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PROJECT ASSISTANCE COMPLETION REPORT

HILL AREAS LAND AND WATER DEVELOPMENT PROJECT

(386-0489)

Table of Contents

	<u>Page</u>
I. INTRODUCTION	1
II. PROJECT GOAL AND PURPOSE	2
III. PROJECT HISTORY	3
IV. PROJECT STATUS AND ACCOMPLISHMENTS	8
A. Physical Achievements	9
B. Institutional Development	12
C. Sustainability	16
V. LESSONS LEARNED	17
VI. MISSION FOLLOW-UP ACTIONS	18
VII. ATTACHMENTS	
A. SPECIAL COVENANTS	
B. SUMMARY PROJECT FINANCIAL STATEMENT BY PROJECT ELEMENT	
C. PLANNED (AS IN PROJECT PAPER) VERSUS ACTUAL OUTPUT	
D. OTHER MAJOR OUTPUTS OF THE HALWD PROJECT	
E. MISS CONSTRUCTED/REMODELLED	
F. APPLIED RESEARCH/FIELD STUDIES	

I. INTRODUCTION

The Hill Areas Land and Water Development project (HALWD), authorized in July 1984, built upon and expanded USAID/India's irrigation portfolio, and was designed to concentrate on the smaller systems and steeper topography characteristic of the hill areas in the Indian state of Himachal Pradesh (HP). A growing rural population had imposed increasing pressures on the land and water resource base of the hill areas of India. Unrestrained tree felling and overgrazing destroyed fuel, fodder and timber resources and depleted watershed resources, causing increased soil erosion and flooding during the monsoon rains. The reduction in watershed cover combined with loss of top soil through erosion reduced the soil moisture retention and production capability of the land.

As is the case in the plains of India, the economy in the hills is dependent upon agricultural productivity which, in turn, is dependent upon a reliable source of water made possible with irrigation systems. However, only four percent of HP was irrigated, as compared to about 25 percent of the country as a whole. The technological approach to land and water resources planning and development in the hilly regions was entirely different from that developed, tested and applied in the plains, where AID had previous to the HALWD Project been involved. The hilly regions represented undulating steep topography, different agro-climatic and soil conditions, scattered and comparatively small localized land holdings in remote terrains and deep-seated rivers involving lift schemes or seasonal flash streams as a source of water. The HALWD project was to take the AID irrigation strategy into this sub-Himalayan region of northern India in order to expand and improve the irrigation coverage.

II. PROJECT GOAL AND PURPOSE

The broad project goal was to increase agricultural production and rural incomes. The project purpose was to increase irrigation efficiencies and expand the area under irrigation. The purpose was to be met through innovative approaches to hill area minor and small scale irrigation development by incorporating both state and community responsibilities in developing land and water resources. To this end, the project was to emphasize chak¹ development in the design and construction of minor irrigation schemes, initiate community-based approaches to irrigation system design and management, introduce environmental control, establish coordination among state agencies involved in the sector, facilitate staff and institutional development, and commit a research and technology adaptation effort to the hill areas.

The following project components were identified as essential in order to achieve the project goal and purpose:

--Design and Construction of Minor Irrigation Schemes (MIS): The project activities included the design and construction of up to 150 remodelled minor schemes covering 15,000 hectares and the development of additional water harvesting schemes on 7,700 hectares.

--Chak Development: Some 38,700 hectares of chak development in the irrigation command area as well as rehabilitation of 2,000 hectares through the rural development schemes were included under the project.

¹ Irrigation Service area of about 40 hectares serviced by a single canal outlet

--Afforestation and Erosion Control: Works in scheme areas were to be confined to afforestation and erosion control, including watershed treatment and horticulture development.

--Community Based Management Systems: This component was to facilitate community awareness, interest and participation; elicit community engagement in the design of schemes; and encourage placement of operations and maintenance responsibilities with farmer organizations.

--Human Resource and Institutional Development: Staff training and development were to be directed toward improving the knowledge and skills needed to plan and design irrigation facilities; to understand and analyze irrigation systems in an integrated manner; and to involve communities in the planning, operation and maintenance of systems. Analysis, review and field studies were envisaged. Pilot research was to be undertaken in areas such as new technologies, land development, water harvesting and demonstration of irrigation and chak development schemes.

III. PROJECT HISTORY

The HALWD project was authorized on July 16, 1984 as a seven-year project with an AID funding of \$54 million (loan funds of \$50 million and grant funds of \$4 million). The project was eventually extended to September 30, 1992, and the total AID obligation was revised to \$24.744 million (\$3.401 million in grant funds and \$21.343 million in loan funds).

