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Water Resource Management and Training Project
386-0484

EVALUATION OF THE IRRIGATION MANAGEMENT TRAINING COMPONENT

ISPAN ACTIVITY NO. 625A
ISPAN REPORT NO. 6

IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST
Sponsored by the U.S. Agency for International Development
EVALUATION OF THE IRRIGATION MANAGEMENT TRAINING COMPONENT

October 1988

by

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Prepared for the Office of Irrigation and Water Resources,
U.S. Agency for International Development
New Delhi, India
EXECUTIVE SUMMARY

INTRODUCTION

The purpose of this evaluation is to provide guidance to the Government of India (GOI) and USAID on the progress, direction and effectiveness of the Water Resource Management and Training (WRM&T) Project, a USAID-supported effort of the GOI, aimed at increasing water resources system productivity by improving the professional and technological skills and capabilities of irrigation and water resources specialists, and carrying out related policy and technical research and studies.

This evaluation was carried out by Dr. Jack Keller, Irrigation Consultant and Dr. Lin Compton, Training Consultant, assisted by Dr. Michael Walter, Water Management Research Advisor, USAID/New Delhi. They visited State Training Institutes (STIs) in Madhya Pradesh, Maharashtra, Tamil Nadu and Andhra Pradesh, and Mahatma Phule Agricultural University in Maharashtra and Anna University in Tamil Nadu in August 1988. They made use of interviews, observations, discussions, and documentary analysis in their evaluation. Concurrently with this broad evaluation of WRM&T, a review of overseas training, and the WALMI at Aurangabad, Maharashtra was carried out by Shri M.L. Mathur and Dr. W.B. Rahudbar. The executive summary of their report is attached as Appendix A.

A contractor team made up of Louis Berger International Incorporated (LBII) and Water and Power Consultancy Services (India) Ltd. (WAPCOS) are the prime contractors for the WRM&T Project. This contractor team provides technical assistance to the STIs and selected universities. A Joint Project Management Committee (JPMC) consisting of representatives from the Irrigation Research Management and Improvement Cell (IRMIC) of the Central Water Commission (CWC), USAID, LBII and WAPCOS oversees the project. At the state level, project activities of the STIs and the universities are guided by a State Technical Council, chaired by the state's Secretary of Irrigation or a senior administrator associated with irrigation management policy in that state.

FINDINGS AND RECOMMENDATIONS

The evaluators were greatly impressed by the progress made in developing and implementing training activities by the institutions visited. The STI's are making a considerable impact on increasing the awareness of on-farm irrigation needs. Furthermore, the spirit at the institutions is good, the staff seem to be quite motivated, and their course materials and ability to present them is improving.

Present course programs appear to be broad, generic and academic. Programs are apparently not planned specifically to meet the needs of the officers of the Irrigation and Agriculture Departments or the Command Area Development Authorities. In view of this the evaluation team recommends that the STI's initiate a process in collaboration with Irrigation and other concerned Departments to carry out strategic planning to systematically design training programs focused on the specific work activities of irrigation system designers and operators, and the knowledge/skills necessary to increase their capability.
The focus of present training programs at all the project supported institutions appears to be mainly on the tertiary or on-farm level of irrigation systems. However, there are major structural and management concerns and opportunities for improvement at other levels. In view of this the team recommends a more balanced training approach to encompass key aspects of the entire irrigation system. This would involve a greater emphasis on the operation and management of the "main system" (above the outlet to the tertiary system). That would increase the usefulness of the training for Irrigation Department engineers.

The team commends the efforts being made to improve course subject content and the quality of materials. Yet some course content remains less effective and relevant than desired. While participants are presented programs consisting of sets of course subjects, the subject matter is not well integrated into a systematic curriculum. Therefore, the team recommends that the curriculum be modified to more closely reflect the actual work functions of the Irrigation Department officers, with the subject matter integrated through practical application and with much more emphasis on field activities as well as action research.

The STIs faculty are generally enthusiastic, hard working and qualified. Faculty are recruited on the basis of subject matter considerations, without due attention to their teaching ability. Instructors rely too much on lectures as their primary mode of teaching and seldom take advantage of participatory and hands-on methods which are superior for practical non-academic training. The team recommends that a "teaching methodologist" be available to each STI to evaluate and help SIT instructors improve teaching techniques and methods.

Although several project-funded efforts have been initiated, none of the STIs visited used evaluations to assess the procedures, effects, and impacts of their training activities. Evaluations are a necessity for determining how to improve the relevance and quality of training, and for adding discipline to the program. The team recommends that rigorous and meaningful evaluation procedures be developed and institutionalized at each STI.

The team observed a lack of systematic interaction between the STIs and the universities. Present exchanges are primarily personal and ad hoc. The university field programs could strengthen the STI course content and action research, and the STIs could provide an informative professional linkage for the universities. In view of this, it is recommended that serious efforts be made to promote systematic and substantive interactions between these two groups.

The selection process for trainees has often resulted in the choice of candidates who were not in the greatest need of training, nor in a position to make optimal use of the training given to them. The team recommends that each state review its guidelines and procedures for selecting trainees to insure that candidates who can make optimal use of the training given to those are chosen.

The team finds that it would be more cost-effective to strengthen a training-of-trainers capability within India itself, than to continue with the U. S. based program. The team
recommends that an appropriate Indian institution and personnel be identified and arrangements made for foreign consultants to work with them to develop a strong training of trainers program in India.

Implementation of the above recommendations will involve planning and identification of specific actions and activities. Hence the evaluation team has suggested procedures and follow-up steps to be taken in the areas of strategic training planning, action research, and education methodology.
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AD</td>
<td>Agriculture Department</td>
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<tr>
<td>ADA</td>
<td>Assistant Director, Agriculture</td>
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<tr>
<td>AE</td>
<td>Assistant Engineer</td>
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<tr>
<td>ASCO</td>
<td>Assistant Soil Conservation Officer</td>
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<td>CADA</td>
<td>Command Area Development Authority</td>
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<td>CBIP</td>
<td>Central Board of Irrigation and Power</td>
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<td>CGWB</td>
<td>Central Ground Water Board</td>
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<tr>
<td>CWRDM</td>
<td>Center for Water Resources Development and Management</td>
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<td>CWC</td>
<td>Central Water Commission</td>
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<td>DDA</td>
<td>Deputy Director, Agriculture</td>
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<td>EE</td>
<td>Executive Engineer</td>
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<td>GOI</td>
<td>Government of India</td>
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<td>GWB</td>
<td>Ground Water Board</td>
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<td>ID</td>
<td>Irrigation Department</td>
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<td>IMTI</td>
<td>Irrigation Management &amp; Training Institute</td>
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<td>IMTP</td>
<td>Irrigation Management &amp; Training Project</td>
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<td>IRMIC</td>
<td>Irrigation Research Management and Improvement Cell</td>
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<td>JDA</td>
<td>Joint Director, Agriculture</td>
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<td>JPMC</td>
<td>Joint Project Management Committee</td>
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<td>LDC</td>
<td>Land Development Corporation</td>
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<td>LBII</td>
<td>Louis Berger International, Incorporated</td>
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<td>MPAU</td>
<td>Mahatma Phule Agriculture University</td>
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<td>MWR</td>
<td>Ministry of Water Resources</td>
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<td>STC</td>
<td>State Technical Committee</td>
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<tr>
<td>STI</td>
<td>State Training Institute</td>
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<tr>
<td>SDO</td>
<td>Sub-Division Officer</td>
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<tr>
<td>SMS</td>
<td>Subject Matter Specialist</td>
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<tr>
<td>SE</td>
<td>Superintending Engineer</td>
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<tr>
<td>TAC</td>
<td>Technical Advisory Committee</td>
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<tr>
<td>TOT</td>
<td>Training-of-trainers program</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>VEO</td>
<td>Village Extension Officer</td>
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<td>VEW</td>
<td>Village Extension Worker</td>
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<tr>
<td>WALMI</td>
<td>Water and Land Management Institute</td>
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<tr>
<td>WAPCOS</td>
<td>Water and Power Consultancy Services (India) Ltd.</td>
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<td>WRM&amp;T</td>
<td>Water Resource Management and Training Project</td>
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Chapter 1
BACKGROUND

1.1 The WRM&T Project

The Water Resource Management and Training (WRM&T) Project is a technical development activity supported by the U.S. Agency for International Development (USAID) to improve:

- water management system technologies;
- the professional and technical skills and capabilities of irrigation and water resource specialists; and
- policy and technical dialogue.

1.1.1 Basic Objectives. The project is a major technical resource of the Government of India’s central and state irrigation and water resource organizations. It provides assistance for state irrigation improvement activities, and support for centrally organized irrigation and water resource management and training improvements. The major project components include:

- irrigation management training;
- water resource management, systems analysis, and training;
- action research;
- information dissemination; and
- organizational and procedural change.

The WRM&T project is a key element in USAID/India's strategy for promoting irrigation and water resources development (summarized in Appendix B). The strategy is to tap the considerable technological and institutional experience in water resource development available in the United States, and bring it to bear on improving cost effectiveness and overcoming system management constraints in irrigation and water resource development in India.

The current thrust of the WRM&T Project is toward the whole irrigation system, rather than the earlier almost total focus on the on-farm production system. A 1985 review of USAID/India's program by M. Walter also pointed to the need to give main system issues greater focus. Quoting from the summary of that paper:

"The experience of the past four years clearly indicates that reliable main system supply is a major constraint to sustainability and performance, and
is prerequisite to downstream on-farm development. Our analyses indicate high returns to main system improvements and operations which ensure reliable supply. On the other hand, initial returns to on-farm investments have been disappointing. In new systems, efforts in initial planning and operations can also yield high marginal returns."

With these lessons learned, and the evidence of sustained productivity from predictable water, USAID is shifting attention towards improvements in planning and operations to increase performance of water resource/irrigation systems. This strategy focuses on the fundamental technical, economic and institutional aspects of surface and ground water supply which are prerequisite to cropping shifts for more productive use of a resource under stress.

Specific objectives for the WRM&T Project are defined in Attachment A of Project Implementation Letter (PIL) No. 7 (Appendix C). The evaluation team addressed the general and specific aspects of these project objectives as outlined below:

1. Strengthen selected state training, academic, and research irrigation/water resource organizations to address priority state resource issues through
   - helping the state training institutions and other state organizations to identify priorities,
   - developing the state capabilities for planning,
   - developing technical support links among state organizations,
   - improving the technical analysis and monitoring/evaluation of state irrigation departments, and
   - improving the interactions among irrigation system management and farmers.

2. Develop self-sustaining state training and operational research capabilities at training institutions in 11 major irrigation states through
   - improving curriculum planning, preparation, implementation and evaluation,
   - developing a training-of-trainers and faculty training program in India,
   - adapting and transferring specific training courses from the United States to India,
   - introducing modern training methodologies and pedagogical techniques,
developing a formal evaluation program to ensure the relevance, specificity and utility of training, and

initiating and institutionalizing action-oriented research capabilities tied to training.

3. Establish irrigation management education at MS University (Baroda), Anna University (Madras), Sukhadia University (Udaipur), and Mahatma Phule Agricultural University (Rohuri) through

• improving the academic curriculum and materials, and

• carrying out relevant irrigation and water resource management research.

4. Initiate organizational and management studies in irrigation in the participating states.

5. Develop microcomputer capabilities to improve the design, operating, and management of Irrigation Departments in selected states.

1.1.2 Mode of Operation. The project has 14 client institutions, including ten State Training Institutes (STIs), and four universities. Originally five STIs and four universities were supported by the project. The remaining five STIs were formally added in early 1988; however, the project had begun working activities with them in 1987.

State Training Institute is the generic name for the institutes that were set up to provide in-service training on irrigation management issues in the various major irrigated agricultural states of India (see Figure 1). These institutes have their own campuses, which were financed by a combination of state, World Bank, and USAID assistance. The ones originally financed primarily with World Bank assistance are usually called Water and Land Management Institutes (WALMI), while those primarily funded by USAID assistance are called Irrigation Management Training Institutes.

A team made up of Louis Berger International, Incorporated (LBII) and Water and Power Consultancy Services (India), Ltd., (WAPCOS) are the prime contractors for the WRM&T Project. The team, which shares more or less equally in carrying out the contract, operates under an "Official Letter of Understanding." LBII is a U.S.-based general consulting firm, and WAPCOS is an engineering consulting entity owned by the Government of India.

A Joint Project Management Committee (JPMC) made up of representatives from the Irrigation Research Management and Improvement Cell (IRMIC) of the Central Water Commission (CWC), USAID, LBII, and WAPCOS has been established to provide oversight of and guidance to project activities (see Figure 2).
Figure 1 Map of India
Figure 2. Joint Project Management Committee
The JPMC is chaired by the CWC/IRMIC representative. At the central level, proposals are generally initiated by the contractor team for review and approval by the JPMC. There is informal exchange between the STIs (and universities) and the contractor team before proposals are put forward to the JPMC.

At the state level project-related activities of the STIs and universities are under the control of State Technical Councils. Each council is chaired by the state's Secretary of Irrigation (or Public Works) and includes other concerned Secretaries (such as Command Area Development Authority, Agriculture, Finance, etc.), the STI Director, and the Vice Chancellor where a university is involved (Figure 3). CWC/IRMIC and USAID are typically invited as guests (unfortunately the contractor team is not usually invited).

