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TABLE OF CONTENTS

SECTION PAGE

LIST OF TABLES iv

FOREWORD v

EXECUTIVE SUMMARY vi

BACKGROUND vi
OBJECTIVE vii
OUTPUTS vii
ACTIVITIES AND ACCOMPLISHMENTS vii
PROJECT DIFFICULTIES ix
RECOMMENDATIONS x

1 INTRODUCTION AND PURPOSE 1

1.1 BACKGROUND 1
1.2 OBJECTIVE 2
1.3 SCOPE OF WORK 3
1.4 PROJECT OUTPUTS 3
1.5 OVERVIEW 3

2 PROJECT HISTORY AND MAJOR ACTIVITIES 4

2.1 IVD MODULE DESIGN AND DEVELOPMENT 4
2.2 TRAINING AND TECHNOLOGY TRANSFER 6
2.3 PROCUREMENT AND TRANSFER OF IVD SYSTEMS 9
2.4 EVALUATION OF IVD TECHNOLOGY 11
2.5 PROJECT EXPENDITURES 12
2.5.1 Project Budget 12
2.5.2 Personnel Resources 13

3 PROJECT ACCOMPLISHMENTS

3.1 ACHIEVEMENT OF PROJECT TARGETS 14
3.2 CONTRIBUTION TO THE FIELD OF WATER RESOURCES 18

4 PROJECT DIFFICULTIES 18

4.1 IVD PRODUCTION 18
4.1.1 Content Development 18
4.1.2 Communications and Logistics Difficulties 19
4.1.3 Delay in GOI Approval of the NMIC 19
4.1.4 Technical Problems 19
4.1.5 Political Obstacles 20
4.2 PROCUREMENT AND TRANSFER OF IVD SYSTEMS 20
4.3 IVD TRAINING 20
4.4 EVALUATION OF IVD TECHNOLOGY 21

TABLE OF CONTENTS (continued)

5 RECOMMENDATIONS 21

5.1 LEVERAGE INVESTMENT AND IDENTIFY "LESSONS LEARNED" AND FUTURE OPPORTUNITIES 21
5.2 CONTINUE TO EXPAND SKILLS IN IVD DEVELOPMENT 21
5.3 DISSEMINATE PROJECT OUTPUTS 22

Appendix A: IVD Equipment Specifications A-1

Appendix B: Distribution of Equipment B-1

Appendix C: MCBIVD Project Progress Reports C-1

TABLES

Table 1: Summary of project expenditures as of December 1992, letter-of-credit report 12

Table 2: Level-of-effort summary 13

FOREWORD

Irrigation management (IM) as a serious, applied field is only about 30 years old. The objectives of IM and its training program are to build up local capabilities to improve water control (availability, dependability, and equity); conservation of soil and water resources; improved productivity and returns to investments in irrigation.

In the late 1970s, India made a commitment to invest considerable resources to improve the professional development of its engineers. The Irrigation Management and Training (IM&T) Project of India is probably the largest and most significant IM Training program to be attempted to date anywhere. Under that project, special "Water and Land Management Institutes" (WALMIs) have been established in 11 states, for training senior, middle, and junior level officers of Irrigation and Agricultural Departments.

Thus, training in IM has evolved rapidly in India. In terms of training effectiveness, however, IM Training needs greater levels of support. The goal of the Microcomputer-based Interactive Videodisc Training Project (MCBIVD) was to determine whether Level III Interactive Videodisc technology can help enhance the effectiveness and efficiency of IM training in India.

This report describes and presents information about the design and establishment of the MCBIVD Project, the major achievements of the project, problem areas which remain and will require solution, and recommendations for future activity.

EXECUTIVE SUMMARY

This report is the final document prepared for the Microcomputer- based Interactive Videodisc Training (MCBIVD) Project, a component of the Water Resources Management and Training Project, which was sponsored by the U.S. Agency for International Development (USAID). It provides a summary of the major activities conducted over the life of the Project, the principal achievements of the Project and difficulties faced, and recommendations for further action on the part of the Government of India (GOI) and/or USAID.

The Project was developed, organized, and conducted by Education Development Center, Inc., of Newton, Massachusetts, assisted by Colorado State University of Fort Collins, Colorado, the National Institute for Information Technology, New Delhi, and Datamation, New Delhi. The Project had a life of slightly more than two years, from May 1989, to September 1992. Total USAID funding for the Project was $3,888,930.

BACKGROUND

India has invested considerable resources to improve the professional development of its irrigation engineers. Although training in irrigation management (IM) has evolved rapidly in India, training effectiveness needs greater levels of support. The MCBIVD Project was designed to explore whether Interactive Videodisc (IVD) technology could support expanded and improved irrigation management training. To determine whether IVD could help meet India's critical IM training needs, USAID took the lead role in providing technical support for pilot testing IVD technology, through the Microcomputer-based Interactive Videodisc Training Project.

Interactive videodisc technology was chosen because it is adaptable, flexible, and allows for continuous development. Learners are taught problem-solving and decision-making in addition to the subject matter of a given course. The equipment is easy to use, and evaluations of IVD technology in the United States consistently show that the technology is effective, flexible for training large numbers of widely differing learners, reduces learning time, and improves retention.