The reasons for limiting the funding under the project were because the funding levels were initially set based on extremely limited USAID/India experience with project implementation in Himachal Pradesh. In addition the Government of Himachal Pradesh

had limited experience in irrigation development. As a result, the project budget and subsequent obligations of U.S. assistance were in excess of needs for achievement of identified project objectives and in terms of Himachal Pradesh's capacity to use the funds in a timely manner.

The HALWD project was conceived as a comprehensive program to integrate land and water development with a clear focus and emphasis on irrigation. Forestal, agricultural and horticultural activities were all seen as supportive and protective of the irrigation system investment. The HALWD project used a performance-based disbursement mechanism, a disbursement strategy based on performance criteria rather than simple completion of construction. The implementation plan was designed such that high level decisions were to be taken and coordination with the State Level Implementation Committee (SLIC), made up of administrative secretaries of the concerned departments. The collaborating departments included the Irrigation and Public Health Department (IPH), Forestry Department (FD), Agriculture Department (AD), Rural Development Department (RD), and the Horticulture Department (HD). The SLIC was formed in fulfillment of one of the conditions precedent to the project and was to be responsible for approving work plans and budgets, assuring that adequate staff was deployed, quality control was maintained and issues related to effective institutional arrangements were addressed. The Land and Water Development Cell (Project Cell) was also established to provide technical and administrative support to the SLIC. It was to prepare guidelines, review scheme proposals, monitor project implementation, assess training needs and coordinate special studies and programs for technology adaptation.

The project had a start up delay of about one and a half years due to the novel, multi-departmental implementation arrangements and the rigorous technical requirements of the project. The mid-

term evaluation, conducted in March 1988, found that the SLIC met on average three or four times per year to approve budgets and work plans but had not been able to deal adequately with matters related to staffing, monitoring and feedback. While the Project Cell had provided technical and administrative assistance to the districts, most staff time in the Cell was devoted to review and modification of scheme plans.

The mid-term evaluation team noted that after the start-up delay, schemes had been constructed at an accelerated rate, creating significant new irrigation potential. The team also found that the criteria requiring calculation of water demand based on estimated crop evapotranspiration was being used and resulted in more economical designs. In addition, the criteria requiring calculation of internal rates of return (IRR) for each scheme were being followed, and schemes had indeed been rejected based on these criteria. A three day USAID-sponsored course on the procedure for calculating IRRs had a very significant and positive impact on irrigation design in the state.

The mid-term evaluation found that the FD components, primarily watershed protection above the irrigation command site, had been approved in 21 IPH project schemes, and were unique examples of inter-departmental cooperation in the project. The evaluation also revealed that although the Government of Himachal Pradesh (GOHP) had an increasing awareness of, and in principle accepted the need for, farmer participation in subproject design and implementation, this participation was not being incorporated. In addition, the number of GOHP irrigation professionals had not been increased sufficiently, and, therefore, the project was larger than the state's institutional capacity to implement it.

The evaluation team further noted that although coordination and cooperation at the district level worked well between the participating departments, and secretaries at the state level

discussed project related activities, the Project Cell was operating on a self-contained basis and was not as yet a vehicle for inter-departmental cooperation.

Finally, the team found that technical assistance needed to be provided on a continuing basis through the formation of a Liaison Coordination Unit (LCU), a non-governmental organization, and that this should be formed along the lines used in other USAID-funded irrigation projects. The LCU would serve both to help implement monitoring and training activities and to provide resource persons in guiding the organization and managing the activities.

In September 1990, USAID-funded consultants prepared a Farmers' Organization Development Program (FODP) implementation plan which included the following objectives:

- to assess the Project Cell's commitment and performance in identifying and fielding staff for the Farmers' Organization Development Program (FODP);
- to train staff of the FODP at all levels;
- to meet and train GOHP engineers and help them develop work plans to ensure effective and coordinated actions between technical and FODP staff; and
- to assist members of the LCU to develop work plans in farm and small water system management and irrigated agriculture extension packages.

One of the clear project issues was the need for coordination at all levels. The Project Cell was trying to provide coordination at all levels by making itself the hub of all activities and was still preoccupied with the initiation of new irrigation schemes. In spite of hard work, the creation of the FODP faced many hurdles such as the bureaucratic delays in selecting and

appointing staff and in identifying the initial 24 pilot sites for FODP activities.

During their visit, U.S. project-financed consultants trained LCU and FODP staff and engineers to provide the skills needed to enable them to successfully carry out their assignments. The consultants also met with LCU members and recommended that their activities be focused on specific areas which could provide lasting benefit to the GOHP. The identification of a GOHP counterpart for each LCU staff member was necessary to ensure a collaborative effort to develop appropriate training and demonstration activities.