The State Technical Council acts like a Board of Directors reviewing, finalizing, and approving annual plans and budgets which are drawn up and presented by the STI as required by law. However, the plans and budgets must still be ratified through other state offices, and the budget can still be cut. The contractor team can and does interact with the STI in drawing up the annual plan and budget but has no formal means of interacting with the State Technical Council. Furthermore, there is no other formalized planning linkage between the STIs and the respective universities, or for that matter between the STIs and the Irrigation Departments, Agriculture Departments, or Command Area Development Authorities.

1.1.3 Current Situation. The project got off to a slow start in 1984; however, the pace has quickened during the past year and a half, with all major technical contracts being put in place by early 1987. While work has begun on all project components, the organizational and procedural change and the information dissemination activities are just now getting started.

1.2 Evaluation Team

This evaluation was designed and financed by USAID/New Delhi. The Mission requested the Irrigation Support Project for Asia and the Near East (ISPAN) to manage this activity and recruit a two-member consultant team to carry out the evaluation. The selected team included: Dr. Lin Compton, Team Leader, Professor of Extension Education and International Agriculture, University of Wisconsin; and Dr. Jack Keller, Civil and Irrigation Engineer and Professor Emeritus, Utah State University. Dr. Compton, has spent 11 of his 26 years of professional experience in South and Southeast Asia, and Dr. Keller has worked on irrigation problems in more than 40 countries. The team was assisted in India by Dr. Michael Walter, Water Management Research Advisor, USAID, New Delhi.

1.2.1 Purpose. The purpose of this evaluation is to assist the Ministry of Water Resources, Central Water Commission, and USAID to review the progress, problems, and issues of the irrigation management training activities of the WRM&T Project. The evaluation is intended to identify mid-course modifications to improve the relevance, impact, and implementation of project irrigation management training activities. It is limited in scope and designed to assess in a constructive manner what has been learned.
STATE TECHNICAL COUNCILS
(STCs)

CHAIR – Secretary of Irrigation
- Other Secretaries, CADA, Ag., Finance, etc.
- Director of STI
- Vice-Chancellor (State with Us)
= IRMIC & USAID (As visitors)

Figure 3. State Technical Councils
and what needs to be done to fulfill project objectives. The evaluation is intended to help set future directions, especially for the training assistance activities.

1.2.2 Scope of Work. The scope of work developed by USAID/India included the following elements.

(1) Training Organizations

- Review the progress in the development of improved training programs at the university departments and STIs.
  - Evaluate the evolving roles, training responsibilities, and client groups of the participating agricultural and engineering universities and the STIs.
  - Make recommendations for improving the direction and effectiveness of WRM&T Project assistance in further strengthening technical and institutional capabilities.
  - Review the training strategy and objectives and determine whether they complement client organization training needs.
- Review WRM&T Project assistance in light of the formal and informal linkages between the universities and STIs and their major client organizations.
  - Suggest ways of enhancing project assistance, professional linkages and exchange among the universities, STIs, and the client organizations.
  - Identify ways to enhance a client-based training orientation.
  - Suggest ways of improving the WRM&T Project’s training agendas, training curricula, and content to respond to client requirements.

(2) Irrigation Training Course Content and Curricula

- Review the training courses and curricula assisted by the WRM&T Project at selected STIs and participating universities, and identify requisite project assistance to ensure development of problem-focused course curricula and content such as in main system management and operations, management training, social and economic analysis, and relationship with client organizations and farmers.
- Identify gaps in technical skills and capabilities of training staff at universities and STIs.

- Review training component linkages with other project components, especially the action research activity.

- Recommend ways of improving training linkages and activities with action research, organization and procedural changes, and other project components.

- Review the curricula and training content of the joint training-of-trainers program assisted by the WRM&T Project.

  - Analyze the training program and compare it with the major technical problems and requirements of the client organizations.

  - Make recommendations for improving the curricula and course content of the training-of-trainers program.

  - Review the plans and the timetable for transferring the training-of-trainers program entirely to India.

  - Identify problems and technical requirements in order to facilitate the transfer of the training-of-trainers program.

  - Comment on the technical and institutional linkages that are required to improve and maintain technical quality of the training-of-trainers program.

  - Evaluate the future need for the training-of-trainers program and its frequency.

(3) Training Skills and Improvement Activities

- Review project efforts regarding the pedagogic skills improvement program and activities.

  - Analyze approaches and review the applicability of these skills for in-service and academic training programs.

  - Review the actual use of project introduced pedagogic skills in training programs.

- Review project assistance to the pilot training needs assessment in Maharashtra and make recommendations for improvements and future efforts.
- Review the status of and WRM&T Project plans for carrying out regular evaluations of in-service training activities.

- Make recommendations for improving the methodology for utilizing in-service training evaluations and user (and client) feedback in curricula and training content.

- Suggest ways of developing more feedback loops for improving the quality and relevance of training and enhancing the use of the training.

(4) Participant Training Activities

- Review the project-funded training of specialists in the United States and third countries.

- Review information and follow-up summaries of the use of participant training.

- Comment on the venue, content, and relevance of participant training.

- Review the justification and impact of participant training and its usefulness as part of an overall training strategy.

- Make recommendations for improving the technical selection of courses for participant training and broadening the bases and institutions of technically relevant courses.

- Review the current course evaluations by project participant trainees and develop recommendations for improving the feedback from participant trainees and improving the relevance of training courses.

- Review the evaluations of trainee performance by project participant training institutions and develop recommendations and a format, if necessary, for evaluating participant trainee performance at future training courses funded by the project.

1.2.3 Basic Itinerary. The evaluation was carried out in two stages: (a) The team visited Colorado State University, Fort Collins, Co. to interview the staff and current trainees involved in the Training-of-Trainers program being carried out there; and (b) The team visited India from August 5 to August 30, 1988. In India the evaluation team visited and reviewed the programs at the STIs in Madhya Pradesh, Maharashtra, Tamil Nadu, and Andhra Pradesh (see Figure 1), as well as Mahatma Phule Agricultural University in Maharashtra and Anna University in Tamil Nadu. The visits were very brief, lasting from one to three days. The teams' itinerary is presented in Appendix D.
1.3 Evaluation Strategy

The principal focus of the evaluation team is on the irrigation management training activities and programs supported by the project. However, the team also felt that some attention should be given to the research component as it is an integral part of the overall irrigation management training program.

1.3.1 Focus of The Evaluation. The clients of the WRM&T project are the various institutions it is designed to serve. However, since the project deals with specific irrigation management training activities, the evaluation focused initially on a review of the training and research programs of selected STIs and universities. The team sought to review and assess the institution's strategic training plans, the quality of the chosen programs, and the efficiency of delivering them at the various institutions visited.

The intent of the team was not to evaluate these institutions per se, but rather to assess how well the project was serving them, and how the project might serve them more effectively in the future. This approach is similar to the dialogue that takes place between farmers and an appraisal team that is trying to find out how well the farmers are being served by the Irrigation and Agricultural Departments -- the purpose is not to evaluate the farmers.

1.3.2 Approach. The evaluation team's approach involved identifying and assessing

- the training strategies and program planning activities;
- the methods used in assessing training needs;
- the accuracy and appropriateness of the training materials;
- and the capacity of faculty members to use them.

While the team did not carefully review the various action research activities, it did examine how they fit into the training strategy and program.

Within the limited time frame available, the evaluation team used an opportunity analysis rather than a diagnostic approach for analyzing the WRM&T Project. Wherever possible, the team tried to focus on what was workable, in a search for strengths rather than weaknesses or what had failed or was not working. Rather than trying to determine the priority constraints and problems, the team tried to identify and assess the context within which the project is functioning and identify how to improve its performance. In addition to its observations and findings (Chapter 2), the team developed recommendations for action planning to identify follow-up activities to the evaluation (Chapter 3), and provided specific recommendations (Chapter 4).

1.3.3 Methodology. The team employed a variety of methods to obtain and verify information pertinent to the evaluation objectives (Appendix E). Team members held individual or group interviews with Indian authorities, educators, field staff, USAID, and
contractor staff (see Appendix F for a list of people contacted). The interviews ranged from a semi-structured list of questions used in the training-of-trainers interview (Appendix G), to a spontaneous, interactive mode of eliciting reports on personal perspectives and performance.

The team also assessed the content of a wide range of documents pertinent to the WRM&T project (see Appendix H, which lists general references, and Appendix I, which lists LBII/WAPCOS documents). The team had extensive opportunities to observe STI and university program facilities, to assess field-based action research activities, and to conduct group interviews with farmers, STI training participants, and university students. The numerous briefings held by the evaluation team for Indian and U.S. officials and contractor staff provided important feedback and increased insight that was incorporated in the team's findings and recommendations.
Chapter 2

OBSERVATIONS AND FINDINGS

Considerable progress has been made in carrying out the WRM&T Project. Impressive STI facilities have been developed at a number of sites. A large number of staff have been recruited and are actively doing their work. Various modes of operation have been devised and are being implemented. Relationships with various organizations are being established which should lead to the exchange of valuable information as the project progresses. A wide range of courses are being conducted. Teaching staff are receiving training aimed at helping them become better teachers. STI staff are becoming more inclined to explore field situations in order to make their teaching more relevant. These laudable developments have been noted by the evaluation team.

The training programs at the STIs and universities are having an important and positive impact on the attitudes of Irrigation Department staff members. They are learning to appreciate the broader objective of irrigation system management, and are focusing their attention on satisfying the production needs of farmers as a prerequisite to improving irrigation performance. The STIs have gained in competence, credibility, and acceptability which is commendable and of major importance for their success. The WRM&T Project has been an essential part of this effort and should continue to build on this base.

2.1 Program Focus

The current focus of essentially all STI and university activities is at the tertiary levels and below. This focus is generally supported by the various Irrigation Departments and agencies of the Government of India. The original thrust of the World Bank-sponsored institutes, as well as this project, was to improve the management and operation of whole irrigation schemes by improving the Irrigation Department Officer’s understanding of on-farm and tertiary systems irrigation issues and needs. It was assumed that they already knew how to manage the system and lacked only a fuller appreciation of meeting crop water requirements and other farmer needs. The current curriculum at the STIs is based on that assumption.

2.1.1 Needed Change in Focus. The STI and university programs supported by the project need to be broadened so that they encompass the entire irrigation system. In addition to irrigation management at tertiary levels, main system management, operation, and maintenance should also be stressed. One or two comprehensive course programs could be offered with the subject matter integrated through practical application using actual in-the-field applications.

The contractor concurs with this view and has suggested to some STIs that they make this shift, but there has been slow progress in this direction. The project should concentrate more effort on this area, and provide increased support and encouragement to capable universities for work on main system management activities.
2.1.2 Farmer Participation. The rationale for farmer participation in irrigation management is fairly well known and recognized. Organized in water-uses associations, farmers can focus activity at the local level in a manner that facilitates systematic government agency response. Such local groups also ensure greater accountability, an important concept in management.

Studies are being suggested or undertaken to identify effective approaches for enhancing the development of sustainable water-user associations. In interviews with several groups of farmers, the evaluation team learned that the primary concern of the farmers seems to be that water is delivered reliably, at the right time, and in sufficient or promised quantities. Farmers indicated that they were willing to adapt their cropping patterns according to water availability and market prospects. In other words, if they know what they are dealing with they tend to make decisions that are not only in their best interest but favorable to more efficient and productive system operation as well. This decision-making process can be assisted by irrigation and extension cadre but it cannot be dictated by them. STI training for the trainers of these cadre is important.

The formation of new water-user associations in areas where irrigated agriculture is becoming a possibility for the first time may require the development of expertise at the STI concerning what farmers need to learn to become self-sufficient and how this might best be taught to them at the Farmer Training Centers operated by the Agriculture Department.

2.2 Program Development

When the STIs started only a couple of years ago they were provided with an agenda that was the best that a collection of international and India consultants and Indian officials could offer at that time. The STIs have done a credible job in trying to follow this agenda, and the project has played an essential and supportive role in this process. It should not be overlooked that the STIs have been able to change attitudes in essential ways. While continuing with the existing program, the STIs should begin to become more problem-oriented and specific in their training programs. STIs should strive to make sure that field programs and training activities are relevant to the real needs of the farming population and those who serve them.

2.2.1 Evaluating Each STI Program. Ideally, program development should come before course development. Rather than devise a new comprehensive training program, the contractor plans to evaluate the program at each institution. Its stated intention is to analyze the course content, examining its effectiveness and accuracy, and assessing the effectiveness of the teaching methods, including hands-on exercises. The contractor plans to visit each STI and examine its courses subject by subject asking why it is being taught and how it is relevant.

This approach is certainly a step in the right direction, but the contractor has been unable to make much progress in carrying out this very time-consuming analysis. Furthermore, the contractor has said that there has been little interest on the part of the STI Directors for
such an evaluation. The contractor has since developed an innovative alternative approach in the form of course development workshops discussed below in Section 2.3.

2.2.2 Need for a Strategic Training Plan. In each state the effective owner of the STI is the Irrigation Department, and the Irrigation Department officers are its principal direct clients. Other important clients may be Agriculture Department officers, and in a few cases, farmer leaders and other personnel from the Irrigation or Agriculture Departments (the latter are only clients indirectly). STI programs would be most effective if they are developed on the basis of strategic training (and research) plans formulated in collaboration with the Irrigation Development and, where appropriate, the Agriculture Department.