OBJECTIVE

The objective of this project was to explore the potential use of interactive videodisc technology to enhance and expand the training capacity in water resources systems planning and management in India. The objectives of the project were to:

- introduce selected Water and Land Management Institutes (WALMIs) and universities to MCBIVD technology and to train them to utilize the technology to enhance their training programs
- develop a pilot MCBIVD Level III training course and conduct the course for selected staff from the WALMIs and universities
- develop in one or more WALMIs a capability to develop IVD courseware
- assess the relevance of IVD training courses in the WALMIs

OUTPUTS

The contract between USAID and Education Development Center, Inc. (EDC) called for the following deliverables:

1. Train a Core Team of approximately 10 faculty in the basic skills of IVD courseware development
2. Develop five interactive videodiscs that will demonstrate the capabilities of IVD to deliver irrigation management training in India
3. Assess the appropriateness and effectiveness of the IVD courseware in the WALMI training programs
4. Select, procure, and install IVD systems, ancillary equipment, and software to allow use of IVD applications

ACTIVITIES AND ACCOMPLISHMENTS

Early stages of the project focused on design of the first IVD program and a production plan for its development. After the first IVD program was completed, a two-tier approach to IVD program development was undertaken, which involve developing two videodiscs simultaneously. During the course of the project, five videodiscs were completed, each of which is highly complex and demonstrates different capabilities of IVD.

Demonstrations of the first videodisc, on Maintenance of Distribution Systems, were held for the USAID Administrator, other USAID representatives, the Joint Secretary of the Ministry of Water Resources,

members of the Central Water Commission, the MCBIVD Management Committee, and others. The consistent response of those viewing the demo were that IVD was extremely exciting, interesting, and of great potential value to India.

Training the two Core Teams, one from WALMI Aurangabad and one from College of Technology and Agricultural Engineering (CTAE), Rajasthan Agricultural University at Udaipur, was another major project activity. Formal training began with a workshop held at EDC, Newton, Massachusetts, USA.

During the training, IVD experts discussed IVD development, and the Core Teams conducted "hands-on" design activities, working with IVD experts. Trainees also visited a number of world-famous institutes, including Harvard University Law School and MIT, where IVD was being used for training.

In India, the training continued, with the objective of having the Core Teams participate with the EDC IVD team in the development of Modules 2–5 as part of a "hands on" approach to training in order to develop their IVD skills. Due to the severe time constraints under which the WALMI Core Team members operated in their regular faculty responsibilities, their involvement in Modules 2 and 3 was far less than had been earlier envisioned.

In response to this situation, the Project Director developed an alternative approach to providing the Core Team with "hands on" IVD development experience. In the new approach the Core Teams developed an IVD course independently, as fitted their schedules, with guidance and some workshop instruction by EDC.

In addition to training the Core Teams, EDC also transferred many IVD skills to its partner Indian firm, NIIT, as part of the effort to develop IVD courseware production skills in India.

Another important project activity was to select, procure, ship and install IVD systems in India. This activity was completed by August 1992, when all equipment except a few systems used for production were installed at the sites. The sites had been prepared under guidance of EDC and NIIT.

An additional output of the project was to assess the quality and relevance of the IVD courses. The project developed rigorous evaluation plans with each of the four "testing sites:" three WALMIs and with CTAE, Udaipur. As part of those plans, baseline data were collected for regular classroom-*cum*-field-trip instruction. Although the collection of IVD data was delayed due to the delay in receipt of the Not Made in

India Certificate (NMIC), substantial IVD data were also collected at each site. These data are available for rigorous analysis of the efficiency and effectiveness of IVD training in India.

The MCBIVD project was unique. Although there had been IVD projects that involved some video shooting in the developing country and had as the target audience the developing country, the MCBIVD project was the first that involved extensive participation of host country professionals, in the form of hands-on production and training. The project developed outstanding training videodiscs, introduced the technology to India, generated strong interest and commitment to pursue the technology among not only irrigation management training agencies but also among other sectors in India, and developed basic IVD skills upon which India can build to develop strong IVD capability. The project also raised interest in multimedia among other developing countries, as well as raising understanding of and interest in developing countries among U.S. multimedia companies.

In this way, the MCBIVD Project served as a landmark project. It demonstrated that multimedia, in the form of IVD, can be an appropriate, effective technology for training professionals in a developing country. It opened the door to learning more about how multimedia can be used in other key fields in developing countries to improve training.

PROJECT DIFFICULTIES

Despite project successes, this project encountered difficulties. One major problem was that existing IM content was too abstract to serve as the basis for a "hands-on" IVD course, or, for some topics, there was no content at all that was generally agreed upon by experts.

Another problem was severe communications and logistics difficulties that obstructed production in Aurangabad and Udaipur. A third major problem was the delay in the NMIC (Not Made in India Certificate), which prevented transport of the IVD equipment to India in a timely manner. This delay impaired production, training, and evaluation.

There were also difficulties associated with the limited time the Core Teams could devote to IVD activities and gaining hands-on experience, in the face of their very heavy load of other WALMI responsibilities.

Finally, the formal IVD evaluation, which was to be a crucial part of the project, could not proceed as scheduled due to the delay in the NMIC.

RECOMMENDATIONS

The MCBIVD Project opened many opportunities for multi-media in India. It would be valuable to leverage the investment already made and identify other areas where IVD training could contribute to India's development goals. These areas include population, health, manufacturing, safety procedures, etc. Decisions should be made about whether and how to use IVD to help meet training goals of these other important areas.

To do so, a full evaluation is necessary to examine rigorously the opportunities and requirements for using IVD in the future. Such an effort should identify priorities for future activities, including the precise subject matter that should be developed.

In order to conduct this effort, it would be valuable for USAID to support the conduct of five major tasks:

(1) Use the data collected in the MCBIVD project to evaluate the appropriateness and effectiveness of IVD in India.

(2) Identify opportunities for IVD to help improve irrigation management.

(3) Systematically field test the videodisc programs that have been developed. As is the case when any new technology is introduced, IVD must be tested in the field in order to identify and implement minor modifications (such as changes in user interface) that will greatly enhance its impact under those field conditions.

(4) Identify the "lessons learned" about the development and use of IVD in India as they apply more widely to other developing countries.