In April 1991, USAID engaged U.S. consultants and conducted an implementation workshop in order to assist the GOHP to consolidate the project gains and strengthen the institutional development aspects of the project. Specifically, the following project issues were addressed:

1. Pressure had been increasing to construct more and more schemes without adequately taking into account the feasibility of the efforts, particularly with regard to chak development and farmer participation. Substantial progress had been made in facilitating the GOHP's ability to form Water User Associations (WUAs), a necessary condition to the funding and sustainable functioning of irrigation schemes. However, there seemed to be a reluctance to carry through with the thrust of farmer participation with the additional GOHP personnel and increased support necessary.
2. The GOHP continued to manifest strong reservations toward harnessing the strengths of private sector consultants to assist the public sector in the implementation of a more efficient irrigation system in HP.

3. Training and institutional development efforts had come to a standstill. In the context of increased sub-project design/approval, the Project Cell could not focus on the institutional development aspects. It was not able to play the role envisioned for it as a facilitator of inter-disciplinary collaboration among participating GOHP departments, universities and institutions. The Project Cell's functioning had been hampered by the fact that there was no permanent institutional base for either the project or the Project Cell in the GOHP, thus limiting the Cell's authority.

The GOHP was urged to lift any limitations on the future training of project related departmental staff, to take the necessary concrete actions to assure continued progress in adopting the formation of WUA's as part of irrigation scheme design and development, to take all steps necessary to establish a functioning LCU for the project, and to clarify lines of authority and intentions concerning the future status of the project cell in a manner that maximized the rapidity and acceptance of actions needed.

The 1991 implementation workshop was a great success and elicited the GOHP's action on all the issues listed above. The initiation of post-construction reviews of selected schemes with an interdisciplinary team was designed to help enhance the quality of the schemes. The LCU (managed by an Indian private sector firm) started providing technical support to the GOHP and project sponsored activities. Finally, the GOHP recognized the need for increased farmer participation. With USAID inputs, the Project Cell was re-oriented to focus on institutional aspects, and started providing support to LCU members by helping them to obtain GOHP counterparts and by instituting weekly coordination meetings to focus on the FODP.

IV. PROJECT STATUS AND ACCOMPLISHMENTS

Despite the problems encountered during project implementation, the HALWD project has produced excellent examples of how land and water resources can be developed in an integrated manner in the hilly regions of India. The multi-departmental efforts have produced an integrated program of irrigation system development, institutional development, extension and training which together form the basis for transforming HP into a state with an irrigated agricultural economy.

Although implementation of some project components only effectively began in 1990, there is clear evidence that significant positive impacts were achieved. The development of land and water resources suited to the mountainous region's ecology, the evaluation of scheme investments, the improvement of scheme design, the development of farmers' organizations, interventions in afforestation and soil conservation, rapid shifts in cropping patterns, and the participatory and inter-disciplinary approaches were all established and improved. Furthermore, the institutionalization of many of these activities is well underway. (See Attachments C and D for a list of project accomplishments.)

A. Physical Achievements

1. MIS Construction and Chak Development

The project introduced innovations in creating models of economically viable schemes suited to the mountain regions of HP and helped to initiate a policy dialogue that resulted in policy change on several fronts. Significant advances were made to protect water systems, to stabilize fragile mountain lands, and to improve system utilization. Under the HALWD project, 878 small irrigation systems were constructed or improved in ten HP

districts and by project completion, the irrigated area had been expanded by over 26,000 hectares. This was considered by the GOI/GOHP and the final evaluation team to be a remarkable achievement in light of the fact that only 60,000 hectares had been irrigated between 1948-1985. (See Attachment E for the list of MISs.) Based on the success experienced in the HALWD project, the GOHP/ID has decided to design and construct all future irrigation schemes using criteria introduced in the HALWD project.

Another significant achievement was the readiness in the GOHP departments and local communities to test cost-saving technologies, generally new to the state. Sprinkler technology was tested at three pilot sites and experimentation with trickle irrigation for horticulture crops and vegetables was undertaken with the involvement of Solan University. The use of these new technologies is likely to be continued beyond the HALWD project life as they have been found productive and cost-effective.

In addition, a definite shift from a mono-cropping to a mixed cropping pattern of high value crops was observed in the project area. This shift usually results in an increase in per capita income. For example, the USAID-assisted Panog water tank scheme successfully took the farmers from a mono-cropping (maize) to a multi-cropping culture (tomato, capsicum, french beans, ginger, peas, lentils, and maize). The income that has been generated on the small irrigated acreage of that scheme has resulted in a significant improvement in the well being of the farm families as assessed through the construction of new houses, renovation of old houses, new television sets, and increased school enrollment. In addition, the number of crops used in crop rotation also increased after project irrigation schemes were constructed. Because of these changes, i.e., the shift to cultivation of cash crops, particularly off-season vegetables and an increase in

cropping intensity in the command areas of the schemes, the farmers' incomes have increased.

