per acre, both very respectable yields.

Drainage investigations were started in all areas in 1953 to determine the drainage requirements. During 1956 and 1957, very detailed drainage studies were made, logging deep open pits on 200 meter centers over the entire area and even closer spacing in selected areas. The studies reulted in a drainage plan that has only been partially implemented. The places in the tracts where proper drainage has been installed have had their salinity lowered and a favorable salt balance is now maintained. These low salinity areas are producing crops with high yields.

Although the necessity for drainage was recognized and the benefits were evident, the Government was giving first priority to expanding the old irrigation systems and developing new ones. The drainage problem has now reached such a level of severity that major efforts are essential to stop further deterioration of the soils in the project area.

The areas of each of the tracts and their salinity levels are given below:

Tracts	Total Acres	Very Severe (EC 16+) Acres	Severe (EC 8 - 16) Acres	Moderate (EC 4 - 8) Acres
Nad-i-Ali	31,015	2,650	10,000	18,265
Marja	48,800	4,550	23,500	20,750
Shamalan	72,000	10,500	11,000	50,500
Darweshan	50,000	5,400	8,100	36,500

HAVA has drainage plans (that need updating) for the project area and would like to implement them to provide the necessary drainage and reduce the salinity levels. The yields of most crops grown in the project would be

increased greatly with lower salinity levels (see Appendix Table A). Using charts of the USDA Salinity Laboratory, it is easy to see that if the electrical conductivity (EC) (salinity) is lowered from 16 to less than 8, the crop yields will more than double. In some crops, such as corn, wheat and vegetables, the yields would double again when the salinity is lowered to an electrical conductivity of four or less. Therefore, with good drainage, one can expect production in the project area to at least double.

HAVA's drainage plan for the project calls for 22 kilometers of major drains to be constructed in the Shamalan, 75 kilometers in Nad-i-Ali, 64 kilometers in Marja, and 47 kilometers in Darweshan. Some drains will have to be deepened and others cleaned. It is estimated that about 4,390 kilometers of additional farm drains also would be required.

The irrigation practices used at present have aggravated seriously the ground water situation. They have also reduced yields and used water, needed in other areas, very wastefully. Few of the farm turnouts and farm checks are operational. Most water control structures are in a bad state of repair. The project plan calls for rehabilitation of the control system starting with the main irrigation lateral checks and turnouts down to the last farmer's turnout at the end of the system. Where economical, lining of the main laterals and sub-laterals would be done to cut down on the water losses that are taking place through continuous flow of water into the open substrata. The project also would provide for irrigation plans to be set up. The plan would determine the water needs for each farm and irrigation schedules would be laid down in such a manner that they would have to be followed. A program of education and training to teach the farmers when and how to irrigate will be necessary. A rotation plan of irrigation would greatly increase the efficiency of water use.

Solving this second problem, i.e., of better utilization of irrigation water will help in three ways:

a. reducing the amount of water that is now wasted and that is contributing to the high water table and salting;

b. making more water available to irrigate a larger area;

c. applying the water to the crop that it actually requires so that the yields would be higher.

At present there are about 105,417 acres being cultivated by about 14,000 farmers in the project area. It is envisioned that after the project is completed,

and assuming adequate drainage, there would be an additional 65,000 acres irrigated on which about 10,000 farmers could be settled. Altogether there would be an estimated 259,000 people that would be directly benefited by the project.

In rehabilitation of the water control structures, the farmers and farm labor would be hired to provide the unskilled labor needed. It is estimated that 10,000 structures would be needed and the farmers would receive the equivalent of about $51,000 for their work. The farmers would also be paid by HAVA to dig their farm drains and this is estimated to be the equivalent of $1.27 million.

3. Prior AID and Other Donor Experience in the Area. Over the 20-year period that AID has been involved in this project area, we have spent in the neighborhood of $90 million, $20 million in the form of grants. Of the loans, about $25.5 million have been in support of electric power generation and transmission systems, most of which will not begin to pay off for another two or three years. For this investment and large investments by Afghanistan, the country now has two large dams -- the Kajakai and Arghandab, a hydropower plant soon to go into production, roads, canals, drains, schools and a hospital, a functioning administrative organization (the HAVA) and a construction organization rated as the best in the country (HACU).