(5) Identify important opportunities to contribute to other areas, including training in population, health, environment, and the private sector.

(6) Recommend "next steps" for the use of IVD in training in India in order to gain greatest value from the technology.

It will also be important to help ensure that the Core Teams receive support to pursue their work on IVD development, at least part-time.

Finally, it would be valuable to develop a plan for disseminating the IVD training programs to other Water and Land Management Training institutes in India and to make the IVD training programs accessible to other countries. In addition, the "lessons learned" from the MCBIVD project experience should be made available to other countries.

Final Report
Microcomputer-based Interactive Videodisc Project
Contract No. 386-0484-C-00-9131-00

1 INTRODUCTION AND PURPOSE

Education Development Company (EDC) began work in August 1987, under contract for the U.S. Agency for International Development, to assist the Government of India (GOI)–as represented by the Ministry of Water Resources (MOWR)–to explore the use of Interactive Videodisc (IVD) technology for training irrigation engineers. In this work, EDC has received the cooperation of its subcontractors, CSU, NIIT, and Four Winds Software.

The objective of the MCBIVD project is to consider whether IVD technology can help India meet its training needs for water resources engineers from State and Central organizations. The purpose of this document is to provide an overview of the project and its history, to discuss both the important project accomplishments and the major difficulties encountered in conducting the project, and to offer recommendations for further activities in support of the use of IVD technology for training in India.

1.1 BACKGROUND

In the late 1970s, India made a commitment to invest considerable resources to improve the professional development of its irrigation engineers. One critical concern was the extent of land on which irrigation systems would have to be effectively managed. The major obstacle was management of those systems. It became clear that both engineering and operational skills would be needed at three levels: a senior or policy-making level, a middle management level, and a junior management level.

The Irrigation Management and Training Project of India, managed by the elite Central Water Commission (CWC) of the Ministry of Water Resources, began in 1983, and is probably the largest and most significant IM Training program to be attempted to date anywhere. The IM&T project is one of which India is justifiably proud. It has become recognized as a program of excellence, attracting top faculty and skilled trainers.

Also, in 11 states, special "Water and Land Management Institutes" (WALMIs) have been established and now train senior, middle, and junior level officers of Irrigation and Agricultural Departments. In some cases farmers are being trained.

Training in IM has evolved rapidly in India. In terms of training effectiveness, however, IM Training needs greater levels of support. The MCBIVD Project was designed to explore whether Interactive Videodisc Technology could support expanded and improved irrigation management training.

The MCBIVD training programs were based on lessons learned about the requirements for successful training. These include:

1. Training must be action-oriented rather than being academic in nature.
2. Training should be self-initiated as much as possible.
3. Participatory training methods are preferable to lectures.
4. IM training needs to become interactive so learners can move at their own pace.
5. Better evaluation of whether training has an effect on job performance is needed.
6. Training that supports major field activities seems to produce the best results.

In addition, many WALMIs could benefit from education technologies that would help compensate for lack of faculty in certain irrigation management fields.

Interactive videodisc technology was chosen because it is adaptable, flexible, and allows for continuous development. Learners are taught problem-solving and decision-making in addition to the subject matter of a given course. The equipment is easy to use. In addition, reports on IVD technology in the United States consistently showed that the technology was effective, flexible for training large numbers of widely differing learners, reduced learning time, and improved retention.

To determine whether IVD could help meet India's critical IM training needs, USAID took the lead role in providing technical support for pilot testing IVD technology.

1.2 OBJECTIVE

The objective of this project was to explore the potential use of interactive videodisc technology to enhance and expand the training capacity in water resources systems planning and management in India. The target trainee population is practicing water resources junior engineers from State and Central Government

organizations. The recipients of this training are to apply the concepts they have learned on the IVD to determine optimal methods of managing water resources. Specifically, the objectives of the project were to:

- introduce the WALMIs and universities to state-of-the-art MCBIVD technology and to provide training and assistance that will enable them to effectively utilize the technology to enhance their training programs.
- develop a pilot MCBIVD Level III training course and conduct the course for selected staff from the WALMIs and universities.
- develop in one or more WALMIs an independent capability to develop, evaluate and modify existing training courses.
- assess the relevance of IVD training courses in the WALMIs.

1.3 SCOPE OF WORK

In the contract, EDC was specifically charged with the following major activities:

1. To develop interactive videodiscs on irrigation management.
2. To assess the appropriateness and effectiveness of IVD for irrigation management training in India.
3. To train Core Team in the development of IVD courseware.

1.4 PROJECT OUTPUTS

According to the USAID/EDC contract, by the end of the contract period, the project would have provided the following deliverables:

1. Train a Core Team of approximately 10 faculty in the basic skills of IVD courseware development.
2. Develop five interactive videodiscs that will demonstrate the capabilities of IVD to deliver irrigation management training.
3. Assess the effectiveness and appropriateness of the IVD modules in WALMI training.
4. Select, procure, and install IVD systems, ancillary equipment, and software to allow use of IVD applications.

1.5 OVERVIEW

The remaining sections of this report provide a brief history of the project and its major activities, a discussion of the significant project accomplishments, a description of those task areas where project outputs

are less than anticipated, and recommendations for future development and expansion of the use of IVD in irrigation management training.

2 PROJECT HISTORY AND MAJOR ACTIVITIES

2.1 IVD MODULE DESIGN AND DEVELOPMENT

In the early stages of the project, activities focused on design of the first IVD program and a production plan for its development. A Management Committee Meeting was held in March 1990, to review the design of Module 1, and to refine the topics for the next two modules, Operations and Drainage. At that meeting, the importance of identifying subject matter experts (SME) who had strong understanding of field practice as well as academic understanding of the content was also discussed.