2. Afforestation and Soil Erosion

Significant progress was made in the afforestation activities and the stabilization of associated fragile lands. Activities were carried out on 269 schemes and the approach has been adopted by the state for the entire irrigation sector. USAID monitoring visits observed that in the Palion irrigation scheme the fragile landscape had been stabilized through the introduction of plantation systems and check-dams with similar progress noted in the Targali irrigation system (which has traditionally been vulnerable to soil erosion). Under project sponsorship, the FD undertook the afforestation activities and engineering works such as check-dams, embankments and retaining walls. Activities were carried out around the source, along the conveyance and in the command areas of the schemes to protect the irrigation structures, maintain a regular supply of water and improve the environment of the command area.

Farmers have reported that the soil conservation works have been instrumental in maintaining a regular supply of water and reducing the silt flow into the storage structures. The check-dams have facilitated raising of the stream bed and checking the flow of water and thus have saved the banks and structures below. Over time, the plantations which were established will prove valuable in preventing soil erosion because these systems require that a variety of species are planted. In addition to soil conservation, the plantation system ensures that the forests yield fodder, fuelwood and small timber, a valuable contribution to the command area farmers.

Environmental benefits resulting from project activities are indirect and qualitative and therefore difficult to estimate.

The forestry activities have long gestation periods, but it is feasible to predict that the outcome of these programs will include the reduction of sediment into the streams, maintenance of regular water supply and protection of scheme components. A more immediate benefit has been evidenced by the fact that with the availability of more tree fodder and on-farm fodder, a number of farmers are buying improved varieties of cows and buffalo which will reduce the grazing pressures in the forests and pasture areas, contributing to improvement of the area's ecology. Another example can be found in the areas near Shimla, where villagers had previously cut and sold the grasses in order to make a living. With the newly available irrigation system, however, the villagers have begun cultivating vegetables and other cash crops, and are less likely to cut and sell the grass.

B. Institutional Development

The HALWD project was complex and demanded substantial management capabilities. The project's size and objectives were overly ambitious given the time frame and the limited strength, experience and existing institutional capacity of the implementing GOHP departments. In spite of the structural faults and limitations within the GOHP, the implementors and the state policy makers have demonstrated the will and commitment to meet the challenges of the project and to continue well beyond project completion the successes achieved during implementation.

The increased responsiveness of the GOHP to project innovations in institutional development areas, along with the sound technical and administrative contributions made by the LC' have contributed significantly to improved performance of the irrigation sector in the state. Overcoming the difficulties experienced in the early stages of the project, the Project Cell gained experience and demonstrated (for the first time in the State of HP) an inter-disciplinary approach to water and land

resource management. Periodic coordination meetings were held and attended by representatives from USAID, the Project Cell, the IPH, AD, HD, FD and LCU.

An inter-disciplinary collaborative effort between the IPH and the AD resulted in setting apart a three tiered unit in the AD which is mandated to work collaboratively with the selected IPH staff in the field. This effort toward institutionalization of irrigated agriculture strategies could become an effective mechanism for stabilizing the community-based approaches.

Over the short period of its involvement, the contribution of the LCU in facilitating the inter-departmental collaborative approach toward problem solving has been acknowledged and appreciated by the professionals involved in the project at all levels. Other major contributions made by the LCU included engaging consultants highly experienced in hill area irrigation, assisting in the formation of farmer organizations, training, post-construction review, performance testing and scheme monitoring. Guidelines relating to the planning, design, execution, operation and maintenance of schemes which were prepared by the LCU are expected to be very useful in implementing minor irrigation projects and sustaining project activities beyond the cessation of USAID assistance.

The HALWD project promoted new linkages between the public sector departments and private sector firms for scheme planning and design, agriculture extension, technical assistance and professional training. Initial linkages with private firms/autonomous institutions for collaboration in professional training and development were developed by the U.S. resident specialist. The Project Cell contracted with Water and Power Consultancy Services, Consulting Engineering Services Pvt. Ltd. and several other private consulting agencies to provide in-country training services.

There has been a marked change in the attitude of GOHP engineers and agriculturists - they are now more responsive to the needs of the farmers, and focus on improving the operation and maintenance of the schemes and ensuring an adequate supply of water.