The irrigated area has increased from 180 thousand acres in 1950 to about 396 thousand acres in 1974; double-cropping has increased from 34,000 acres to 185,000 acres during the same period. As the water supply has been extended to new areas, HAVA, with AID assistance, has taught the farmers new techniques and production has increased rapidly. Fertilizer sales have expanded to the point that about one-third of the fertilizer used in the country is consumed in this area. Crop production has increased three and four-fold, both because of increased yields and increased area, and the production of high value crops has increased dramatically.

Insofar as other donors are concerned, to date they have made a very small contribution. However, the Asian Development Bank (ADB) has approved loans to construct a highway through the area and to install floodgates on the Kajakai Dam to increase water storage capacity. Early Japanese and German work resulted in the construction of parts of two major canals, but was done so long ago that little record of their activities exists today.

4. Studies. Literally hundreds of limited or specialized studies have been conducted on the area, many of them very good. (See especially the three

mentioned in para A.1. above.) In addition, the Asian Development Bank is planning a survey of the Upper Helmand to determine which areas are best suited for irrigation, rehabilitation and irrigation extension as a result of the installation of the Kajakai gates. The feasibility of the gate project depends on rehabilitation of about 26,000 hectares and extension of irrigation on about 20,000 hectares in the present project area.

In addition, the USAID has been asked by the HAVA and the Government of Afghanistan to assist with a soil and water resources study to begin in Fiscal Year 1976. The end result would be, hopefully, a series of studies inventorying the soil, water, and other resources of the region and making recommendations for their use.

5. Views of the Country Team. The Country Team has spent many hours considering the Valley and the associations of the U.S. with it. They unanimously agree that, if possible, the job there should be finished and that the course proposed for this project, i.e., drainage and water control improvement with the active cooperation of the farmers, is appropriate for U.S. involvement.

B. Economic and Financial Analysis

The HAVA receives its budget from the Central Government and funds are allocated from both the Development Budget and the Operational Budget. In past years, the total budget of HAVA has averaged about afs 100 million, which (currently at afs 60 = $1.00) is about $17 million. The budget for the current fiscal year (1353) is afs 134 million, approximately $2.2 million and is expected to be afs 155 million in 1354.

While planning the project, meetings were held with the Central Government and Ministry of Planning and assurance was given that, if additional funds were required for HAVA to meet the obligations of the project, funds would be made available.

In addition to the funds obligated by the Government of Afghanistan, the farmers to be benefited by this project are expected to contribute labor and a certain amount of animal power. For this they will be partially compensated, but it is expected that they will still have made a sizable investment in improving the drainage on their land.

During the first year of the project, the USAID proposes to provide grant funding of about $ 1 million to cover U.S. personnel costs, spare parts, repair of equipment, and fixed cost reimbursement for part of the costs of main drain rehabilitation and the digging of smaller laterals and drains down to the farm gate. The project may also provide part of the funds for partially reimbursing farmers for labor in digging on-farm drains.

The major intended direct beneficiaries of this project are the lower income rural people. The project will construct (or rehabilitate) farm drains on land that is either not drained or is poorly drained. This is the land whose productivity suffers most from waterlogged, salted soils. Some undrained farms are badly salted, very unproductive and the income of farmers living on such farms has to be supplemented by non-farm sources. Some land when drained will be opened to settlers. The settlement privilege is limited to persons having assets of less than afs 10,000 ($167).

Farm drains have to have outlets into which water can be discharged. This project accordingly provides for the construction, rehabilitation and improvement of larger, communal drains into which the water of the farm drains will be discharged. The major beneficiaries of the work on larger drains will also be the poorer farmers since it is generally true that where farm drains are needed, communal drains are also needed (because they do not now exist or need deepening in order to provide for adequate drainage).

If the project is successful, it is likely that it will be continued, although not necessarily with U.S. assistance. The plan worked out by HAVA would be completed in 1980. Total investment costs would be $23 - $24 million with an estimate of $16.0 million in foreign loans/grants and $8.0 million contributed by HAVA. It is estimated that upon completion of the plan, average farm income would increase from $516 in 1970 to $1,085 on 24,000 farms in 1980, an increase of $569 per farm. It is estimated that the increase in farmer costs would be 25 percent of their increased income. From the above, a crude internal rate of return of over 30 percent was computed.

Because the project will result in an increased demand for labor (from digging drainage ditches and because of increased production), the project may push up the local wage rate of farm laborers to some extent. If this happens, one could expect a movement of laborers into the Valley. With the increased purchasing power of the area, one could also expect improved business conditions especially in Lashkar Gah.