The objective of the training (and associated research) supported by the WRM&T Project is to improve irrigation performance. Therefore, to be result-oriented the strategic training plan for each STI should include strategies to:

• mobilize the needed human resources;
• select the right training in order to upgrade the skills of the right personnel to carry out their assigned tasks.

Without a strategic training plan, and regardless of how well the individual training modules are thought out and implemented, much of the energy devoted to the training efforts will be dissipated.

The current programs at the STIs visited by the evaluation team are general in nature. The training program currently given to Irrigation Department officers increases their awareness of the productive purpose of irrigation investments, and provides them with some useful and new information, but it is not targeted at specific needs or at their job assignments in any direct way.

2.3 Curriculum Development Workshops

The project has provided a significant contribution to improving the quality and utilization of course materials, and new approaches hold the promise of further improvement. The contractor has initiated an innovative course development program focusing on individual courses that cover the primary levels of irrigation systems. This course development program facilitates much needed interaction and networking among the various institutions.

The curriculum development workshop is held at a selected STI. Faculty interested in teaching a similar course at other STIs and universities are invited to attend. They, as well as other interested professionals, are also invited to present appropriate papers on the subject. The workshops ordinarily last two weeks, with the first week dedicated to the presentation of technical papers and other pertinent technical and methodological materials, and the second spent organizing the technical material into a coherent course. A course outline, lesson plans, texts or lecture notes, visual aids, and hands-on exercises are all prepared during the workshop.
Design of the workshop is initiated by a small team of content specialists (consultants) and advisors who develop reference and generic training materials for the course. The evaluation team had the opportunity to interview the content specialists who were on TDY assignments for the "Irrigation System Maintenance" and "On-farm Irrigation Methods" courses. These consultants were apparently well qualified for their respective assignments; however, they were given little guidance or opportunity to tailor their work so it would be relevant locally. They received no detailed guidelines concerning the actual needs of the potential trainees.

The contractors intend to set up seven such course development workshops, each to be held in a different STI. The subject areas to be covered are:

- irrigation (main) system maintenance,
- irrigation system operations,
- automation of irrigation systems,
- computer applications for irrigation management,
- on-farm irrigation methods,
- social and organizational aspects of irrigation management, and
- economics of irrigated agriculture.

The plan is to prepare three levels for each course which differ in the amount of detail and the complexity of the exercises. Courses for junior-level officers will be two weeks long; for middle-level officers they will be condensed to three days, and for senior level officers, to only one day. For higher-level officers, the general idea is to inform them of what is being covered, and what they may expect of their subordinates.

The contractor proposed the curriculum development workshop at the first STI directors meeting. The directors discussed it and selected the above mentioned seven topics. These were assigned to individual STIs who each agreed to provide a leadership role for their designated topic. This topic selection process has its merits, but it does little to target the training efforts to pragmatic needs. Even if the courses are not too academic in themselves, they may lack in relevance for the potential trainees at all three levels, because:

- they were not formulated as logical components of planned, systematic training program; and
- a detailed needs assessment is not available.

It has been proposed that selected STIs take a leadership role in a particular area in which they have a strong interest and capability. The evaluation team feels that this is a
commendable idea. Other STIs can still fully participate and have strong programs in the same course program area. Networking, and working under the direction of an interested leader in a selected subject area, should be the most efficient way to develop good course materials and enhance the performance of all STIs in that area. Furthermore, while there are regional and state differences to contend with, addressing these differences should provide stimulation to, and new insights for, all concerned.

The curriculum development workshop concept is innovative and should have considerable value in stimulating networking and more efficient cooperation among the STIs. All the faculty responsible for a given subject are brought together so they can discuss their work and exchange lecture notes and experiences. They leave with an upgraded set of lecture notes and other materials and resources to teach from. In addition, the workshops give the contractor an opportunity to work with the faculty in upgrading their teaching methods.

2.4 Relation of Action Research to Training

The evaluation scope of work calls for an assessment of linkages between action research activities and teaching programs. Based on discussions with STI staff and observation of action research field activities the evaluation team found considerable confusion about what action research is or should be.

The action research activities were intended to be an integral part of the STI training programs. The idea was to test innovations on actual irrigation systems prior to incorporating the related subject matter into the curriculum. Of equal importance was the proposed use of action research activities for experiential field training of both faculty and participants at the STIs. Not using action research in this manner, except in a very few cases, results in a significant loss in training opportunity. It is imperative that the staff have hands-on field experience not only in terms of how to do things, but also with the consequences of doing them.

The action research initiative is so new and lacking in an effective framework, that it has thus far had no influence on the quality of the training program at the STIs or universities. The evaluation team concluded that there is considerable confusion about what action research is, and how it compares to other types of research and studies.

STIs are attempting to undertake a kind of action research which they are not adequately prepared to carrying out. They need to design field programs and evaluate their ability to carry them out and achieve the desired results. This action research should feed information back into the general curriculum/course structure. However, the action research methodology must be mastered before any attempt is made to use these research results for training.

Apparently separate staff members were being hired to conduct the action research program, leaving instructors in the STI courses and university faculty relatively uninvolved. This significantly diminishes the opportunity for effective feedback from action research into teaching. Although many faculty members have expressed an interest in opportunities
for involvement in field research, they have not been encouraged or allowed to undertake such activities.

Action research cum action training can and should occur within at least four different but conceivably interconnected contexts:

- University faculty could focus on understanding the functioning of effective and non-effective water-user groups in order to devise training programs aimed at helping such groups function better.

- STI staff should be involved in action training, focusing on studying and finding ways to improve the training of irrigation engineers and Agriculture Department personnel responsible for counseling farmers about on-farm irrigation matters.

- Selected Irrigation Department engineers and Agriculture Department personnel should receive training at the STI on the content and methods associated with the farmer-leaders of water-user groups.

- Farmer-leaders should share the results of their training with other farmer-members of their water-user group.

University faculty should be encouraged and funded to focus attention on all four contexts and identify ways of achieving the desired objectives within each.

2.4.1 Contractor's Efforts. Contractor staff are working closely with a few interested STIs, and have developed a useful handbook of comprehensive guidelines on setting up and conducting action research. The guidelines stress:

- developing a carefully thought out action plan;
- monitoring and recording the processes as they unfold (rather than "doing research"); and
- tying these activities into the overall training programs.

2.4.2 Action Training. In Madhya Pradesh (MP), USAID's Minor Irrigation Project involves financing the construction of 50 minor (500 to 2000 hectare) irrigation systems. One of the action research activities of the associated STI is to monitor the implementation of the design, construction, and management strategy at a site near the STI that will also be used for varied field training exercises. The innovation to be monitored and studied is the imposition of rotational water supply procedures and full tertiary development in conjunction with farmer interaction. These approaches are new to the Irrigation Department.

The purpose of the field studies is to monitor these new procedures (within the site and within the Irrigation Department) and to adjust them to local conditions if necessary.
While this is not research in an academic sense it is a useful and needed field study which can also have considerable utility for training purposes. Perhaps it might be better to call this an action study and training site, or simply an action training site, rather than confusing the issue by calling it an action research site. In any event, the activity fulfills a current need and is probably within the capacity of the available staff.

2.5 State Training Institutes

Ten STIs are now included in the project, five of them having been recently added. Facilities range from temporary quarters in dilapidated housing to large complexes of modern structures. Classroom facilities and library holdings range from makeshift to well organized. The STI staff in Bhopal, for example, were eager to take the evaluation team to a mountain top overlooking the city and the lake where a large modern campus is to be constructed.

2.5.1 Relationship to irrigation Departments. Although most of the STIs have been established and registered through government law as autonomous entities, the Irrigation Departments of the respective state governments continue to serve as both patron and client of the STIs. Most STI staff members and 80-85 percent of the trainees come from the Irrigation Department. Although the STIs may be autonomous in the sense of being responsible for their own day-to-day activities, they are strongly influenced by the Irrigation Departments.

The STI functions as both a continuing professional education and practical training institution. State irrigation authorities and officers are provided conferences and seminars in which current matters and concerns are studied. Most STI activities, however, are centered around the training of various levels and categories of engineering cadre in the Irrigation Departments. It might be desirable to have the universities assume more responsibility, but the universities, for the most part, do not seem to be involved in the continuing education needs of the Irrigation Departments. This, in part, may account for the lack of interaction between the universities and the STIs.

2.5.2 Selection of STI Trainees. The procedures used for the recruitment and selection of Irrigation Department (ID) personnel to attend a training course or workshop, or their assignment to the faculty of an STI, do not appear to be based strategic plans for personnel or human resource development related to the ID's role in irrigation system management.

General decisions about the courses, and types and numbers of trainees are reached at an annual meeting of STI staff and officials of various government departments. Several STI staff seconded from the Irrigation Department told the evaluation team that when an irrigation official was asked to identify staff members to send to the STI for training, he will usually select from his office staff without using specific criteria. Several STI staff members indicated that training participants from the Irrigation Department were often absent or tardy, and that the STI staff had no authority or control over the situation.

The evaluation team had very limited time to explore these issues. However, the team did hear from several sources in one STI that for the most part the persons being trained were
not those who needed it the most. Desk officers rather than field-based junior or sub-
engineers were the primary beneficiaries. In another STI, many of those being trained
were not subsequently assigned to tasks where they could employ their new skills. This
situation may be due in part to the lack of strategic personnel or human resource
development planning by the IDs and the STIs.

STI staff could assist state organizations to carry out strategic personnel planning, including
role or job analyses based on the performance and task requirements of each job. Assuming improved irrigation system performance is a principal ID mission, an irrigation
system analysis needs to precede job analyses in order to pinpoint those roles which need
most attention if the more serious weaknesses in main system performance are to be
overcome. Training would then be focused on strengthening the most critical or top
priority roles or jobs defined on the basis of total system performance. Having established
the performance requirements for each job, it would then be possible to measure the extent
to which the current staff possesses the requisite knowledge and skills for doing the job
effectively. The result of this would be an identification of the learning needs of staff
assigned to perform various jobs. STI faculty and administrators need to identify
specifically targeted learning groups, that is, persons who as a group have similar learning
needs and abilities.

Irrigation Department policies promote training aimed at helping its personnel increase
their levels of awareness and understanding of irrigation management technology and issues
in a general way. The present general training does help staff members to move from one
position to another as personnel shifts and rotations occur. Too little attention is given to
determining what specific content areas could help personnel perform specific roles and
assignments better. The question of generalization versus specialization (including whether
this apparent dichotomy is even necessary) continues to be troublesome.

2.5.3 Masters Degree Option. One STI provides an opportunity for irrigation personnel
to receive university credit toward a masters degree when they undertake a year-long
training course. After completing this course, trainees have to spend two months at the
university in order to be awarded the degree. It is not at all clear that the STI should
endeavor to undertake such responsibility given the possible distraction from its major
function. Obviously both pluses and minuses are involved. It is easy to appreciate the
incentive value for irrigation personnel of earning credits toward a degree. However,
potential duplication of effort and resulting competition between the STI and the
universities may occur under these circumstances.

2.5.4 STI Campus Farm. One STI has its own farm on the campus. This seems to
be quite an expensive operation, one requiring considerable attention to logistics and
management. It is probably unwise for the STI to expend the time, expense, and energy
to run this farm, given that the institute is surrounded with farms on which it could
perform training demonstrations.

2.5.5 Focus on Tertiary Systems. As previously stated, the program at some STIs does
not seem to include sufficient emphasis and training on main system management problems
and issues. The predominant focus is generally on tertiary systems. This is perhaps
understandable, since during discussions, the evaluation team found that some STI staff were not aware that a reliable flow of water to the outlet should be achieved before farmers are mobilized and organized to develop on-farm systems. Hence they would be unlikely to see a need to place greater emphasis on main system aspects of operation.

2.5.6 Computer Training Program. One STI has made a large investment in the development of a computer training program. Eighteen computers are already available and ten more are soon to arrive. An appreciable effort has been made already to develop and or to adapt software for processing of information on irrigation matters. The stated intention is to train irrigation officers in the use of computers in an irrigation management information system. The discussion focused on the need for a management information system model, and resulted in a recognition that the development and testing of such a model could perhaps be carried out within a nearby Command Area Development Authority, and that the perfecting of such a model would help put the computer training effort on a sound footing.

2.6 STI Faculty

The evaluation team interviewed a large number of STI faculty, individually and in departmental clusters. They are predominantly young or middle-aged. There are very few senior faculty. They range from the enthusiastic to the disenchanted, and from those with considerable practical experience to those with none. Their perspectives on the educational process cover a broad range.

The evaluation team could not identify definite and clear criteria and procedures for selecting and assigning STI faculty. In some cases it appeared that the faculty member volunteered, whereas in others the faculty member seems to have been conscripted against his will. The evaluation team met only one female faculty member. Various persons interviewed expressed concern about the problems that arise when faculty members are seconded from the Irrigation Department for a temporary three to five year term. This sometimes resulted in faculty members with little sense of accountability to the STI; they realized that their primary base was in the Irrigation Department. Others said that sometimes it was difficult to create strong cohesion among various faculty members who were there for different purposes and tenure, and with different intentions.