1. Community Based Management Systems

Underlying the success of the project has been the growth of farmer participation in many project activities and the formalization and regularization of the sphere of joint activities between the farmers and technical irrigation staff. Farmer participation has been facilitated by the Agriculture Development Groups, farmer run Water User Groups and through the use of Association Organizers (AOs). AOs are specially trained facilitators who live in village areas and help farmers to organize their associations and develop them to their full potential. The farmer organization development program has already demonstrated an improvement in command area coverage, in some cases with irrigation increases as high as 80 percent of available agricultural land due to improved farmer interaction.

Two hundred eighty-seven micro-irrigation schemes which were completed by the GOHP/AD were handed over to the farmers for day-to-day maintenance with minimum GOHP intervention, and in all the schemes constructed/remodelled under the HALWD project, Farmers' Organizations have been formed and registered under the Societies Registration Act. The registration process evidences an important, official sanction of the role of farmers in sustainable irrigation systems. Most significantly, the GOHP has agreed in principle to turn over all schemes to the farmers (except for lift schemes, wherein all infrastructure above the delivery tank will be turned over to the farmers). Further, the GOHP has agreed that the registration act should be looked on as the first step toward the development of an effective water law and overall water policy. The HALWD project assisted the GOHP in

the development of such a law. By project completion, the research had been completed and a draft bill was expected to be available for vetting and passage by the legislature in the next session.

Noteworthy examples of community involvement/management include the Panog scheme where each farmer is contributing Rs. 10 per month toward the maintenance of the scheme (traditionally farmers paid no water charges), and in the Bhood, Sirsa Manjholi, Neri Jamli schemes, where large numbers of farmers have been organized to deal collectively with irrigation management issues. Another innovative activity in farmers' involvement was the Basolan Micro-watershed scheme, developed by a U.S. specialist, which involved the farmers beginning at the planning stage through completion. Through project activities, farmers are gradually becoming aware of the importance of land and water resource conservation, protection of the irrigation system, stabilization of fragile lands, the economics of irrigated agriculture, a market based economy, and crop management practices. Farmers confidence in project-generated products is seen within the command area of the Sainj scheme. Although more than 30 percent of the area had been lying fallow for years, it was fully cultivated in 1992. This was a direct result of project introduced improvements (assured supply of water and demonstrations to update agricultural techniques), as well as the fact that the assistant engineers worked closely with the farmers to provide the needed services and advice.

2. Training

Noteworthy training programs were conducted to improve the professional skills of GOHP officers in soil and water management, on-farm development, watershed development and water control measurement. Over 1,700 officers participated in more than 100 in-country courses, and 25 officials participated in

U.S. courses. A project sponsored U.S. Resident Specialist provided technical assistance in the areas of research, micro-watershed planning and development, water management, design of micro-irrigation schemes, computer applications and project monitoring. In addition, the Resident Specialist conducted four courses in computer applications for senior and mid-level GOHP officers and developed "how-to" guides for selected software and basic computer skills. This training led to a more productive utilization of the computer facility provided through the project in ten districts of HF. An innovative technical guide was also developed, containing data on various crop-mixes for different agro-climatic zones and suggesting the fertilizer, irrigation and other inputs needed for maximizing yield.

The farmer training program, on the other hand, helped to build farmers' confidence, increased their ability to communicate within the farmers' organizations and with the government staff personnel, as well as increasing their understanding of management techniques and record keeping. More than 29,000 farmers received project sponsored training, and the benefits derived will ensure that the farmers' organizations are managed efficiently and effectively.

Numerous Indian universities and private consulting agencies participated in training activities, offering seminars, courses and workshops. In addition, three universities were involved in field studies sponsored by the project. Twenty-three applied research and special studies covering management, marketing, economic and technical aspects were completed resulting in valuable findings, new opportunities for improved management and technical practices. These studies are expected to favorably influence policy in the technical and managerial areas. (See Attachment F for the list of studies/research completed.)

C. Sustainability

Major steps were taken in the HALWD project for sustainable development of hill area irrigation. These include the establishment of the rigorous economic Internal Rate of Return criteria for selection and approval of lift schemes; the increased GOHP emphasis on economically feasible lower lift schemes; and the development and establishment of farmer organizations to form community based approaches to irrigation system design, construction, operation and maintenance. The GOHP has adopted a number of new policies incorporating project innovations and is developing a novel state water policy. The institutional development and policy changes resulting from the HALWD project are probably the strongest indicators that many project innovations will be sustained. A major revamping of the entire irrigation and related sectors has been achieved with every reason to expect that it will yield sustainable systemic results. To solidify such an outcome, the GOHP must engage in further activities in the fields of policy support, monitoring and evaluation process strengthening, and replication of the FODP successes.