As per capita income grows, private saving and investment should be stimulated. The project is not likely to improve Government revenue materially, either directly or indirectly, unless a system of taxes (or user chargers) is introduced which is based on the benefits received criterion. The longer-run impact of the project on the whole economy could be significant as production of higher value crops increases and as agro-industry develops.

C. Policy and Administrative Analysis

The proposed project area has two distinct types of irrigation systems. Part of the Shamalan is an old irrigated area that originally received its water from temporary diversions from the Helmand River. The new areas of the Shamalan, and those of Nad-i-Ali, Marja and Darweshan receive their waters from canals that were built in the late 1940's and early 1950's. With the new canals, the old river diversions were no longer required.

It has been the policy of the Government of Afghanistan to put available resources into extending their irrigation systems as far as possible instead of completing them with water control structures and adequate drainage. The result has been waterlogging and the increase in soil salinity, mentioned before. This condition has brought about a lowering of yields and the abandoning of some areas. The drainage problem was recognized soon after the new irrigation system was completed. Studies were made of the drainage problem and a drainage program was developed. Unfortunately, the old view of the situation prevailed and only a small part of the entire area had the recommended drainage system installed. The areas with good drainage systems are producing crops with high yields, while areas with insufficient drainage have low yields which are deteriorating as the salinity levels increase.

The present Government, in recognizing the problems and desiring to increase food production, now believes that better use could be made of their financial resources by improving the existing irrigation systems instead of extending irrigation facilities.

Concurrently with the development of an irrigation system, the U.S. has helped develop an administrative system in the Valley which has had some difficulties in the past, but the present senior staff seem to be stronger and more cognizant of the requirements of a good administrative system than was the case in former years. It is expected that this project will help to improve both the policy making and administrative capabilities of the HAVA and that the whole area of the Helmand-Arghandab Valley will benefit from this improved administrative climate.

D. Technical Analysis

As has been noted many times in this paper, the problems which this project is attempting to face are problems that have developed because of deliberate policy and administrative decisions in years past, and all of them, as now known, do have feasible technical solutions which are commonly accepted in all parts of the irrigated world. Therefore, except for problems created by remoteness of the area, USAID believes that the problems to be faced by the members of the teams participating in this project are amenable to solutions using techniques already well recognized and accepted by irrigation experts.

E. Social Analysis

a. People. There are about 25 - 35,000 farm families living in the Helmand Valley, 4 - 5,000 of which have been settled there within the past 20 years. While the settlers are from nearly every ethnic group in the country (including Uzbeks, Tajiks, Indians and Pashtun nomads) the original and still dominant ethnic group in the region is the Pashtun of the Durrani tribe.

b. Land. Although farmers in the valley are mostly landowners and operators (over 90 percent of the farmers own some land), there are numerous forms of sharecropping practiced and large numbers of people involved, including small landowners. The average farm size is about 22 acres, but the range is from about 6 acres in the Sanguin-Kajakai area to about 70 acres in Khan Neshin.

The average landholdings generally increase in size as one moves down the Helmand as districts become less developed, perhaps soils become poorer and desert conditions become more severe (south of Darweshan). To over-simplify, generally the region consists of a large number of small landowners (5 - 15 acres) with a few large landowners (Khans) (2 - 400 acres) mixed in. The Khans generally dominate the socio-politico-economic scene.

c. Water. All crop land is irrigated in the Valley via various parts of irrigation systems ranging from indigenous diversions off the Helmand River, to Korez systems (underground tunneling used to bring ground water to the surface) to major government canals like the Boghra. Virtually all systems of water distribution at the farm level are indigenously maintained, operated and controlled. In theory, these systems are democratically operated. In fact, the local Khans generally dominate the water distribution systems.

d. Government. The system of government, like the local indigenous system of power, is based on authoritarian and paternalistic principles. The role of governor with a great potential of central authority and power is tempered by social distance and an informal, unstated pattern of action which allows indigenous systems of power (the Khan) to control at the village level. There is little trust of government officials and their programs by the farmers. Generally, the government will be involved in local affairs in cases where apparent uncomplicated aid will be forthcoming, where the villagers have no control over the involvement or where the involvement will be superficial and can be ignored.