By the end of May 1990, the design, video production and post-production for Module 1 was completed in India, and discs were mastered in London. In late 1990, the designs of Modules 2 and 3 were reviewed.

In May 1990, EDC conducted a demonstration of Module 1 for Ms. Henrietta Holzman, USAID Assistant Administrator. Ms. Holzman found the videodisc extremely interesting and considered it a "highlight" of her trip through the USAID Asia missions.

Ms. Radha Singh, Joint Secretary of the Ministry of Water Resources, another guest of honor at the demonstration, also found the videodisc to be an outstanding example of a new technology that can support Indian development.

At the Management Committee that subsequently took place, the members discussed with Mr. Navin Kumar, Director of External Affairs of the Ministry of Water Resources, the prospects for financial support for IVD after the project is completed. Mr. Kumar felt that there would be strong support for the technology within the Ministry of Water Resources, in view of the contributions IVD can make to the Ministry, and the valuable resource the Core Teams will provide after they develop IVD skills.

The Committee also discussed the fact that continued training and technical assistance is likely to be needed for some time after the completion of the project in order to ensure that India develops an independent capability in IVD development.

A demonstration of Module 1 was conducted for the Committee members. They were impressed by the Module and excited by the prospects for future opportunities to use the IVD technology.

At the end of December 1990, the third Management Committee Meeting was held in New Delhi. The committee approved the topic for Module 2, "Crop Water Requirements and Water Flow Measurement," and for Module 3, "Drainage."

It soon became clear that there was no acceptable standard content available for either Module 2 or 3, and the EDC team had to develop the content themselves, utilizing the expertise of subject matter experts (SMEs) from India and the United States. The primary consideration of the EDC team was developing content appropriate for IVD technology, i.e., content that is not just "theoretical" but develops skills directly applicable to the field. According to the SMEs, the content that EDC developed is highly innovative, and, in itself, will provide an extremely valuable contribution to irrigation management training.

By March 1991, final development of the macro and micro designs for Modules 2 and 3 were completed and video production of Modules 2 and 3 were begun.

By mid 1991, discussions between USAID and the EDC team were held to consider the feasibility of developing a module on "water-user participation." The EDC Project Director held a number of meetings with SMEs to determine whether such a topic would be appropriate for IVD technology. The conclusion was that this topic would make an extremely valuable and interesting videodisc module.

By that time, however, the delay in GOI approval of the NMIC began to affect videodisc production. As the EDC team moved into simultaneous development of two discs, additional IVD equipment became essential in order to keep the project on schedule. Therefore, EDC staff found it necessary to formulate some creative equipment solutions, e.g., using isolated microcomputers to develop software and then transfer the software to the IVD systems.

Thus, the delay in NMIC approval made the programming and graphics development process far more difficult and complex. In addition, there were extreme difficulties in communications and logistics between the United States, Aurangabad and Udaipur. As a result, in July 1991, EDC discussed with USAID relocating the field sites from Aurangabad and Udaipur to New Delhi. In mid-September 1991, USAID gave EDC permission to do so. EDC completed this relocation to New Delhi in November 1991.

Video production of Modules 2 and 3 was completed in July and August 1991, respectively. The two modules were submitted for mastering in London during the last week of August 1991, as planned.

At the same time, research for Module 4 began. Subject matter experts were identified and background materials collected. By September 1991, a preliminary design document of Module 4 was submitted to USAID which explained the direction the module would take and verified the appropriateness of its topic, Local Water Users Associations. Officials at USAID gave verbal approval for the design.

In November 1991, research for a topic for Module 5 began. At the Management Committee Meeting held in December 1991, the topic of Flow Measurement Devices was chosen for Module 5.

By June 1992, Module 1 had been completed, including alpha and beta testing. At that time, mastering and replication of Module 2 and Module 3 were also completed and reviewed by SMEs.

The scripting and micro design for Module 4 was also proceeding on schedule, and final design specifications were completed in April 1992.

Meanwhile, the topic "Water Flow Measurement" was finalized for Module 5 and approved by the Management Committee. It was also decided that Module 5 would focus on the modified Broad Crested Weir (BCW), since that type of device is simple and inexpensive to construct.

By April 1992, the design for Module 5 was complete and preparations were made for filming.

By the end of August 1992 Modules 4 and 5 were completed.

In September GOI and USAID approved EDC's request for copyrights of Modules 1-5.

2.2 TRAINING AND TECHNOLOGY TRANSFER

Training in the United States

Training of the two Core Teams, one from WALMI Aurangabad and one from CTAE, was held at EDC in Newton, Massachusetts, May 28-June 30, 1990.

During the first week of training, IVD experts fully discussed the theoretical aspects and basic concepts of IVD design and production. The Teams therefore got the prerequisites for understanding what

IVD is and how to move ahead with it. In Phase 2 of the training, there was a workshop environment in which the Teams developed an instructional design, working with facilitators who were experts on IVD design and development.

Each Core Team worked separately. Their first task was to identify a topic. They then turned to developing contents and worked on a macro and micro design.

In between workshop sessions, the trainees went on a number of field trips to world-famous institutes, e.g., to Harvard University, MIT, a private company that develops IVD, and a video/film production studio. They saw IVD applications (at Harvard Law School) and very sophisticated high-tech. They learned a lot of powerful techniques, including those from a production studio.

From the training, the Core Teams learned, from a "hands on" process, how to develop IVD courseware, how to develop a team spirit among people of different disciplines, the art of listening to others and adjusting to others' decision-making, and how to be flexible. They also got a checklist of steps for developing IVD. In addition they received project management software and learned to use it. They also received the Dr. Halo graphics package and were shown how to use it.

In evaluating the training workshop, the participants found the faculty second to none.