V. LESSONS LEARNED

1. Despite the very real successes of the HALWD project, its implementation posed several challenges. This was largely due to project complexities, its multi-departmental nature and its large target area. Given the limited GOHP capabilities, considerable time was spent orienting the state mechanisms to project requirements. Despite these limitations, the project's physical targets far exceeded the GOHP's previous achievements. Moreover, the hill areas climate was not conducive to accelerated field activities (particularly during the four winter months).

2. The project was concerned primarily with the design and construction of as many schemes as possible in order to ensure commitment of funds. This preoccupation with design and construction caused other vital project components to receive less attention than required. Establishment of farmer organizations, agricultural extension and training activities all experienced late implementation. Although instituted later in the project, firmer controls need to be incorporated into project design in order to inhibit counterparts from focusing on design and construction activities to the detriment of an integrated development approach that gives equal weight to institutionalization.

3. Farmer organization development program activities were carried out on schemes which were largely complete, leaving no option but to adopt a post construction participatory approach to farmer organizations. However, farmers should be effectively involved in planning and decision making at the early stage of schemes, as on other USAID irrigation projects. This early involvement could be incorporated into a benchmark of the performance-based disbursement system.

4. During the eight years of the project, six Chief Engineers were assigned to the Project Cell. This had a negative effect on sustained project planning and systematic monitoring. In addition, the Chief Engineer had little authority over IPH field officers. The project should have required the establishment of a single Chief Engineer for project life, as well as ensuring that the position had appropriate operational authority to function as the major decision maker.

VI. MISSION FOLLOW-ON ACTIONS

Mission follow-on actions beyond the project assistance completion date of September 30, 1992 are limited to follow-up

technical assistance. The increased responsiveness of the GOHP to project innovations in institutional development areas has resulted in significant improvements in the irrigation sector of HP. Technical assistance provided by the LCU has greatly contributed to this improved performance. To further the institutional consolidation and field level training, it has been considered useful to arrange additional technical assistance. Consequently the Mission has made an OYB transfer to the AID/W Irrigation Support project for Asia and Near-East to provide the technical assistance. The Mission will ensure that this buy-in arrangement is implemented smoothly.

SPECIAL COVENANTS

1. The Cooperating Country will take appropriate measures to ensure adequate provision of counterpart financial and staff resources, at the state level, for expeditious implementation of project.

STATUS: The GOHP has provided adequate counterpart financial resources, and has, in general, provided adequate staff for the implementation of the project. The GOHP established a Special Coordination and Monitoring Unit consisting of specialists from all the participating departments. In particular, they have assigned the additional field staff required for the farmer organization development and agricultural extension programs.

2. The Cooperating Country will introduce community-based management systems on project financed irrigation schemes.

STATUS: Nearly all of the project financed schemes have farmer organizations. Emphasis on strengthening farmer organizations has shifted from pilot areas to other project areas. The GOHP has agreed to formalize the farmers' role in system maintenance and operation. It has also agreed to revise the existing water laws by clarifying the rights and duties of both the farmers and GOHP officers in system management.

3. The Cooperating Country will explore ways to share more fully the costs of the project financed schemes with their beneficiaries.

STATUS: This is a sensitive issue with the GOHP and will be possible only after the new water law is passed and effectively initiated. However, experimental efforts have demonstrated that farmer organizations are willing to contribute unskilled labor and in some schemes they have mobilized cash contributions from their members for the purpose of maintaining the schemes.

4. The Cooperating Country agrees that responsibility for Schedule II (Community) schemes rehabilitated or upgraded under the project will not be transferred to Schedule I under the Minor Canals Act of 1976, except under extraordinary circumstances.

STATUS: This has been complied with by GOHP.

5. The Parties agree to establish an evaluation program as part of the Project. Except as the Parties otherwise agree in writing, the program will include, during the implementation of the Project and at one or more points thereafter:
 - (a) evaluation of progress toward attainment of the objectives of the Project;
 - (b) identification and evaluation of problem areas or constraints which may inhibit such attainment;
 - (c) assessment of how such information may be used to help overcome such problems; and
 - (d) evaluation, to the degree feasible, of the overall development impact of the Project.

STATUS: In March 1988 a mid-term evaluation of the project was conducted and addressed the above points.

6. The Cooperating Country/Grantee shall exercise every reasonable effort to require each person trained under the project to work in activities related to the project or in activities approved for financing under this Project Agreement, in India, for not less than three times the length of time of his or her training program.

STATUS: Efforts by GOHP/GOI have been made to comply with this requirement.