Another weakness in the make up of the overall faculty was the virtual absence of social scientists, although there were indications that attention was being given to this matter. The evaluation team was told that there were a limited number of experienced of social scientists available. The same phenomenon has been observed elsewhere in India and in other countries. The shortage of social scientists able and willing to work at agricultural universities or in other assignments related to agricultural and rural development is a serious problem in programs requiring improvement in the interface between government and rural populations. For these reasons, it will probably be difficult to achieve multi- or interdisciplinary interactions among the faculty.

Responses from the faculty about their satisfaction with their assigned location and work ranged from, "I like it and it is good for my family" to "I do not intend to stay here much
"longer" and from "I like teaching and feel that I have some natural inclination in this area" to "I am bored because I am required to teach things which are too fundamental and I'm not provided an opportunity to develop content related to real needs." A number of faculty members expressed strong concern about their opportunity for promotion from assistant to associate or from associate to full professor. Some had served in the assistant professor rank for six or seven years and had received no assurance that they could be promoted. Existing policy and a quota system restrict the opportunity for promotion regardless of merit based on performance. A number of faculty members indicated that they would be leaving because of this.

### 2.7 Curriculum Development

The evaluation team spent a considerable amount of time reviewing curriculum and course materials that had been prepared by STI faculty. Typically an extensive collection of lecture papers, course notes, lesson plans and bibliographies were presented to the team in bound form. The difficulty and expense of binding these papers were obvious. A high percentage of the material in each case was borrowed from various texts, the lectures of various experts, and outlines and illustrations encountered in previous training-of-trainer workshops. The material did not appear to be adequately adapted to local realities as might be expected if field studies or fieldwork were incorporated.

The current emphasis is on doing things on a large scale (at all STIs), and subsequently trying to achieve more efficiency and effectiveness in individual programs. It is possible to be efficient (achieving a better input-output ratio) and yet not be effective. And one can be effective (making happen what you want to have happen) and yet be totally irrelevant. There is a need to reverse the process by emphasizing relevance first, then effectiveness, then efficiency, and then, having developed some confidence in doing the right thing and doing it well, to implement it on a larger scale so that it will benefit all those for whom it is relevant. State organizations, STIs, and universities need to pursue this kind of reasoning and action if they are to design and deliver a quality product or service to their clients.

#### 2.7.1 Determining Course Content and Formats

The STIs do not have systematic procedures for determining the content of the curriculum and related courses. The leaders of the various state agencies meet annually and make recommendations to the STI personnel about the coming year's teaching program. It was not clear to the evaluation team whether the STI makes recommendations for certain courses and department leaders approve the recommendations, or whether the department leaders themselves recommend the specific courses needed. Neither approach suggests that the results from a systematic analysis of training needs was used.

The number of courses an STI should offer, and the duration of these courses are controversial issues. One STI stressed its long-term courses and in comparison neglected short-term courses or mini-workshops. Staff at another STI were rather adamant about offering only three-week courses, the general reasoning being that it was not desirable to keep personnel away from their jobs for more than that length of time. Yet there are certain learning requirements (e.g., the development of an overall understanding of a total irrigation system) which would seem to call for an emersion in intensive saturation courses.
of a longer-term nature. The evaluation team could not detect much interest in identifying the most appropriate balance among the different approaches.

In general, it appears that the curriculum and the courses offered at the STIs are standardized and persist from year to year with little modification and adaptation to localized conditions. The faculty themselves repeatedly offer the same courses. It was not clear to the evaluation team just how adequate the curriculum/courses were in relation to the real needs. The courses commonly provide material to cover every possible contingency, rather than a more targeted approach, aimed at providing specific material to meet the specific needs of specific learning groups.

The first step in course content selection is a training needs assessment. An ideal method for conducting such a training needs assessment is to establish a panel of judges or experts for each role or job to be studied. This panel should be comprised of persons who have in the past demonstrated great knowledge and skill in performing this role or job. A careful detailed analysis by the panels of the knowledge- and skill-based competencies needed to perform specific jobs would establish a foundation for the training curriculum. This "key informant" approach contrasts with the current training needs assessment approach which makes use of an opinion survey of persons now performing various jobs and the supervisors of those persons. Since many currently perform at less than the desired levels of knowledge and skill, the information derived from this survey is not likely to be of much use in identifying the knowledge and skills needed by an individual to perform a specific role at an optimum level of performance. The contractor's staff need to rethink their approach to training needs assessment, and design and field-test strategies and methods which can be both effective and easily administered by STI staff.

In an effort to create more problem-focused training experiences, the contractor should conduct workshops which call together into one learning group persons who perform various levels and types of roles within that system. Ideally, such persons would not know each other personally, as they would be selected from different geographic zones. The groups would be seen as "diagonal" analysis teams, because they would include representatives from the system's hierarchical levels on a non-aquaintedness basis. This would facilitate openness and honesty during their interactions. These diagonal analysis teams should conduct a systems analysis to identify problems and explore ways of overcoming them. Often within a large system there are problems which concern inter-role relationships. Such problems impede the effective functioning of the system.

The contractor should also encourage and facilitate more sharing of curriculum development experiences and products among the STIs. This could result in a more objective self-evaluation of each institution's efforts and results.

2.7.2 Too Academic and Diffuse. The evaluation team was specifically asked to address the question of whether the curriculum was too academic and diffuse. With this in mind the team endeavored to find out what different people meant by "too academic" and what their expectations were in terms of focusing or targeting the training activities.
It was interesting to note that most people had difficulty articulating their thoughts on these two issues, and there was considerable diversity in their responses. This highlights the current confusion in determining what are the right course packages for the STIs and what are the right methodologies for presenting them. The classic answer given to the question about whether or not an individual course was too academic was that it had "too much theoretical detail." Some respondents added that the course had "irrelevant detail." More insightful answers suggested that some courses themselves may not be very relevant in terms of improving irrigation performance in other than very marginal and abstract ways.

Throughout the assessment, the evaluation team encountered references to training being too classroom-bound, and academic or theory-oriented, with insufficient emphasis or attention given to field-based practical training. In one STI the team observed some division between the faculty who worked in the classroom and the field staff assigned to help carry out practical activities. In another case, faculty reported dissatisfaction with the lack of administrative support and encouragement for faculty fieldwork, adequate teaching materials, etc. Several faculty members stated that they could not obtain transportation to go to the field.

2.7.3 Transfer of Foreign Courses. Gradual progress has been made during the past two years in transferring courses from the United States to India. Foreign consultants have been brought to India for short periods to facilitate this effort. Much more needs to be done in this respect during the next two years.

Expatriate consultants should be encouraged to pursue a three step approach when assisting in curriculum development or teaching methods. The consultant should conduct a problem, need, or situational analysis that supplements information provided by the project. Second, the consultant should take sufficient time to prepare and deliver relevant inputs. And, third, at an appropriate later date, the consultant should conduct follow-up assessments and carry out any follow-on action found to be necessary. Ideally such work would be carried out in partnership with Indian counterparts, the general reason being to try to institutionalize the capability to continue such work after the departure of the consultant.

U.S. professors who have conducted courses deemed to be successful by Indian administrators and training participants should be invited to co-teach those courses on a one-time-basis in India with appropriately chosen Indian colleagues. The three-fold purpose of this arrangement would be to assure that the subject matter content was grounded in India’s realities, to help the Indian counterpart increase his confidence and competence, and to establish an enduring collegial relationship between two professionals for each course.

2.7.4 Evaluation and Monitoring. It is imperative that the contractor help the STIs to develop mechanisms for self-directing, self-correcting programming. Each STI faculty members should be thoroughly trained in how to monitor and evaluate the process, effects, and impact of curriculum development and teaching. Only in this way will it be possible to achieve desired improvements in the quality of both.

There does not seem to be much emphasis on conducting a formal evaluation of courses other than to seek participant feedback upon the completion of a course. This feedback
was generally in the form of an assessment of trainee satisfaction with course content and teaching methods. In a few cases, trainees were asked to provide suggestions about how to improve the courses. Some of the more frequent suggestions are for a more practical orientation, distribution of lecture notes in advance, the use of video-tapes, lectures on farm structures, more field visits, more lectures by experienced people, and more practical demonstrations. In addition it was frequently suggested that participants should be selected from the ranks of officers actually serving in the field. It is worth noting that there is little feedback or suggestions concerning the greater involvement of trainees in participatory methods. People are not likely to envision or appreciate what they have not experienced.

Not enough time has been given to the development of procedures for evaluating the quality of the curriculum. STIs should develop flexible learning kits rather than textbooks, which can become outdated rather quickly. Information and teaching methods are constantly changing. Rather than invest time and expense in preparing bound standardized course material, instructors should be encouraged to use well organized notebooks or binders which allow them to extract old outdated material and insert new updated material as time and circumstance dictate or allow. Instructors should also be encouraged not to teach by the book all the time but rather to try to tailor their teaching to the needs and readiness of their students.

STI instructors should be helped to realize the importance of conducting follow-up field analyses to assess the nature and extent to which what was taught is being successfully used by training participants. Only in this way will instructors understand how to adjust course content and teaching methods to make them more relevant and effective. STI directors need to provide encouragement, incentives, and transportation for staff follow-up in the field on the results of their teaching.

The WRM&T Project has been designed as a process activity. Constant monitoring and feedback is required to learn from project activities and make appropriate modifications in content and methods. The STIs need assistance in establishing monitoring and evaluation mechanisms to guide project implementation. The contractor should encourage the STIs and Irrigation Departments to use outside monitoring and review groups to evaluate specific project activities. Such groups could be made up of recognized experts from within India. Foreign expert assistance could be brought in to help set up an overall monitoring and evaluation strategy for the STIs, to conduct workshops on evaluation methods (in collaboration with Indian experts), and to conduct a follow-up assessment of the results.

2.8 Teaching

Several opportunities were provided to the evaluation team to observe classroom teaching in progress. Additionally, separate interviews with individual faculty members revealed useful information about philosophies of education and teaching methods. The team observed a tendency to utilize teaching strategies and methods of a rather regimented and pedantic nature. In a few instances extremely poor teaching methods were observed which resulted in wasted time and energy of students. Time should be spent more productively, for example in discussing the meaning and application of the material, rather than in routine copying of material from or onto chalkboards or overheads.
In light of the fact that many or most of the training participants are not only expected to use what they learn, but also to teach others, trainees should be given the opportunity to practice teaching others what they have learned by simulating teaching situations or conducting classroom exercises in which trainees teach each other. Several times, the evaluation team heard comments about the necessity and desirability of preparing materials in the local language so trainees could use them subsequently for teaching farmers. There was evidence that this had been done in some cases. Much more of this will need to be done in the future.

2.8.1 Knowledge of Teaching Techniques. In interviews with individual faculty, the evaluation team tried to assess how much faculty members knew about various teaching techniques and what techniques they used. The team found that a rather limited range of techniques and methods are being employed. These seem to be limited to the use of various audio-visual aids (transparencies, slides, films) with some emphasis on taking trainees to the field for practical demonstrations or for on-site analysis followed by subsequent report back sessions in the classroom. One instructor pointed out that he tried to use humor from time to time to make the teaching more lively and interesting. One conclusion drawn from the interviews of faculty members who had been sent abroad in the training-of-trainers program was that upon returning to India they had incorporated much of the technical content learned into their current teaching but had not made use of their exposure to participatory teaching-learning methods. Perhaps there is need for some concern about the extent to which training-of-trainers participants should be allowed more practice and opportunity to develop confidence in their ability to use participatory methods.

The current emphasis on rote memorization, pedantic or directive teaching, and textbooks as ultimate authorities represents a limited understanding of what is required to promote human learning. Irrigation and agricultural cadre need to be encouraged to think, to develop an ability to assess a problem situation thoroughly and correctly, and to formulate a proper solution. These individuals cannot develop this type of critical and creative thinking by sitting through lectures in a classroom setting. The performance of the irrigation system will not be substantially improved until personnel are able to go beyond the use of standardized messages and mechanistic responses and learn how to employ effective problem identification and analysis techniques to meet the requirements of a particular situation.

STI staff need to be encouraged to respect the trainee as an adult who has had considerable experience in life and who has an ego or self-concept which must be acknowledged and allowed to come into play if effective learning is to occur. The time and energy of participants is as valuable a commodity as the knowledge and expertise of the trainer. Although learning can occur without teaching, there can be no teaching without learning (although there can be talking without learning). More attention should also be given to creating educational environments which are conducive to the desired learning. This will entail more group analysis and discussion of real life problems.

There is a need for more emphasis on learner-centered education and training in the STIs. Training participants need to learn the art of synthesis and integration. Trainers need to
be encouraged to move away from chalk-and-talk methods of lectures and laboratory or even field demonstrations where trainees are lectured but not allowed to participate. "As you are taught, so shall you teach" -- a self-perpetuating didactic paradigm.

Several ways to examine learning should be employed by the STI:

- learning about irrigation (in the context of effectively functioning irrigation systems),
- learning how to learn about irrigation (in the context of cognitive and personal development),
- learning about learning how to learn about irrigation (in the context of curriculum development).

There is a great need to promote educational procedures that emphasize:

- the identification of learner interests, needs, and potential;
- the development of the knowledge-skill-attitude-based competencies needed for effective job performance;
- the development of curriculum and courses which specify the behavioral objectives which learners may want to pursue (depending on the degree to which they lack or want to learn what is implied); and
- the use of a psychology of adult learning which recognizes the importance of the learner's own past experience and current self-concept.