F. Project Development Team

Mr. Vincent W. Brown	Director, USAID
Governor A. M. Sherzai	Governor and President of HAVA
Mr. Abdul Ghaffor Shuja	Director General Technical and Engineering Dept., HAVA
Mr. Ahmed Zia Morshidi	Acting President, Department of Planning, Ministry of Plan
Mr. Mohammad Sufi	Vice-President, Agriculture Dept., HAVA
Mr. Aziz Gul	General Director of Planning & Statistics, HAVA
Mr. Mehrabuddin Formali	Director General Planning Dept., HAVA
Mr. Mir Ayub	Agriculture Specialist, USAID/Kabul
Mr. Enayet Seraj	Special Assistant, USAID/Kabul
Dr. Raymond Hooker	Economist, USAID/Kabul
Mr. Zariel Tyson	Agricultural Engineering Advisor, USAID/Kabul
Mr. John Wilson	Chief Food and Agriculture Officer, USAID/Kabul

APPENDICES

APPENDIX A

TABLE: SALINITY LEVEL AND WHEAT YIELDS (1974)

Marja Block	Salinity Level EC 16+ Kg/Ha	EC 8 - 16 Kg/Ha	EC 4 - 8 Kg/Ha
1 A			3920
1 B			4630
1 C	2250		
2 A	2190		
2 B		2725	
2 C		3665	
3 A			4535
3 B			5425
3 C			5805
5 C	2545		
6 E			3920
6 F	2200		
11	750		
West	2185		
T.O. 57	1305		
T.O. 60	1500		
8 A		2560	
8 B		2790	
8 C			4070
9 A		2760	
9 B	1900		
Shamalan			
Khusra Abad		2945	
Said Abad			3910
Khara Ka			3630
Nigareen		3120	
Lach Me			3910
Shakh Achiczaic		3315	
Taband			4030
Kalach		3135	
Surkhdas		3270	
Hazar Asp		3180	
Bolan		2850	
Aainak		2540	
Babaji			4875

APPENDIX A

Shamalan (contd)			
Bushnan			4890
Jangle Bush	1300		
T.O. 29			3880
T.O. 25			4260
Shamalon Village	1230		
Bala Khana			3930
Yaka Ling	640		
Twela	650		
Darweshan			
Hazar seft		2680	
De Zekria		3135	
Husain Abad			3435
Birtaka			3960
Darweshan Village			4080
Keshty			4830
Pushta			3325
Toby			3660
Khowara Ko			4720
Laky			4255
Safar	2145		
Katory Safar	2615		
Nad-i-Ali			
A		2350	
B		2565	
C		2480	
D	2115		
E	1045		
Chad Mirza		3210	
Nakel Abad	2115		
Total	30,680	55,272	101,935
Average	1704	2909	4247

APPENDIX B

CONSTRUCTION TIME TABLE FOR DRAINS ESTABLISHED BY HAVA STAFF

MAIN DRAINS TO BE IMPROVED

Area	FY 1976 km	1977 km	1978 km	1979 km	1980 km
Nad-i-Ali	20	15			
Marja	20	36			
Shamalan	20	30	50		
Darweshan					

MAIN DRAINS - NEW

Area	FY	1978 km	1979 km	1980 km
Nad-i-Ali		30	30	50
Marja		30	30	14
Shamalan			22	
Darweshan			20	27

FARM DRAINS TO BE DUG

Area	FY 1976 F km	1976 M km	1977 F km	1977 M km	1978 F km	1978 M km	1979 F km	1979 M km	1980 F km	1980 M km
Nad-i-Ali	20	-	30	-	30	50	30	75	30	150
Marja	30	-	40	-	40	50	40	75	40	150
Shamalan	5	-	25	-	25	50	25	75	25	250
Darweshan	15	-	20	-	20	50	20	75	20	150

F = Dug by farmers; M = Dug by machine

APPENDIX B

WATER CONTROL STRUCTURES NEEDED

Area	FY 1978	1979	1980	Total
Nad-i-Ali	600	600	350	1550
Marja	600	1200	640	2440
Shamalan	1200	1200	1200	3660
Darweshan	600	1200	700	2500
				10,090

APPENDIX C

MINISTRY OF PLANNING
SECRETARIAT

NO._____
DATE: February 12, 1975
Ref:_____

REPUBLIC OF AFGHANISTAN
KABUL

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

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 assistance 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.

(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 intensification 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

ENVIRONMENTAL IMPACT

The net effect of the project itself will be nil as far as the environment is concerned. However, if the proper recommendations are made and followed, the physical environment of the Valleys as well as their social and economic environment will be improved.

When the drains of the project are completed it will greatly reduce the areas where mosquitoes are now breeding in marshy places and this in turn will greatly reduce the incidence of malaria.