SUMMARY PROJECT FINANCIAL STATEMENT BY PROJECT ELEMENT

HILL AREAS LAND AND WATER DEVELOPMENT (386-0489)

(As of 09/30/92)

(in U.S.\$)

PROJECT ELEMENT DESCRIPTION	Obligation	Earmark/ Commitment	Accrued Expenditure
<u>GRANT:</u>			
Review and Field Studies	378,502	378,502	378,502
Training in Special Skills (U.S.)	176,189	176,189	176,189
Professional Development (Incountry)	1,418,025	1,418,025	1,418,025
Liaison and Coordination	1,427,887	1,427,887	1,427,887
Evaluation	0	0	0
<u>LOAN:</u>			
Minor Irrigation Schemes	10,418,369	10,418,369	10,125,054
Micro Irrigation Schemes	2,533,313	2,533,313	2,482,928
Repaired Schemes	450,045	450,045	408,023
Chak Developmen of Completed Schemes	3,305,918	3,305,918	3,302,791
Afforestation of Irrigation Command	1,903,322	1,903,322	1,627,409
Horticulture Development	549,881	549,881	512,636
Agriculture Extension Support	884,125	884,125	776,657
Project Cell Cost	1,298,796	1,298,796	951,746
TOTAL	24,744,372	24,744,372	23,787,847

Note: The Host Country Contribution has been \$22.54 million

NR:HAWDPACR.WK3

PLANNED (AS IN PROJECT PAPER) VERSUS ACTUAL OUTPUT

PLANNED OUTPUT	INDICATOR	ACTUAL OUTPUT
1. New and improved designs for hill area irrigation schemes	Incorporation of improved feasibility criteria and approved appraisal reports	New and improved designs developed for incorporation in appraisal reports
2. Irrigation system extended to chak level	Detailed system design plans and specification including chak development	Made obligatory as a part of design, planning, cost estimation and implementation process
3. Community based management systems	GOHP Directives and certification that cultivator groups have been organized	Community based management systems developed and community participation is a pre-condition even for identification of schemes
4. Land and Water Development Cell and Committees	GOHP Directives and formation of Cell and Committees	Project Cell and State Level Implementation Committees established
5. Introduction of AD Cost recovery system for Chak Development	Cultivator contributions to cost recovery	Cultivators contribution as a labor force as well as in cash established as a practice
6. Enhanced professional and staff capacity	Trainees trained against approved training plans	Training carried out under the project in specialized areas to achieve this objective
7. Communities oriented to operation and maintenance techniques	Detailed analysis of 50 schemes and sample of all other schemes documenting community operation and maintenance of schemes	Through establishment of Farmer Organization Development (FOD) and giving it a legal entity, the responsibility of operation and maintenance transferred to beneficiaries

NR:sd:hwdpacr2

BEST AVAILABLE DOCUMENT

OTHER MAJOR OUTPUTS OF THE HALWD PROJECT

	<u>Pre-Project</u>	<u>HALWD Project</u>
1. <u>IRRIGATION AREA</u>		
	Total irrigation area created between 1948-1985 (one year prior to start of HALWD) was 60,000 Ha	Additional irrigation area created by HALWD from 1986-1992 is 28,819 Ha
2. <u>CHAK (ON-FARM) DEVELOPMENT</u>		
	Not provided in any schemes	Provided in all IPH and AD schemes. Encouraged by the success of the chak development the GOHP has decided to adopt this component in all irrigation schemes.
3. <u>AFFORESTATION AND EROSION CONTROL</u>		
Water system protection	Not done	For first time the IPH, AD and FD have developed an integrated plan.
4. <u>IRRIGATED AGRICULTURE EXTENSION</u>		
a. Preparation of extension plans for each district	None	Prepared for all 10 project dists.
b. Shift in cropping pattern	Mono-cropping (subsistence)	Three to four high value crops
c. Participation by GOHP Universities	Minimally involved	Actively involved in training of farmers
d. Demonstration	Related to traditional subsistence crops	Focused on high value crops
5. <u>COMMUNITY BASED MANAGEMENT SYSTEMS - FARMER PARTICIPATION</u>		
a. Farmer Organization Development	Practically Nil	Farmer Organizations have been formed and registered in the project financed schemes
b. System maintenance	Water laws old and not meeting field requirements	GOHP agreed in principle to revise the water laws and proposed changes drafted
c. Improvement in socio-economic conditions	Nominal	Increase in improved varieties of cows, bulls and buffalo; doubling of income noted.