After the workshop, the Core Teams believed that they would be able to form a team that would become competent to develop IVD independently. However, they felt they needed a closer connection with EDC in order to do that. Although the WALMI Core Team was over-committed with WALMI responsibilities, they hoped to find a way to carve out time for IVD activities, probably from their personal time.

Ashish Basu of NIIT, who also attended the training, felt the training was valuable because it taught the Core Team to interactively modify and evolve the courseware as they went along. He felt the combination of training with an objective toward actually producing a design was very effective. He also noted that the training itself was "customized," responding to the interests of the Core Teams.

Upon completion of the workshop, participants emphasized that they had not only learned a tremendous amount about IVD, but that they also learned other styles of training which they wanted to apply in their own work. These included the importance of flexibility, and having an iterative process in order to improve the training material.

Training in India

During the period of July–December 1990, the capabilities of the Core Teams and the participating institutions were reviewed to determine the resources that would be necessary to ensure that the Core Teams would develop their IVD skills and that the institutions could effectively adopt the IVD equipment.

Additional needs were identified and communicated to the Directors of the participating institutions. The most important of these needs included sufficient time for the Core Teams to participate with the EDC IVD team in the development of Modules 2–5 as part of an informal "hands on" training to develop their IVD skills.

By June 1991, however, it became clear that the WALMI Core Team members were under severe time constraints in fulfillment of their regular staff obligations. As a result, their involvement in Module 2 consisted almost entirely of acting as SMEs. They had very little time to allocate to observing and becoming involved in other aspects of IVD development. Based on communications with the WALMI it also became clear that those time pressures would not moderate in the following year.

At the same time, the IVD project activities continued to be highly time sensitive and tightly scheduled. The nature of IVD development further complicated the situation because it is impossible to precisely schedule IVD production activities very far in advance. The EDC team had to move ahead to the next development activity as soon as possible after the requisite preceding activity was completed.

As a result, the Core Team's involvement in Modules 2 and 3 were far less than had been earlier envisioned. These limitations, of course, had a major impact on the extent to which the WALMI Core Team was able to develop their IVD skills.

In response to this situation, the Project Director developed an alternative approach to providing the Core Team with "hands on" IVD development experience.

In July 1991 the new training approach was submitted to the WALMI Aurangabad Core Team and the CTAE Core Team for their feedback. The new approach was based on giving the Core Teams the experience of developing an IVD training program completely on their own, with EDC acting only as an advisor and the Core Teams having complete control over "their" IVD. Dr. Rakesh Aeron and Dr. S.G. Bhogle, the Directors of the CTAE and WALMI Aurangabad Core Teams, respectively, reviewed Dr. Brodman's proposal and were very enthusiastic about the new approach. In September 1991, Dr. Brodman notified the CTAE and WALMI Aurangabad Core Teams to begin identifying topics of interest for each of

their training discs. She then submitted in November 1991 a very detailed plan to the Core Teams outlining the various stages of the process. Dr. Brodman met with the Director of WALMI Aurangabad and with the Core Teams to discuss all aspects of the plan in December 1991.

In January, Ed Robbins conducted a Core Team workshop on IVD design in Aurangabad as part of the new approach to training developed by Dr. Brodman. At the workshop, Mr. Robbins provided detailed guidance specific to the teams' needs regarding production of their designs.

In May, the Core Teams participated in a production workshop for the IVD Module they were developing.

From January through June 1992, Dr. Brodman was in ongoing communication with both Core Teams. The design and production programs for both Core Teams progressed very well.

In September 1992 the videodisc produced by the Core Teams was pressed and a copy given to each Core Team. Programming of those IVD programs continues by the Core Teams.

Transfer of Skills to NIIT

An important objective of the project was to develop IVD courseware production skills in India. As part of the process to achieve that goal, EDC transferred many skills to its partner Indian firm, NIIT. As NIIT's skills expanded, NIIT took on wider IVD development tasks, e.g., day-to-day management of the programming aspects of the project. In June 1991, with approval from USAID, EDC's subcontract with NIIT was revised to reflect NIIT's ability to take on more IVD development activities. Under the revision, NIIT managed the day-to-day programming and communicated regularly with EDC Head of Programming, John Correa, through an online data transmittal service and by courier. In that way, EDC maintained overall design/technical specification and quality control responsibilities.

2.3 PROCUREMENT AND TRANSFER OF IVD SYSTEMS

Visage, Inc. was selected to provide the equipment for the MCBIVD project.

The equipment specifications of the equipment are presented in Annex A. A testing procedure for the systems was established, and shipping was scheduled to commence on receipt of the NMIC (Not Made in India Certificate), which EDC was informed would be approved in the month of July 1990.

In late 1990, the selected shipper for the IVD equipment, Matrix International, arranged for equipment shipment upon receipt of the NMIC.

NIIT, on the behalf of EDC, also conducted a site review and checked each institute's facilities to ensure they were ready before the equipment was shipped.

In January 1991, six months after the NMIC was supposed to be received by EDC, the Department of Electronics approved the NMIC, and a major hurdle to importing the IVD systems for the project was overcome. Upon receiving the approval, EDC worked with the Ministry of Water Resources to facilitate the rest of the process for finalizing the NMIC. At that time, it was hoped that the NMIC will receive all required signatures by the end of 1991.

NIIT contacted all of the sites to ensure that all electrical and other site requirements were fulfilled before shipping the IVD equipment to the sites. John Correa also coordinated with NIIT to ensure the appropriate brand of Constant Voltage Transformers (CVTs) were purchased and installed for each site. All of the sites invested considerable time and resources to build these facilities. NIIT also prepared to send an electrical engineer to each site to ensure that the facilities were properly completed, e.g., there is adequate grounding for the equipment.