Better and more effective teaching behavior needs to be promoted. The contractor needs to provide STI and university faculties assistance that will enable them to become more competent and confident about using better teaching methods. These faculty members need to be helped to move beyond an over-reliance upon audio-visual aids and learn methods that promote more participatory forms of learning. They need to be helped to realize that they are responsible for promoting a lateral transfer of knowledge and insight among experienced training participants and that this is at least as important as providing inputs themselves through lectures. A relevant and timely question posed by an instructor to learners can promote as much or more good thinking and meaningful analysis as a lecture.

STI and university faculties should be provided assistance in learning how to correct ineffective educational practices or instructional styles. Video technology could be used in micro-teaching seminars, especially for new instructors. This approach facilitates a self-diagnosis and evaluation of teaching performance and generally leads to subsequent improvements in teaching behavior. This technology and method have already been proven effective elsewhere. The contractor should arrange such micro-teaching seminars and bring in experts to conduct them.
More team concepts in training should be employed. Within current courses, participants should be organized into smaller groups or teams of five to six each to carry out a field assignment. The teams would conduct an analysis of the field situation, carry out a team approach to the preparation and presentation of their findings, and seek feedback from the other groups or members of the class. Group methods of this nature have received insufficient attention thus far.

Much of the training provided by STIs for state Irrigation Department personnel does not emphasize helping training participants to learn how to teach others. Achieving a multiplier effect through "echo training" will be possible only if STI trainees are provided with ample opportunities to develop skill and confidence in their ability to help their field subordinates learn how to solve problems or perform certain tasks well.

The STIs should each select an individual to function as an educational technologist-methodologist in charge of improving the teaching abilities of the teaching faculty. The STIs and universities participating in the project should identify one professor of extension and adult education who has shown interest in irrigation or agricultural development to be trained for the new position. This person should go through four to six months of intensive professional training, either in India or the United States. This amount of time would be necessary to give the person a sound educational philosophy and an adequate knowledge of methods and the strategies and techniques for helping others become effective educators. A program of this length would give training participants an opportunity to design and practice sound pedagogy and develop sufficient confidence in their ability to use it and teach it.

These new specialists should be encouraged and assisted to form an active network of professional trainers.

2.8.2 Participatory and Hands-On Training. Participatory, hands-on methods help training to stay practical and are powerful adult teaching techniques. Hence, the evaluation team reviewed STI programs in terms of the extent and effectiveness of their use of these methods.

The full meaning of the concepts behind participatory, hands-on training and skills for applying them are only partially understood. For example, in a course on water measuring, the students learn about a number of flow-measuring devices and techniques such as flow meters and flumes. The lowest level of what might be called hands-on training would be to have samples of the devices for the participants to handle and perhaps a video of the devices being installed and/or used in the field. This could be fortified by letting the participants actually use the devices in a laboratory setting; or better yet going to an actual field site and setting them up and/or using them. However, the most meaningful hands-on exercise would be to put flow measuring in a real context, and have the participants calibrate the water losses and flow distribution along a minor canal for example. In addition to gaining some experience by installing and using the devices, they would also obtain hands-on experience related to the purpose and utility of flow measurement in irrigation water management.
Another example concerns participatory methods. Figure 4, as a schematic depiction of an irrigated agricultural scheme, contains considerable direct information and a great deal of symbolism. A lecture on the information presented in the figure would be sure to put participants to sleep, for by looking at the figure carefully they could quickly conceptualize the information. However, a more thought-provoking, guided participatory approach in presenting the figure would promote greater interest and learning. The facilitator (or lecturer) might ask questions about the meaning of the three-sided inner box which is open at the watershed end; the three domains; the shaded areas; the system and irrigated area being shaped like an arrow; the irrigated farms being in the head; the bar-like graphs in which inflow and outflow are written; the outflow graph being less irregular; the rain cloud; and the input list being outside of the box surrounding the scheme while the effects list overlays the boundary. Having the participants discuss the various meanings in groups is also effective. Or each participant could be asked to list two or three questions or issues which readily come to mind as he studies the figure. Then all the participants could be asked to share their lists and explain why they feel the items to be important. The instructor could then fill in any obvious gaps.

2.9 Institutional Exchanges and Interactions

Not all STIs are the same. They have developed at different rates and to a certain degree in different directions. There are advantages to this if each STI has been developing programs that respond directly to local realities and conditions, and if the directors or leaders of different STI are encouraged to get together and exchange notes and viewpoints about their experiences. Much could be gained from such exchanges. By exposure to how a particular need has been met by another STI, institutes could envision a proper response for their own geographic area. So far this type of lateral transfer has probably been inadequately promoted.

Another way to promote exchange is to recognize that each separate STI may have or could be encouraged to develop strength in a particular area. The project could provide supportive resources to that STI to help it along. Each STI then could become a center of excellence from which all the other STIs could learn.

The resources of time and human energy are scarce and must be used wisely. An effort should therefore be made to identify problems and institutions where breakthroughs might be more readily achieved and passed on as valuable lessons to the other institutions. Carrying this out requires attention to networking and exchanges. In a sense, the contractor needs to promote a "centers-of-excellence" concept so that the strengths of a particular institution are emphasized and built upon in order to improve the art and science of research, fieldwork, and training.

An additional strategy would be to select two STIs to work as a whole, that is, to help upgrade the overall relevance and quality of the institution by improving management and education. Such a model-building strategy could result in helping other STIs to see the direction in which they should go without having to reinvent the wheel.
Figure 4. Three Domains and the Inputs, Outputs and Effects of an Irrigation Scheme
2.9.1 Interaction between the Irrigation and Agriculture Departments and Farmer Groups. Although top-level officials get together when decisions are made regarding the allocation of state resources, there does not seem to be a driving force to bring local irrigation or agriculture personnel together with farming communities. Currently the Agriculture Department in some states is adding a subject matter specialist position for irrigation at the Taluka (subdivision) level to complement the existing subject matter specialists for agronomy and training. This opens up an excellent opportunity for studying how to coordinate agronomic and irrigation information pertinent to the needs of local water-user associations.

Currently, the activities of extension personnel at the farm level in irrigated agriculture are limited by the rigid schedule of training for extension agents and the short duration of their visits to villages in their area of responsibility. Water-user associations have need for advice and consultation which differ greatly from that which village extension workers are able to provide. These workers have been trained to serve as deliverers of messages, about fertilizer and pesticide applications. They generally lack the capability to interact with farmers about conflicts arising over water allocation procedures, questions about crop rotations or patterns based on plant seasonal water requirements, etc. This suggests the need for farmer training provided by appropriate subject matter specialists. Obviously not all farmers in a sub-division can be trained by one subject matter specialist. Therefore a serious re-thinking of how to organize and carry out farmer training is necessary. Farmer training could and perhaps should be conducted at the many Farmer Training Centers found in each state. STIs could provide training for Farmer Training Center trainers to enable them to carry out the farmer training.

2.9.2 STI and State Agency Interaction. Existing links among STIs and state organizations are not sufficiently broad and substantive. The main links presently consist of the annual meeting of STI staff with state organization leaders to determine the schedule of courses for the year, and the less formal contacts required to recruit trainees and faculty. Stronger functional links are needed between the two, especially in regard to program planning, training needs assessment, and evaluation. A state level planning workshop for officers from Irrigation and Agricultural Departments in each state who are responsible for program and/or staff development, and officers from STI who are responsible for determining the content and scheduling of training courses might be designed and convened to facilitate program planning.

Ideally, the thrust of the initial workshop would be formative: participants would review, clarify, and strengthen the definition and procedures for systematic problem and need analysis, training needs assessment, and program planning. Action plans for carrying out these analyses, assessments, and subsequent planning activities could be drawn up for review, critique, and refinement. The idea would be for the participants from the Irrigation and Agriculture Departments and from the STIs to work as state-based teams to develop and implement action plans.

2.9.3 STI and University Interaction. The evaluation team found little organized interaction between the STIs and the four universities, two agricultural and two engineering
that are specifically associated with the WRM&T Project (except in the case of WALATARI and A. P. Agricultural University in Hyderabad). What little interaction there was seemed to be based on already existing personal relationships. While any interaction is better than none, these ad hoc relationships fall far short of project expectations.

The faculty, however, did not seem to have many ideas about how this type of interaction or partnership could be organized or carried out. In Maharashtra, some suggestion was made about appointing an MPAU faculty member to serve as a liaison with the STI. Unless there is purpose and tangible incentive for both parties, little interaction can be expected. Because of the geographic distribution of the four universities, the direct linkage between a particular university and STI is not very straightforward. In the present administrative set-up, there are no clear incentives for individuals to interact with others outside their institution (except as noted in section 2.9.2). Furthermore, there are no administrative procedures and guidelines established for encouraging interaction between STIs and universities in either training- or research-related activities. The team can visualize a number of possibilities for meaningful interaction, such as having the universities participate in action research activities; having the universities develop basic academic materials supportive of the practical course work at the STIs; and promoting the interchange of faculty, students, and training participants through field visits and certain laboratory exercises, to name a few.

2.10 University Research and Teaching

Two universities were visited, Anna University in Madras, and Mahatma Phule Agriculture University (MPAU) in Rahuri. In each case, the evaluation team was able to make a limited assessment of the current program through discussions with the vice-chancellor, other key administrators, faculty in the irrigation and water management program, and graduate students. One major observation at MPAU/Rahuri was that the multidisciplinary program encompasses far too many courses. Previously it included as many as 30 courses, but that has been reduced to approximately 16. This may still be too many because such a wide range of courses may sometimes indicate a lack of focus, direction, and priority. On the other hand, the wide range of courses indicates a strong interest in the program by faculty from several departments. However, the evaluation team was not able to evaluate this aspect.

The university should be concerned that the value of a multidisciplinary degree program be appreciated, especially in the Irrigation Department. Discussions with students uncovered strong concerns about future employment prospects. The Irrigation Department has not been inclined to hire university graduates who have mixed or interdisciplinary degrees.

A major problem of such a broad program is the heavy teaching load placed on the faculty. Many faculty members expressed a desire to do more research but stated that they were unable to do so because of their heavy teaching requirements. Another possible effect is a decline in the quality of teaching which can occur when a teacher must cover too many subjects.
The current priority between teaching and research at some universities should be evaluated. The current emphasis on curriculum and teaching a large number of courses is misplaced and seems to have prevented faculty from undertaking important research. At this time, more emphasis should be given to the development of a strong knowledge base through faculty research to strengthen irrigation science and practice. The development of a graduate curriculum should be a secondary or deferred concern. At present the opposite situation seems to prevail, further hindering efforts to adapt the curriculum to Indian conditions and practices.

Neither the Government of India nor USAID has emphasized university irrigation research programs enough nor provided them with adequate monetary support. The Government of India (through the Command Area Development Authority, the Central Water Commission, and the Irrigation Research Management and Improvement Cell) and USAID need to provide funds for university research on irrigation questions and issues.

The research program will strengthen the knowledge base to support the teaching and extension training activities of the universities so that these institutions can prepare future leaders and to provide useful inputs into the existing irrigation programs. University faculty should be encouraged to streamline the curriculum for irrigation and water management in order to focus more energy on improving the relevance and quality of what is taught. Faculty teaching loads should be reduced allowing more time to carry out useful research activities.

2.11 Training of Trainers

The evaluation team interviewed faculty at both the universities and the STIs who had participated in the training-of-trainers program in the United States. Before coming to India, the team had the opportunity to interview 29 trainers participating in the program at Colorado State University in Fort Collins, Colorado. The U.S. interviews revealed that trainees were worried that they would not be able to implement what they were learning upon returning to India. Some said that it would be difficult because they would be working under supervisors who would be uninformed and therefore probably non-sympathetic. This point suggests that the goals of the training-of-trainers program were not adequately discussed with supervisors prior to the departure of trainees for earlier training programs, and that as a result, supervisors failed to understand or support the program’s objectives. However, participants seemed to be excited about and actively engaged in the training program.

Later interviews in India yielded mixed responses, suggesting satisfaction with some aspects of what was learned but dissatisfaction with others. Specifically, participants had incorporated the content of various subject areas into their teaching but did not seem to be utilizing the teaching methods to which they had been exposed in the United States. (Two groups of participants did not receive any training in methodology at all.) Some participants expressed reservations about the usefulness of being exposed to technologies in the United States which they felt to be inappropriate for India. Others expressed some concern about the possibility of not having an opportunity to continue in a position wherein
they would be able to make use of their new knowledge, or that it was likely that they would be in that position for only a short period of time after returning from the training.

Participants also suggested that there was a need for them to receive better preparation before coming to the United States. A major request was for more literature on topics which were to be treated in the USA so that they could do some preparatory reading. Concern was also expressed about the need to have U.S. instructors with more knowledge about India's conditions and needs.

The U.S. portion of the training-of-trainers program is nearing completion. This evaluation has revealed that the program is concerned primarily with the content of technical subjects to the near exclusion of teaching methodology. The use of Indian pedagogists to conduct training on teaching methods was not successful because of the rather narrow emphasis on audio-visual presentation techniques. The time seems to have come to place more emphasis on developing an in-country training-of-trainers program.