	<u>Pre-Project</u>	<u>HALWD Project</u>
6. <u>HUMAN AND INSTITUTIONAL DEVELOPMENT</u>		
a. Inter-departmental coordination	Depts worked in isolation	For first time IPH, AD & FD worked in collaboration; HD & Universities made similar efforts
b. Professional Training	Negligible	GOHP engineers, agriculturalist, foresters, and horticulturalists have received in-country training; 25 trained in the U.S.
c. Training of farmers	Negligible	Over 29,000 farmers trained
d. Establishment of agro-meteorological stations	Inadequate	Six stations newly established and 3 stations strengthened
e. Computerization efforts	None	First ever computers in IPH installed in each district; 7 staff trained in computer applications
7. <u>PRIVATIZATION EFFORTS</u>		
Use of Private sector firms/consultants for		
a. Professional Development	None	Private consulting firms engaged for first time
b. Technical Assistance and project monitoring	None	LCU (a private sector firm) provided services to the public sector for first time
c. Farmers development	None	U.S. & Nepalese consultants provided T.A. to successfully promote this activity
d. Handing over O&M to Farmers	None	GOHP agreed in principal; committee field tested proposal

BEST AVAILABLE DOCUMENT

Pre-Project

HALWD Project

8. PROCEDURAL AND ORGANIZATIONAL CHANGES

a. Adoption of new economic criteria

BC ratio used

EIRR now being used

b. Restriction on high lift schemes

No restriction

High lift schemes being discouraged. GOHP agreed in principle to restrict to 50 meters

c. Adoption of USAID design criteria for all future schemes

No standard

USAID criteria now being used for all schemes

d. Integrated approach for development of land & water resources

Not practiced

Now being encouraged

e. Improved monitoring and review (walk through of systems with farmers and officers, post construction review, etc.)

Not practiced

Now being encouraged

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BEST AVAILABLE DOCUMENT

MISS CONSTRUCTED/REMODELLED
UNDER THE HALWD PROJECT

SCHEMES BY DEPARTMENT	IN NUMBERS
ID	438
RD	153
AD	287
TOTAL	878

COMMAND AREA	IN HECTARES
ID CCA	12797.85
CD	23810.70
RD CCA	7537.49
AD CCA+CD	3008.59
TOTAL	47154.63

CCA: Cultivable Command Area

CD: Chak Development

APPLIED RESEARCH/FIELD STUDIES
COMPLETED UNDER HALWD PROJECT

DESCRIPTION	AGENCY
1. Evaluation of water use efficiency for fruit crops in drip irrigation/items	*UHF Solan
2. Development of suitable water harvesting techniques using rainfed condition	UHF Solan
3. Social economics benchmark survey of USAID assisted irrigation projects in Hamirpur, Solan and Una districts	UHF Solan
4. Baseline survey of USAID assisted Shimla irrigation subprojects in Shimla and Bilaspur	**AERC
5. Socio-economic benchmark survey of command area of proposed irrigation projects in Mandi, Kangra, Chamba and Kullu districts	***HPKV, Palampur
6. Estimation of seepage loss in irrigation channels and evaluation of different lining materials in reducing seepage during conveyance and storage in high rainfall area	HPKV, Palampur
7. Evaluation of water requirement of important crops in different agro-climatic zones	HPKV, Palampur
8. Impact of Government assistance on the operation and maintenance of RD kuhls (channels)	UHF Solan
9. Fluctuation of water level problem in Lift Hamirpur Irrigation Scheme (LIS) Kandraur district, Bilaspur	****IPH
10. Improved utilization of tank/outlet system Reckong- in Flow Irrigation Scheme (FIS) Dwarch Bathara kuhl, Rampur	IPH Peo
11. Impact of irrigation on socio-economic structure of farm families in Kangra and Kullu	HPKV, Palampur
12. Performance evaluation of trickle irrigation system in relation to traditional surface irrigation for vegetable crops	HPKV, Palampur

13. Establishing and strengthening of agro-meteorological observatories for estimation of Evapotranspiration (ET).	HPKVV, Palampur
14. Study of management on different irrigation Shimla schemes/systems	AERC
15. Recurring cost of irrigation water Shimla	AERC
16. Impact of irrigation on socio-economic Shimla structure of farm families	AERC
17. Marketing of high value perishable crops Shimla	AERC
18. Water requirement for peas and tomatoes	UHF Solan
19. Drip irrigation - an irrigation management project	UHF Solan
20. Women's role in irrigated agriculture system	UHF Solan
21. An economic analysis of investment in irrigation tubewells	UHF Solan
22. Establishment of weather stations in different agro-climatic zones for estimating Evapotranspiration values	UHF Solan
23. Cultivation of continental and off-season vegetables	GOHP Agri Dept

-----* UHF - University of Horticulture and Forestry
**AERC - Agro-economic Research Center
***HPKVV - Himachal Pradesh Krishi Vishwa Vidyalay
****IPH - Irrigation and Public Health Department