It took more than a year for the NMIC to be completely processed by GOI. This continued delay had a substantial impact on NIT's programming schedules for Modules 2–5. In March 1992, EDC finally received all signatures from the Directorate Generale Trade and Development (DGTD) for all items on the NMIC. One final form, the Duty Exemption Certificate, was, however, required before EDC was allowed to ship the IVD systems to India. The Duty Exemption Certificate was finally issued by GOI in March 1992; the NMIC was received by EDC in May 1992.

EDC had installed most of the IVD systems at the sites by July 1992. With the approval of GOI, the final shipment of a few systems that were being used for IVD development was initiated in October 1992. Along with the systems, System Administrator Manuals, User Manuals, and other support materials were delivered.

For the first shipment, which consisted of most of the IVD systems and auxiliary equipment, John Correa of EDC tested the equipment before it left the United States, and after it reached the sites in August 1992.

For both shipments, NIIT helped ensure that each site received its designated equipment and that the equipment is not damaged. Dr. Brodman sent an implementation log sheet to NIIT, which gave them a standard procedure to follow when unpacking the IVD equipment.

2.4 EVALUATION OF IVD TECHNOLOGY

By early 1990, rigorous evaluation plans were developed at each project site, in a collaborative effort of EDC and the WALMI or University faculty. Evaluation teams were identified at each site.

By June 1990, the schedule of the evaluation process, that was developed by Dr. Janice Brodman with the WALMI and CTAE faculty, had to be rescheduled due to delays in GOI approval of the NMIC. Equipment required to field test Module 1 before the evaluation could not be shipped until the NMIC was in hand.

By August 1990, the evaluation schedule was revised and the new schedule approved by the WALMIs and CTAE.

By June 1991, "control group" evaluation data had been gathered at all three WALMIs and at CTAE using pre- and post-evaluation tests administered to trainees receiving non-IVD training on maintenance problems in irrigation canals. The tests were conducted smoothly, testifying to the value of the pilot tests that had been carried out in the evaluation test design process.

It was hoped that the NMIC would be approved so that the IVD tests could be completed by April 1992. Given that schedule, it had been planned that the evaluation data would be analyzed and the report completed by July 1992.

Further delay in issuance of the NMIC, however, again postponed the evaluation plan. All aspects of collection of the baseline data from all sites were complete by end 1991. Due to the delay of the NMIC approval until March 1992, however, the equipment was not installed at the sites until end July 1992. The IVD tests were subsequently conducted, and the data collected, but the project ended before it was possible to analyze the data.

2.5 PROJECT EXPENDITURES

2.5.1 Project Budget

As finally amended, the project budget was $3,888,930. The contract specified eight budgetary line items, namely "Salaries," "Travel and per diem," "Training," "Equipment," "Other direct costs," "G&A-Direct," "Subcontracts," "G&A-Subcontracts." A summary of the allocation of expenditures among these eight categories is given in Table 1. Note that these cost data are as of the most recent letter-of-credit report (December 1992) and do not contain all project completion and close-down expenses.

TABLE 1: Summary of Project Expenditures as of December, 1992.

Category	Contract Budgeted Amounts	Expenditures to 12/31/92	Amounts Remaining	% Spent
Other Direct Costs	721,799	618,213	103,586	85.65%
Equipment	369,213	379,356	-10,143	102.75%
Salaries & Wages	1,230,558	1,224,162	6,396	99.48%
Travel & Per Diem	352,858	291,088	61,770	82.49%
Training	55,093	55,093	0	100.00%
G&A (Direct)	756,816	703,698	53,118	92.98%
Subcontracts				
Datamation		21,023		
Gateway		5,771		
Geovision		52,272		
Rod Daynes & Assoc		14,800		
AAPC		8,000		
Steve Lambert		16,000		
William Bramble		4,000		
Four Winds Software - FFP		28,360		
Four Winds Software - Materials		8,131		
NIIT		108,432		
Colorado State University		124,190		
Total Subcontracts	377,849	390,979	-13,130	103.47%
G&A (Subcontracts)(1)	24,744	22,392	2,352	90.50%
Grand Total:	3,888,930	3,684,982	203,948	94.76%

(1)Travel line includes $56,868 in International Air Travel which bears the 5% Subcontract overhead rate.

2.5.2 Personnel Resources

As amended, the contract called for the use of approximately 344 person-months of professional and non-professional effort on the part of EDC employees and consultants. As of September 30, 1992, approximately xxx person-months had been expended. A detailed breakdown of technical effort utilized by the project is given in Table 2. Note that the total person-months are as of the most recent letter-of-credit report (December 1992) and do not contain all person-months related to project completion and close-down.

TABLE 2: Level-of-Effort Summary

Position	Budgeted Person-Months	Person-Months Invoiced (through Dec., 1992)	Person-Months Remaining	Percent of Budgeted Person-Months Utilized
Administrative Assistant	44.8	42.3	2.5	94.42%
Field Management	66.4	61.4	5.0	92.47%
IVD Evaluation	14.8	8.3	6.5	56.08%
Program Mgmt & Procure	19.3	19.0	0.3	98.45%
Project Director	37.9	37.1	0.8	97.89%
Subject Matter Experts	47.5	13.9	33.6	29.26%
TA-Production	24.7	17.0	7.7	68.83%
TA-Design Programming	85.8	73.5	12.3	85.66%
Training	2.8	2.8	0.0	100.00%
	344.0	275.3	68.7	80.03%

*Subject matter Experts were subcontracted. This table only reflects employees and consultants.

3 PROJECT ACCOMPLISHMENTS

3.1 ACHIEVEMENT OF PROJECT TARGETS

Section 1.4 of this report listed the project outputs that are identified in the contract. The degree to which these outputs have been achieved is discussed here.