2.12 Contractor Perspective

The contractor sees its function as principally to assist in carrying out specific assigned or requested activities and to initiate new ones (e.g. the curriculum development workshops). But it does not seem to have a clear vision of its role as a facilitator of strategic planning, reorientation and/or significant change. Thus, while the contractor may from time to time make a suggestion (e.g., more attention should be placed on the main system), it becomes frustrated when the suggestion is not acted upon, perhaps expecting USAID to intervene. This attitude was revealed to the evaluation team during interviews with the contractor's managers and staff.

The contractor should develop more cohesive and strategically focused inputs for the WRM&T Project, rather than the current approach of only responding to individual requests for assistance as they come in from the field. The aim should be to bring about a more systematic analysis of needs and the potential for resolving those needs at the state level. One step in this direction would be to include the contractor at State Technical Committee meetings so as to be better informed of the rational and decisions which are apt to affect subsequent work. A second step would be to continue to provide a reasonable amount of technical inputs required, as requested by the STIs so as to maintain rapport with them, but gradually increase the capability of state organizations and STIs to prepare state implementation plans that specify the needs to be met, the inputs required, and a realistic schedule for providing them.

The team recognizes, however, the yeomen efforts that the contractor has made in its desire to perform. It has organized its office in an efficient and effective way, its administrative procedures seem to be excellent and the staff pleasant and productive. These are commendable achievements.
Chapter 3

ACTION PLANNING

The recommendations of this evaluation (Chapter 4) focus on opportunities to improve WRM&T project performance. The specific steps and activities which are needed to refine and implement these recommendations should be identified through a systematic planning process. The comments which follow are intended to guide and promote such a planning process whose result would be an action program. The planning process consists of several steps including:

(i) selecting the right course packages;
(ii) identifying the right people to be trained; and
(iii) identifying and selecting the right training methodologies.

3.1 Strategic Planning

One goal of strategic planning for training is to select the right course packages and train the right people. Managers of the Irrigation and Agriculture Departments should work with the STIs to plan training programs which address specific work activities related to more direct improvements in irrigation system (scheme) performance. This collaborative process will involve the following four stages or steps:

- Decide what weaknesses in system management can be improved through training. (This requires a basic understanding of current problems with system operations, and the required knowledge/skills and how they can be employed within the existing irrigation context to improve performance.)

- Determine who is to be trained and what knowledge/skills they need. (This involves taking into account the organizational structure of the concerned organizations.)

- Conduct a training needs assessment to determine the gaps between role performance requirements and the knowledge/skills of the individuals performing these roles.

- Translate these gaps into specific learning objectives and courses.

The current practice of course selection and scheduling could be improved by the addition of strategic training planning. The general notion that irrigation performance will be improved by teaching irrigation and agriculture officers about on-farm water management was a useful basis for program development during the early start-up period for the STIs and this project. Now is the time to focus on all the complex factors that affect irrigation system performance and relate these to the formulation of training programs.
Strategic training planning requires the participation of all the key institutions, which in turn requires a more intensive consultative relationship between the contractor and all the other parties involved, especially the managers of the Irrigation Departments. Considerably more dialogue will be required than has heretofore taken place.

The contractor should make a new and concerted effort to promote, assist, and guide a strategic training planning process at each STI. The annual STI work plans should be developed as a joint effort of the managers of the Irrigation and Agriculture Departments, selected universities, STIs and the finance/planning agency in each state. To be effective, strategic training planning requires support and encouragement from the highest administrative levels of the agencies involved. The evaluation team recommends establishing a Strategic Training Planning Advisory Committee (STPAC) as a standing working committee under the guidance and control of each State Technical Council as an early step toward facilitating more meaningful interchange.

The initial strategic planning team, including the contractor, will need to meet with the top management of each Irrigation Department to explain and convince them of the value of and the need for strategic planning and to gain their confidence. These meetings should be carried out with the guidance of the Joint Project Management Committee. This will be a difficult task, requiring not only considerable time but also a great deal of expertise. Some of the expertise needed can only be gained from experience. Therefore, the team recommends concentrating on two states at first, Maharashtra and Madhya Pradesh. In both states USAID has large on-going irrigation portfolios with research components. Consequently USAID already has project officers in these states who have developed rapport and dialogue with the concerned agencies.

The evaluation team recommends that the Strategic Training Planning Advisory Committee consist of high level managers as well as technical experts appointed by the secretaries of the Irrigation and Agriculture Departments and the vice chancellors of the collaborating universities. In addition, at least two appropriate professionals from the contractor's team should be included. The committee should be chaired by a member of the State Technical Council or his appointed representative. The job of the committee will be to oversee the strategic planning activities on behalf of the State Technical Council and serve as an advisory board in developing the annual work plans and related implementation programs. At least at the beginning, the contractor, in collaboration with the STIs, the universities, and the Irrigation and Agriculture Departments, would be responsible for developing the actual preliminary strategic plans for review and approval by the Strategic Planning Advisory Committee. However, the program should be set up so that eventually the STI could take the leadership role as soon as possible in developing the preliminary action plans as well as the annual work plans.

As mentioned above, the expertise for carrying out comprehensive strategic planning is limited. Experts are needed who have sufficient understanding of the untapped irrigation knowledge/skills and how they might be pragmatically employed within the Indian context to improve irrigation performance. In addition special skills are required for carrying out efficient and effective training needs assessments. We realize these two areas of expertise are not currently covered by the contractor's team, although they should have been.
However, since the contractor is in the process of reconstituting its team, now is an opportune time to employ a professional who has the expertise in irrigation engineering and training as noted specifically above, for it is most important to have an individual with this skill available on a full time basis. Furthermore, it is the irrigation expert who will probably need to take primary responsibility for meeting with Irrigation Department management. The expertise for carrying out the other functions necessary for strategic planning can be more easily transferred and/or acquired through short-term consultancies which involve the same individuals for repeated visits over a long period of time.

3.2 Action Program and Action Training

The identification, design, testing, and promotion of alternative means for improving irrigation and water management is an integral part of the project. Such activities could be appropriately labeled action program and action training, and should encompass the following phases:

1. Preliminary surveys or field studies to determine the nature and scope of weaknesses or deficiencies in the system and the identification of those which are critical to system performance. These assessments should be seen as pre-program efforts to determine the priority of studies.

2. The design of potential solutions or responses to the problems which have been studied with a strong emphasis on the involvement of all concerned parties. This participatory approach is essential to worthwhile action research.

3. The observation, measurement, and evaluation of the impact of interventions on resolving the problem or issue under study and the adaptations needed to achieve a satisfactory result.

4. The design and implementation of demonstrations and extension training activities (i.e., action training) to help others benefit from the lessons learned through the action research.

The State Technical Council in each state should establish an Action Program and Action Training Committee responsible for overseeing this dimension of the overall program. This committee should comprise the monitoring and evaluation officers from the Irrigation Department, the STI program development officer, university researchers, and others as deemed appropriate. This committee would have to be an energetic and mobile working committee to be effective. It should be able to identify system bottlenecks and develop means to overcome them. The contractor needs to focus its attention on the establishment of this larger umbrella or framework for carrying out action program and action training.

3.3 Educational Methods

The development and strengthening of abilities to teach requires a focus on human behavior—understanding it and what can or must be done in order to change it. This is a full-time job. Each STI should create an educational methodologist position to help all
faculty members at the STI improve their teaching effectiveness. Also each STI should set up an Educational Methods Improvement Committee and provide it with the wherewithal to orchestrate teacher training activities for the STI faculty. The contractor should encourage the STIs (and universities) to select the educational methodologists at the earliest time possible and make arrangements for a four-month intensive training program for them in the United States. The training should include emphases on the theory and practice of learner-centered pedagogy, monitoring and evaluation of educational inputs, process, effects, and impact, and the design of curriculum modules.
These recommendations are based on a review by the evaluation team of training plans and programs at the various institutions visited, and the assistance provided to those institutions by LBIF/WAPCOS. The team was very impressed by the progress made by these institutions getting their training activities underway. We feel they are making a considerable impact on increasing awareness of on-farm irrigation needs. Furthermore, the spirit at the institutions is good, the staff seems to be quite motivated, and their course materials and ability to present them is improving.

1. At present the course programs appear to be broad and academic. Programs are not planned specifically to meet the job needs of the officers of the IDs, ADs or CADAs. In view of this the team recommends that the STIs initiate a process in collaboration with the Irrigation Department to carry out strategic training planning to help the STIs focus training on the specific work activities and knowledge/skill needs necessary for improving the capability of irrigation system designers and operators.

2. The present focus of all the institutions involved appears to be the tertiary or on-farm level. However, there are major structural and management problems related to activities above the outlets serving the tertiary systems. In view of this the team recommends a more balanced training approach with a focus on the whole system. This would give greater emphasis to the "main system" which would be more appropriate for ID engineers, and be less academic.

3. The team commends the efforts being made to improve course subject content and the quality of materials. Yet some of the course content is of questionable effectiveness and relevance. While participants are presented programs consisting of sets of course subjects, the subject matter is not well integrated into a systematic curriculum. Therefore, the team recommends that the curriculum be modified to more closely reflect the actual work functions of the ID officers with the subject matter integrated through practical application with much more emphasis on field activities as well as action research.

4. The STI faculty are generally enthusiastic, hard working, and qualified. Faculty are recruited on the basis of subject matter considerations, without due attention to teaching ability. Instructors rely on lectures as their primary mode of teaching and seldom take advantage of participatory and hands-on methods of non-academic training. The team recommends that a "teaching methodologist" be available to each STI instructor to evaluate and help STI instructors improve teaching techniques and methods.

5. Although several project funded efforts have been initiated, none of the STIs visited used evaluations to assess the procedures, effects, and impacts of their
training activities. Evaluations are a necessity for determining how to improve the relevance and quality of training, and add discipline to the program. The team recommends that rigorous and meaningful evaluation procedures be developed and institutionalized at each STI.

6. The team found little systematic interaction between STIs and universities except on a personnel ad hoc basis. The university field programs could strengthen the STI course content and action research, and the STIs could prove to be informative professional links for the universities. In view of this we recommend that serious efforts be employed to promote more meaningful interactions between these two groups.

7. The selection process for trainees has often resulted in the selection of candidates who were not in the greatest need of training, nor in a position to make optimal use of the training given them. Therefore, the team recommends that each state review its guidelines and processes for selecting trainees to insure that the most appropriate candidates are chosen who can make optimal use of the training given them.

8. Observations and discussions both in India and the United States have lead the team to conclude that it would be more cost-effective to strengthen a training-of-trainers capability within India itself, than to continue with the U.S. program. The team recommends that an appropriate Indian institution and personnel be identified and arrangements made for foreign consultants to work with them to develop a strong training-of-trainers program.
EXECUTIVE SUMMARY

This report presents the results of a limited-scope evaluation of:

i) Overseas Training

ii) One long-term course conducted for in-service professionals at WALMI, Aurangabad.

The evaluation was to be impressionistic and was meant to assess the adequacy, appropriateness, and utility of the two types of training.

Purposive sampling of in-service personnel for overseas training was done taking into account the category of officials from SES to AES of Rajasthan and Maharashtra States. The total number of participants selected for study was 24.

For study of one long-term course conducted at WALMI, Aurangabad a sample of trainees was selected by stratified random sampling. Eleven supervisors of trainees and 4 groups of farmers of Maharashtra were selected and interviewed.

Major findings and conclusions of this evaluation are listed below:

A. Overseas Training

(1) Training has been found to be quite beneficial to the participants as individuals. He is exposed to the new technologies, new skills, and his knowledge is enhanced. The training builds enthusiasm and kindles a longing for devising innovations and putting them into practice for better irrigation management. This in itself is a sufficient reason to continue the overseas training program.

(2) As irrigation management is an interdisciplinary technology, it is imperative that training is imparted to those involved in irrigation management i.e., professionals from several disciplines including engineering and agriculture.

1Former Secretary Irrigation, Rajasthan

2Former Dean of Akola Agriculture University
Although care is taken by the concerned quarters on making selection to the training course, decisions on who will be deputed for training may best be made through a needs analysis by the States to prioritize topic/subjects most important to them, and on that basis make the decisions. A comprehensive criteria and the methodology for deputation from the concerned disciplines could be worked out. (Action: STI's, STC's)

(3) The courses are on an average of about 6 weeks duration out of which 3 weeks are spent in classroom and 3 weeks in field exercises/visits. Most participants would prefer increased time spent in field training and less time in the classroom. Possibilities of designing the course to be more field oriented should be explored. Handouts and lecture notes could perhaps be sent in advance to participants trainees well before they proceed abroad in order to reduce the amount of time spent in the classroom. An orientation course organized in this country would also allow more actual field time. The trainees could be invited to attend this orientation course prior to departure. Training designed with specifically Indian Irrigation system conditions taken into account would also save 'transfer' time and would be more effective. (Action: IRMIC, LBII/WAPCOS)

(4) Persons who have received irrigation management training should be placed in positions where the training will be used to full advantage, rather than in, for example, design or administrative positions. A definite personnel policy could perhaps be formulated in consultation with the State Government, to ensure placement of training personnel on irrigation management jobs, without transfer for at least 3-4 years. As a first step it is suggested that a seminar be held soon after the trainees have returned from the training course in which the trainees could present not only what skills have been learned but also on how the new technology will be transferred to his subordinates and farmers. (Action: STI's, STC's)

B. In-country Long-Term Course

(1) The course builds confidence, inculcates new ideas and exposes the trainees to new technologies. The trainee learns new skills, new irrigation practices and methods of water application. Apart from enhancing the knowledge of his own discipline, it exposes him to a multidisciplinary approach in irrigation management, a new concept for him. It helps to transform a civil engineer into an irrigation engineer. Training is not only beneficial to the trainee as an individual but also the government organization.

(2) Complete facilities available at WALMI/Auranagabad, including classroom and lab facilities, AV aids, library, demonstration farm and the like, are excellent. The instructors are an enthusiastic and devoted group. Their attitudes towards trainees is also excellent.
The course is presently run for junior-level professionals of the Maharashtra Irrigation Department. No trainees are deputed from the Agriculture Department. A separate short-term 2-4 week course is run for the Subject Matter Specialists of the Agriculture Department. It would be much more conducive to the interdisciplinary nature of irrigation management training to have trainees from both departments learn together, and from each other. It is felt that a core course and field exercises may be devised that could be attended jointly by junior engineers of the irrigation department and their counterparts of the agriculture department to enhance the interdisciplinary nature of irrigation management training. (Action: STI's, STC's)

Deputation of officers to receive irrigation management training is an important procedure. Training of those who are engaged in irrigation management should be given priority over those who are engaged in administration, construction, design, etc. With this objective in mind, a definite strategic plan of selection for deputation should be evolved by the State Governments in consultation with WALMI. One possibility might be to restrict admittance to the course to those engaged in, or who are assured of placement on irrigation management jobs. (Action: STI's & STC's)

Presently the long-term course is of 9 month duration for diploma holders and 11 months duration for degree holders. The long duration is designed to make the course more intensive while covering a number of subjects/topics. Possibility of reducing the duration of the course to 5-6 months should be explored. It is better to conduct short-term course on different topics rather than conducting one long-term intensive course. In other States, such long-term courses are conducted for duration not more than 5 1/2 months. This will help to train double the number of persons annually with shorter duration courses. (Action: WALMI/Aurangabad & STC/Maharashtra)

The course consists of classroom teaching, field demonstrations, field and project exercises. Out of the 9-month course, about 2 months are designated for field exercises. Of the 2 months, the trainees spend 1-2 weeks in the field, the remaining time being devoted to the analysis of data collected and writing the project report. In this way the method of the course is too academic or theoretical.

The emphasis should shift to allow more time in the field. One possibility would be for trainees to stay at an irrigation system site for 3 months. Field exercises for this period could be arranged during a crop season so that more "hands on" training could be imparted and to increase the opportunity for thorough interaction between the personnel of disciplines like irrigation and agriculture, and also an opportunity for the trainees to interact with the farmers of the system. As a first step WALMI could perhaps "adopt" a Medium Irrigation System around Auranagabad for field (one line has been cut off) and other concerned officers of the Irrigation and Agriculture Department could also attend the field exercises on a live project, so that they
become aware of the various facets of training. (Action: WALMI -Faculty and Governing Board)

(7) Building the curriculum is an integral part of IM training. The curriculum determines the strength of trainees. The mid-level officers such as Executive Engineer, Assistant Engineer and their counterpart in the Agriculture Department who are directly involved in irrigation management, are in a better position to identify the training needs. It would be more fruitful to build, review and revise the course curriculum in consultation with these mid-level officers instead of senior officers of the client organizations. The expanse of some subjects like Statistics, Economics, Agriculture Sciences, etc. needs to be reviewed and possibly curtailed. (Action: All STI's, STC's)

(8) Trained personnel should be placed on jobs connected with irrigation management in order to fully utilize their newly acquired knowledge and skill. In fact, one of the criteria for posting on irrigation management job could be WALMI training. (Action: STI's, STC's)

(9) The timely training of Executive Engineers in the Irrigation Department is important. A sufficient number of courses could be organized for the Executive Engineers so that all the about 800 Executive Engineers could be trained in irrigation management in the shortest possible time. It would also enable them to appreciate the new skills and technologies learned by the junior officers and their utilization. (Action: STI's, STC's, Universities)

(10) The Team feels that at least a Division or a particular Medium Irrigation System could be "Saturated" with trained personnel so that all the new skills, techniques and technologies could be adopted in such an Irrigation System and thus the impact of the training assessed for further review and improvement of the training programme. (Action: STI's, STC's)
The rational for USAID/India’s involvement in irrigation and water resources is substantial and compelling. The USAID/India’s irrigation program is focused on the fundamental technical, economic, and performance aspects of sustaining productivity from predictable water supply, ensuring reliable on-farm investments have access to a reliable supply of water through irrigation infrastructure and agricultural growth and consequent generation of rural income. India’s public investments in irrigation are huge and continuing yet most systems perform below potential, leading to waste of water and financial resources and, at worst, deterioration of the resource base. The U.S. has considerable technological and institutional experience in water resource development which can be brought to bear on the cost effectiveness and systems management constraints in irrigation and water resources management in India.

Irrigation can be broadly conceptualized as the interrelation of three physical and socio-economic systems and related technical and institutional issues: a water resource macro-system, a water supply hydraulic system, and an on-farm or production micro-system. Two dimensions cut across these: the interacting hydrologies of surface water and groundwater and the various forms of public and private ownership and control. Irrigation performance depends on the management of these systems.

The USAID irrigation/water resource program currently consists of four State-specific and one National support project totaling approximately $270 million focused primarily on small surface irrigation systems. Until recently, USAID’s program rhetoric has generally been directed at the on-farm issues related to agricultural water management and its interface with the water supply system. Meanwhile, USAID’s loans for the most part finance main system infrastructure, hence, although the projects included comprehensive technology package, a dichotomy existed between what USAID talked about and what it was funding. Construction also dominated much of the USAID-GOI dialogue.

The experience of the past four years clearly indicates that reliable main system supply is a major constraint to sustainability and performance, and is prerequisite to downstream, farm development. Our analyses indicate high returns to main system improvements and operations which erase reliable supply. On the other hand, initial returns to on-farm investments have been disappointing. In new systems, efforts in initial planning and operations can also yield high marginal returns. With these lessons learned, and the evidence of sustained productivity from predictable water, USAID is shifting attention towards the planning, operations, and performance of the water resource/irrigation systems. This strategy focuses on the fundamental technical, economic and institutional aspects of surface and ground water supply which are prerequisite to cropping shifts for more productive use of a resource under stress.

The program is currently focused on technical and institutional improvements in public surface systems in the Indian Deccan due to initial project investments and the potential for employment generation from high-value crops in a resource-poor area. This involves improved planning, design and operations of specific irrigation system, and concomitant professional development and research. The institutional thrust is to reorient State Irrigation departments (the primary controllers of water) from public works to public service as well as to broader planning and productivity issues, including resource conservation, groundwater use, and on-public sector possibilities. India-U.S. professional exchange supported by studies and pilots will be key to this thrust.

USAID will also be looking further upstream and underground. Activities have been initiated in the larger water resources environment, both at regional and site-specific sub-project levels. This consists of: training professionals to apply analytical methodologies to basin-wide resource allocation; professional exchange among resource planning institutions; collaboration with USAID forestry activities; and improved planning criteria, hydrological monitoring and watershed management in sub-project development. Groundwater will figure prominently in this effort.

The on-farm production system will receive limited attention. Focus will be on water conservation through discrete technical and institutional studies and demonstrations necessary to complement the water resource and supply strategic thrusts. Possible joint-programs and agro-technology initiatives with USAID forestry and agricultural research activities are being considered.

To implement this strategy, USAID is restructuring and consolidating its irrigation projects to better target assistance. Disbursements are being directly linked to systems performance indicators, rather than to construction. State projects are being consolidated into “programs” to encompass broader issues within their water resource sector. Staff is being shifted from construction and on-farm works towards planning, operations and institutional issues. Grant funded activities are being streamlined to promote studies and technical exchange. Public and private institutions concerned with irrigation issues are being assisted in analysis of performance and management questions.

In sum, to build on past experience and investments and effectively concentrate current staff and funding levels, the Mission’s strategy emphasizes program-level assistance focused on the technical and institutional improvements necessary to ensure reliable water supply. The strategy targets systems management and institutional performance in water resource planning, supply and distribution for irrigation.
Attachment A to PIL No. 7

Water Resources Management & Training Project (386-0484)

Specific Objectives

The Water Resources Management & Training (WRM&T) Project provides resources and support to improve managerial, technical and institutional capabilities for increasing productivity of India's water resources. The overall goal is increased agricultural productivity and improved rural incomes through more effectively managed water resources, irrigation main systems and water distribution networks. The WRM&T Project strengthens the human and institution capability to plan, design, manager and maintain efficient and productive water resource systems for irrigation.

There are both National and State-level objectives of the WRM&T Project:

A. National-Level

1. Support for the Ministry of Water Resources, including CBIP, CWC and CGWB, to deal with current irrigation and water resource issues through appropriate studies, and through technical exchanges with international irrigation water resource institutions. To do this the project will:

   - Place and fund senior officials of this organization to take part in issue-specific policy level short-courses and workshops;
   - Provide topics, specialized assistance and funding to carry out studies on critical irrigation and water resource issues and to conduct national symposia and seminars on them;
   - Provide institutional grants to establish professional relationships between the International Irrigation Management Institute with the Ministry of Water Resources and select State irrigation organization; and
   - Provide for technical exchange between the U.S. and Indian water resource institutions.

2. Develop a national-level capability for water resource system analysis, management and planning in India, by:

   - Partial funding of a central training institute and computer center;
   - Training of trainers in U.S. institutions; and
• Provide technical specialists to develop curriculum and training material, and teach initial courses.

3. Expansion and improvement of the Central Board of Irrigation and Power’s (CBIP) information network and center by:

• Providing of computer hardware and software for a technical information system;
• Providing specialized assistance in information system development and operation; and
• Establishing technical information centers in other regions at appropriate centers.

B. State-level

The project assists eleven states through WALMIs, four state universities and other state training and research organizations to:

1. Strengthen selected, existing state training, academic, and research, irrigation/water resource organizations to address priority state irrigation water resource issues.

Specialist assistance, dialogue ad grant-funding is provided to:

• strengthen capacities of WALMI and other state organization to identify priority irrigation and water resource management problems;
• develop the state capabilities for water resource planning;
• develop technical and support links among WALMIs and other state organizations with relevant water resource and irrigation management organizations;
• improve the technical analysis and evaluation/monitoring abilities of State irrigation departments;
• modernization of irrigation division related to "Planning and Operations";
• develop the capability to analyze economic and financial returns to irrigation system investments; and
• improve the interactions between irrigation system management and farmers.

2. Develop self-sustaining state training and operational research capabilities at training institutions in eleven major irrigation States.

Specialist assistance, equipment procurement and infrastructure development to:
• improve the planning, preparation, implementation and evaluation of training curricula;

• develop a training of trainers and faculty training program in India;

• adapt and transfer specific training courses from the U.S. to India;

• introduce modern training methodologies and pedagogical techniques. Including audio visuals and micro computer technologies.

• develop a formal evaluation program and develop evaluation linkages with concerned department to ensure the relevance, specificity and utility of training;

• initiate and institutionalize action-oriented (operational) research capabilities tied to training; and

• improve training facilities and equipment.

Establish irrigation management education at MS.S University, Baroda, Anna University, Madras, Sukhadia University, Udaipur; and MPA University, Rahuri.

Specialist assistance and grant funds to:

• improve the academic curriculums and materials;

• provide research opportunities for graduate students;

• carry out relevant irrigation and water resource management research;

• provide specialized training for faculty members; and

• provide training and research equipment.

Initiate organizational and management studies in irrigation in the participating States to:

• conduct manpower assessments;

• analyze administrative and management procedures, rules, regulations; and

• conduct job assessments, revise job descriptions and practices.

Develop socio-economic monitoring and evaluation expertise at selected WALMIs, research organizations, universities and institutions in Andhra Pradesh, Maharahgtra, Rajasthan, Binar and Uttar Pradesh.
Develop micro-computer capabilities to improve the design, operation and management of Irrigation Departments in selected States.

Introduce management training into the curriculum of Irrigation Departments' Staff Colleges in Maharashtra and Madhya Pradesh.

Special studies and research - water resources economics, irrigation systems communications, hydrology and drainage related to systems beneficiary roles and responsibilities, computerization & modelling and remote sensing application in Water Resources Development & Management.
Itinerary of the Evaluation Team

Appendix D

8/5 AM Compton arrives, Mathur and Rahudkar arrive from Pune.
PM USAID Orientation, Scope of Work and Planning.

8/6 AM Keller arrives
PM Team reviews briefing material

8/7 AM/PM Compton and Keller meet with Glenn Anders

8/8 AM Logistics, office arrangements, team meets with LBII/WAPCOS
PM Team meets with IWR-USAID staff.

8/9 AM USAID - Preparation for field visit
Team meets Mission Deputy Director and Program Officer
PM Team meets with Central Water Commission

8/10 AM Leave Delhi, arrive Bhopal
(Kaiser/LBII-WAPCOS and Arora/USAID accompany team)
PM Meet Director and faculty of STI(WALMI), Bhopal

8/11 AM Interview faculty of WALMI
PM Joint meeting with Officer of Irrigation and Agriculture Departments, and CADA.
Visit Action Research site (Ghorapachhar), meet with farmers - Meet Secretary of Irrigation, Madhya Pradesh.