Training

The contract called for a Core Team of approximately 10 faculty from a selected institution to be trained in basic IVD skills. At the close of the project, EDC had trained two Core Teams at two different institutions: WALMI Aurangabad and CTAE. These Core Teams were trained in the areas of IVD design and development by top IVD experts, during a six week workshop held in the U.S. The Core Teams also participated in and observed the design and production of two videodisc. In addition, each team was given access to resources to enable them to design and produce their own videodisc. They also received hands-on workshops in India on the major aspects of IVD design and development to support the production of "their" videodisc program. Each Team received a copy of the videodisc they developed.

IVD Production

Another project output was development of 40-50 hours of classroom training or five videodisc sides. It is worth noting that, in general, development of a moderately complex IVD course requires one year of a full IVD team. Yet, in three years, EDC completed all five IVD courses, each of which has a very high level of complexity. This was accomplished with one person in India taking on all of the IVD team roles except coding the program. The project completed five videodisc programs:

- Diagnosis of Maintenance Problems in Distribution Networks
- Estimating and Using Crop Water Requirements
- Introduction Drainage Problems and Solutions
- Working with Water User Associations
- Water Flow Measurement: A New Approach

Brief descriptions of each IVD program are as follows:

1. "Diagnosis of Maintenance Problems in Distribution Networks"

This is a "simulated travel" videodisc program that sharpens engineers' ability to quickly and accurately identify maintenance problems and their causes in the field. The program lets the trainee "drive" or "walk" along three canals several kilometeres long, and inspect over 100 sites from many viewpoints in both "wet" and "dry" conditions. The trainee must identify all of the maintenance problems and their causes at each inspection site, and receives a score reflecting the accuracy of his diagnosis.

2. "Estimating and Using Crop Water Requirements"

The "Crop Water Requirements" (CWR) program employs audio, text, graphics and a series of interactive computerized worksheets to teach the technical procedures and equations necessary to accurately estimate irrigation water requirements at the crop root zone. The program teaches irrigation engineers how to apply these CWR estimates under conditions of short water supply (deficit irrigation) in order to maximize the benefits of existing water resources.

3. "Introduction to Drainage Problems and Solutions"

This module is designed to enhance engineers' awareness of the importance of proper drainage systems and to teach them basic concepts in assessing the drainage needs of a site, selecting a proper drainage solution, and determining the design specifications of the drainage system.

The program provides a hypertext tutorial which allows the trainee to choose the depth of information (graphics, text, and slides) he wants to access regarding technical terms related to drainage. He then undertakes three case exercises in which he must make decisions about three parts of drainage system development: assessment, selection and design.

In the assessment section, the trainee can survey a site by analyzing topographical contours, cropping patterns in two growing seasons, and ownership boundaries. He can "interview" farmers and village heads in different parts of the site, and see photographs of different site areas. In this way, he learns to correlate information that is gathered in site walkthroughs with information normally available in his office. He also learns how to account for discrepancies in the two types of information, and that accurate conclusions require drawing from both sources of information.

At the end of each case exercise, the trainee must review and correct a report on the drainage situation. The trainee's understanding of the case is measured by how accurately he revises the report.

4. "Working with Water User Associations"

This program teaches engineers about important aspects of water user associations and how such associations can help improve water management. The emphasis of the program is on improving engineers' ability to communicate effectively with water users, support development of water user associations, and improve communication between the irrigation system agency and water users.

In the program, the engineer experiences simulated field situations in which he must respond to water users' questions and problems, facilitate meetings with water users, and participate in a "walk through," along with representatives of a water user association, in order to identify and resolve problems on the irrigation system. He sees the consequences of his decisions, actions, and responses to water users. During

the simulations, he receives information about alternative ways to respond to various situations, as well as opportunities to try different approaches and observe the consequences.

5. "Irrigation Flow Measurement: A New Approach"

One section of this program discusses the advantages and disadvantages of the most commonly used water measurement devices in India. The major section of the program focuses on the device which best combines low cost, ease of construction, and accuracy -- the modified broad-crested weir. The program offers step-by-step instructions on:

- How to select an appropriate site
- How to design and build the modified broad-crested weir
- How to maintain this type of device once it is built

The program also includes an interactive "trouble-shooting" exercise that trains engineers to recognize flow measurement problems that could occur if the device has been improperly installed or maintained.

With regard to production of the IVD programs described above, it is also worth noting that commercial videodiscs are commonly designed according to a "cookie cutter" pattern, in order to reduce costs. When multiple IVD programs are developed, they are designed around a single set of macro design specifications. This reduces design time and costs. The MCBIVD project had originally been designed on this principle.

However, during development of the first module, it became clear that this approach would seriously impede achievement of one of the major project goals: determining the effectiveness of IVD technology for irrigation management training in India. Project staff found that such training requires several different types of discs; therefore, the five IVD programs described above each represent different approaches and designs, offering different contributions. By developing the IVD programs in this way, it made possible determination of which types of discs are useful and appropriate for irrigation management training in India. This approach did, however, demand considerably more time and effort than the single macro design approach.

In addition, given the diverse cultural demands, limited oral English capability, and unfamiliarity with computer technology of the WALMI audience, the designers could not apply the design techniques commonly used for IVD in the U.S. and Europe. Instead, they formulated unique and creative interfaces that would be appropriate for the target audience.

With regard to costs, developing an IVD course can vary tremendously due to variations along a number of factors. Development of commercial videodiscs generally run between $100,000 (for low-end "grant" discs or some commercial "cookie cutter" discs) to $3,000,000 (for discs with elaborate video graphics and relatively soft content somewhat like the India IVD "Water Users Associations" module.)