8/12 AM Meet Director, Academy of Administration
PM Meet Secretary of CADA

8/13 AM Team meeting to discuss observations
PM Leave Bhopal, arrive Delhi.

8/14-15 Delhi: Team discussions and analysis

8/16 AM Team A (Compton and Mathur) Leave Delhi, arrive Aurangabad
PM Meet Deputy Director, WALMI and faculty

8/17 AM/PM Interview faculty

8/18 AM Leave Aurangabad, drive to Rahuri/MPAU
PM Meet with Chairman of Irrigation and Water Management Program

8/19 AM Meet Vice-Chancellor and administrative staff (Walters and Maheswari arrive from Delhi)
PM Interview - Director, faculty and students

8/20 AM Leave Rahuri by car - Meet farmer groups in village and at Mula command headquarters. Reach Aurangabad.

8/21 Review observations

8/22 AM Leave Aurangabad, arrive Delhi
PM Review field work

8/23 AM Team B (Keller and Rahudkar, accompanied by Grant and Arora)
PM Leave Delhi, arrive Madras

8/15 AM Leave Madras, arrive Trichy - Meet with Director and faculty of WALMI/Trichy
PM Interview faculty

8/17 AM Interview faculty
PM Visit Action Research station at Tanjaur

8/18 AM Leave Trichy, arrive Madras - Meet with faculty of Center for Water Resources, Anna University.
PM Meet with faculty

8/19 AM Meet Director of CWR
PM Interview faculty: Leave Madras, arrive Hyderabad

8/20-21 AM/PM Review observations

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8/22 AM  Meet Director General and Faculty of WALAMTARI/Hyderabad
PM  Leave Hyderabad, arrive Delhi.

8/23-30  Delhi: Meetings with LBII/WAPCOS staff, Ford Foundation Irrigation Specialist, Irrigation Research and Management Improvement Cell (IRMIC), Central Water Commission and USAID. Report writing

8/31 AM  Leave Delhi, arrive Wisconsin (Compton) arrive Utah (Keller)
### Types of Training Evaluation Activities & Corresponding Evaluation Issues

<table>
<thead>
<tr>
<th>Type of Evaluation</th>
<th>Purpose</th>
<th>Evaluation Questions</th>
<th>Corresponding Evaluation Areas</th>
</tr>
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<tbody>
<tr>
<td>Monitoring Evaluation for Training Activities</td>
<td>Testing Implementation of Activities as Corresponding to Testing Training Effectiveness Training Design in Reaching Training Goals</td>
<td>2. Identification of target clientele groups to a design/plan?</td>
<td>2. Are the training activities being conducted according significant?</td>
</tr>
</tbody>
</table>
## Persons Contacted

**A: WALMI, Bhopal**

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. K.B. Shah</td>
<td>Director</td>
</tr>
</tbody>
</table>

### Irrigation Engineering

1. Mr. S.K. Khar   | Professor                     |
2. Mr. S.P. Sarviya| Professor                    |
3. Mr. S.B. Khandekar | Associate Professor         |
4. Mr. V.K. Bhatt | Assistant Professor          |
5. Mr. A.K. Tiwari| Assistant Professor          |
6. Mr. S.K. Pathak | Assistant Professor          |
7. Mr. B.N. Goyal  | Associate Professor          |

### Agriculture

8. Mr. R.K. Raina  | Professor                    |
9. Mr. C.M.S. Patel| Associate Professor         |
10. Dr. R.P. Rajput | Associate Professor        |
11. Mr. K. Tedia   | Assistant Professor         |

### Social Sciences

12. Mr. S.K. Sharma| Associate Professor         |

### Action Research

13. Mr. H.L. Sahu  | Professor                    |
14. Mr. U.S. Tiwari| Associate Professor         |
15. Mr. C.M.S. Patel| Associate Professor        |

**Officers attended meeting on 11.8.88**

1. Mr. K.B. Shah   | Director                     |
2. Mr. P.C. Agarwal| Engineer-in-Chief, Irrigation|
3. Mr. N.N. Mehta  | Director, Agriculture       |
4. Mr. K.N. Venkataraman | Additional Secretary, Irrigation |
5. Mr. O.N. Thapar | Chief Engineer, Irrigation  |
6. Mr. N.P. Shrivastava | Chief Engineer, Monitoring |
7. Mr. Krishnaawar | Superintending Engineer, CADA|
8. Mr. Vaidhish Kumar | Additional Director       |
9. Mr. R.N. Shrivastava | J.D.A. Agriculture  |
10. Mr. L.K. Saksena | J.D.A. Agriculture       |
11. Mr. K.P. Gargya | State Coordinator, LBII/WAPCOS |
12. Mr. B.J. Bhandari | Superintending Engineer, Ayacut |
B: WALMI, Aurangabad

1. Mr. N. D. Joshi  Director
2. Dr. S. B. Varade  Jr. Director
3. Mr. S. A. Kulkarni  Associate Professor
4. Dr. S. S. Bhalerao  Professor and Head of Department
5. Prof. T. S. Gayke  Assistant Professor
6. Prof. A. H. Shaikh  Assistant Professor
7. Prof. V. S. Padhye  Research Officer, Action Research
8. Prof. S. P. Sonune  Assistant Professor
9. Dr. M. S. Palaskar  Associate Professor
10. Prof. A. R. Suryavanshi  Professor and Head of Department
11. Prof. M. M. Patwardhan  Professor and Head of Department
12. Prof. S. G. Bhogle  Professor

C: MPAU, Rahuri

1. Dr. N. G. Perur  Vice Chancellor
2. Prof. S. H. Shinde  Associate Professor
3. Prof. P. G. Bhoi  Associate Professor
4. Dr. A. V. Mohite  Assistant Professor
5. Prof. S. D. Govantiwar  Assistant Professor
6. Prof. S. N. Suryavanshi  Associate Professor
7. Dr. S. S. Magar  Professor and Head of Department
8. Students of P. G. IWM Course
9. Two Groups of Farmers in the Command of Mula Project.

D: WALMI, Trichy

Prof. R. Gopalakrishnan  Director

Irrigation Engineering
1. Prof. K. Narasimhan  Joint Director (Training)
2. Dr. E. Elumalai  Joint Director Irrigation/Management
3. Prof. S.M. Chokallalingam  Professor
4. Prof. D. Hariram  Assistant Professor
5. Mr. P. Gomathinayagam  Assistant Professor
6. Mr. A.V. Raghupathy  Assistant Professor
7. Mr. K. Devanathan  Assistant Professor
8. Mr. V. Muthurijayan  Research Associate
9. Mr. P. Chidambaram  Research Associate
10. Mr. M.A. Ahmed Ali  Research Associate
11. Mr. G. Duraiakanth  
**Agriculture**

1. Mr. S.V. Arumugam  
   Professor and Joint Director
2. Dr. A. Rajagopal  
   Professor
3. Dr. C.S. Balasundaram  
   Associate Professor

E: Anna University, Madras

   Mr. R. Sakthivadivel  
   Director

**Engineering**

1. Dr. N.V. Pandarikantham  
   Professor
2. Dr. T.V. Gopalkrishnan  
   Lecturer
3. Mr. K. Venugopal  
   Lecturer
4. Mr. R. Mohandas  
   Visiting Faculty Member
5. Mr. A.B.S. Raj  
   Visiting Faculty Member
6. Mr. Krishna  
   Visiting Faculty Member
7. Mrs. N.K. Ambujam  
   T.R.F. Ag. Engineer
8. Mr. C.R. Balagopal  
   Visiting Faculty Member
9. Mr. Sudhakar  
   Visiting Faculty Member
10. Mr. N. Basubramaniam  
   Visiting Faculty Member

**Sociology**

11. Mr. L. Jayaekhar  
   Visiting Faculty Member

F: WALAMTARI, Hyderabad

   Dr. T. Hanumantha Rao  
   Director General

**Engineering**

1. Dr. K.N. Raja Rao  
   Director

**Agriculture**

2. Dr. M. Ranga Reddy  
   Director
3. Mr. M.H. Siddiqui  
   Assistant Director
4. Mr. N. Eswarappa  
   Assistant Director

G: LBII/WAPCOS

1. Dr. Jan Stokhoper*  
   LBII Team Leader
2. Dr. J.D. Brewer*  
   LBII (Previous) Team Leader
3. Mr. J.I. Gianchandani*  
   WAPCOS Team Leader
4. Mr. E.J. Bondurant*  
   Education Specialist
5. Mr. G.B. Johri  
   Agriculture Engineer
6. Mr. T.O. Kojer*  
   Training Specialist

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7. Mr. M.J. Leaf*  
   Social Scientist
8. Mr. O.P. Mehta  
   Irrigation Specialist
9. Dr. B.K. Sarkar  
   Agro-Economist
10. Dr. H.K. Pande  
    Agronomist
11. Mr. A. Krishnachar  
    Editor
12. Mr. R.V. Suryanarayan  
    Senior Technical Officer
13. Mr. P.W. Parwani  
    Technical Officer

* Those interviewed

H: USAID/Delhi Staff

1. Anders, G.  
   IWR Office Director
2. Khanna, J.R.  
   IWR Irrigation Engineer/Construction
3. Maheswari, B.N.  
   IWR Water and Irrigation Engineer
4. Arora, D.R.  
   IWR Program Specialist
5. Bakely, R.  
   Director
6. Mahoney, T.  
   Program Officer
7. Grant, J.  
   Evaluation Officer
8. Walters, M.  
   Irrigation Advisor
9. Thompson, G.  
   Assistant Director
Trainers' Interview

1. What was covered in the training you received (i.e. what do you remember?)
2. What has been most beneficial to you? What have you been able to use? How have you made use of it?
3. How did you become a trainee? How were you selected?
4. What is your favorite teaching method or technique? Why?
5. Do you enjoy teaching? Why?
6. How much exposure to or training in good educational practice have you had? Explain.
7. Who has been your own favorite teacher? What approach did s/he use?
8. What do you do to get trainees ready to learn?
9. Five years from now, what do you want to be doing? What do you think you will be doing?
10. Is WALMI support (equipment, facilities, freedom to plan, etc.) for instruction adequate?
11. What can be done to improve the quality of the educational process at the WALMI?
References


Annual Work Plan and Budget for 1988-89 for WALMIs at Bhubaneswar, Orissa; Dharwad, Karnataka; Gandhinagar, Gujarat; Kota, Rajasthan; Okhla, New Delhi; and Center for Water Resources Studies at Bihar College of Engineering, Patna; and Irrigation Management Training Institute, Kunnamangalam, Calicut.


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Leaf, M., Measures to Activate Farmers' Organizations. New Delhi: LBII/WAPCOS, May 1988


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Minutes of Meeting to Discuss Course Calendar for Financial Year, 1988-89. Bhopal, MP: WALMI.


Proposal for Training of Trainers on Irrigation Management, Phase A.


Schedule for Benchmark Survey for Action Research Project (Halali).

Syllabus for Various Training Courses.

Summary of Observations and Conclusions of USAID Evaluation of Maharashtra State Irrigation Program.


Training Courses, Workshops, and Seminars to Be Organized by the State Training Institutes, 1988-89. New Delhi: LBII/WAPCOS.


WALMI/Aurangabad


REPORTS LBII/WAPCOS

LBII/WAPCOS prepares and issues Progress Reports, Annual Work Plans, and Technical Reports, among others. A list of reports with the status of each is given in this section.

**Progress Reports**

2. Quarterly Progress, April-June 1986 issued June 1987
7. Quarterly Progress LBII/WAPCOS July-Sept 1987 issued Nov 1987
8. Quarterly Progress Institutions, July-Sept 1987 issued Apr 1988
11. Annual Progress Report 1987-88 first draft
12. Quarterly Progress Institutions Jan-March 1988 first draft

**Work Plans**

1. Project Status and Annual Work Plan 1986-87 issued Sept 1986

**Technical Reports**

1. Selecting a Generic Computer Based Interactive Videodisc System for In-service Training in Irrigation Management issued Feb 1987
2. Production of Audio Visual Material for Irrigation Management Training fin draft
3. Training Needs and Catalog of in India Resources in Educational Methodology for Trainers in Irrigation issued April 88
Management

4. Trainer's Guide
   issued
   March 1988

5. Handbook for Drainage of Irrigated Areas in India
   issued
   March 1988

6. Guidelines for Action Research in Irrigation Management
   draft circ
   Mar 1988

7. Directory of Training Resources in Irrigation Management Outside India
   fin draft

8. Computers for Use in Irrigation Management Training
   issued
   Aug 1986

9. Establishment and Development of an Information System for Irrigation Management
   issued
   Nov 1987

    issued
    Jan 1988

11. Video Script writing Workshop Report
    fin draft

12. Teaching Techniques Special Course Report
    fin draft

    issued
    April 88

14. Land Shaping for Efficient Irrigation and Drainage
    writing

15. On-Farm Pipeline Distribution System for Irrigation
    writing

16. Report on a Model Plan for Library and Information center in the State Training Institutes
    first
draft

Other Reports

1. Inclusion of New State Training Institutes in the Irrigation Management and Training Project
   issued
   May 1987

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