Considering the depth of content, the complexities of the program, and the sophistication of the video/graphics production, the IVD modules developed under the MCBIVD project are comparable to discs produced in the U.S. for approximately $500,000 or more.

Despite the difficult production conditions described below, the India IVD project produced five videodiscs in collaboration with Indian organizations, trained two Core Teams in basic IVD skills, developed and implemented a rigorous evaluation plan in collaboration with four Indian institutes, procured, transported, and installed approximately $400,000 worth of equipment and software to India, developed hardware manuals, and conducted "troubleshooting" hardware maintenance training for a total budget of $3.8 million.

Procurement of IVD systems

The project reviewed all of the alternative IVD systems available at the time (late 1989), identified those that were most reliable, field tested, and compatible with current Indian conditions, and selected final systems based on cost competitiveness.

The sites were fully reviewed and assisted in preparing IVD rooms that had proper electrical and other systems. Power conditioning equipment was purchased and installed.

The IVD systems were procured, tested in the U.S. before shipping, shipped to the sites, tested at the sites, and installed. In addition, a selected individual at each site was trained to manage and maintain the systems.

At the request of the Central Water Commission (CWC), the project also reviewed an potential IVD room at CWC. It has been arranged for NIIT to help CWC ensure the room is properly conditioned for the IVD systems. NIIT will also install systems in CWC.

The final distribution of systems is as follows (see Annex B):

- CWC: 5 IVD systems
- WALMI Aurangabad: 12 IVD systems
- IMTI Tiruchy: 10 IVD systems
- WALMI Anand: 10 IVD systems
- College of Technology and Agricultural Engineering, Udaipur: 13 IVD systems

Evaluation

Another output of the project was to assess the quality and relevance of the IVD courses. The project developed rigorous evaluation plans with each of the three "testing site" WALMIs and with CTAE. The plans were developed by the entire faculty of each site, with the Project Director leading the planning

sessions. This effort created a sense of commitment and "ownership" in the IVD technology among the faculty who might otherwise have been hostile to the new technology.

3.2 CONTRIBUTION TO THE FIELD OF WATER RESOURCES

Greater efficiency and effectiveness in water use is an important goal for India and for many other developing and developed countries. One way of achieving improvements in efficient and effective use is through improved training of engineers who plan, develop and manage water resources. The MCBIVD project was unique. Although there have been IVD projects that involved some video shooting in the developing country and had as the target audience the developing country, this was the first project that involved extensive participation of host country personnel, in the form of hands-on training and production.

It produced five videodiscs that can be rated in the top 5% of videodiscs developed anywhere.

It also developed the seeds of IVD courseware expertise in India that will grow into full-fledged capability–and even a new industry–with the proper support.

In addition, the project demonstrated that multimedia, in the form of IVD, can be an appropriate, effective technology for training professionals in a developing country. It opened the door to learning more about how multimedia can be used in other key fields to improve training.

4 PROJECT DIFFICULTIES

This was a landmark project, developing multimedia courseware for the first time entirely in a developing countries. As with any ground breaking project, this project encountered several difficulties.

4.1 IVD PRODUCTION

4.1.1 Content Development

In general, an IVD development team is not responsible for developing the course content–instead, clear content is available, along with a trainer experienced in teaching that content. The India IVD project was designed with the understanding that there was existing content, generally agreed-upon by experts in that field, which the project team could utilize to produce videodiscs.

Early in the project, however, it became clear that either existing content was too abstract to serve as the basis for a "hands-on" IVD course, or there simply was no content that was generally agreed upon by experts. Furthermore, the project objectives required "pan-India" content–an extremely difficult requirement in the field of irrigation management for a complex and varied country like India.

As a result, the IVD team had to develop the course content BEFORE they could even begin the project objectives of developing the videodiscs. Furthermore, they faced the challenge of developing "hands-on" course content on water management that is applicable across India.

This need to develop content -- which was not part of the original project scope, but was essential to achieving the MCBIVD project objectives -- was, by several orders of magnitude, the single most time-consuming and expensive activity in the project. It added greatly both to the time pressure for the project team, and to the project expenses.

4.1.2 Communications and Logistics Difficulties

Producing videodiscs that require extensive shooting in the field is highly challenging under any circumstances. The difficulties for successful shooting in the field in India are multiplied many fold due to lack of reliable telecommunications systems. During periods when it was essential to have rapid, reliable communications between shooting sites and management sites, the phones were sometimes inoperable for many days; it was virtually impossible at any time for the two sites of Aurangabad and Udaipur to communicate by phone with one another.

4.1.3 Delay in GOI Approval of the NMIC

The delay in the NMIC (Not Made in India Certificate) prevented transport of the IVD equipment to India. As a result, the project had about half of the systems that were required for programming and testing. For a long period, the project team found ways to compensate for this situation to avoid falling behind on the programming/graphics schedule. By April 1992, however, the lack of systems at NIIT and in India for field testing began to affect the production schedule.

Since the systems did not arrive in India and get through Customs until mid-July 1992, the programming fell behind schedule. This affected all subsequent activities, e.g., final integration, alpha testing, field testing, and installation.

4.1.4 Technical Problems

There were several technical problems encountered. For example, a major production house in Bombay destroyed part of the first module film. The problem apparently stemmed from using chemicals that had deteriorated because that production facility rarely processed 16mm film, which was being used by the project. Luckily, the project manager had only a small portion of the film processed, as a precaution. As a result, most of the film was saved; nonetheless, a considerable amount of re-filming was required.

4.1.5 Political Obstacles

During in the first year of the project there were production delays caused by problems in the relationship between WALMI Aurangabad and the Irrigation Department.

In addition, political instability, both in India and globally, created problems. During the project lifetime of three years, India had five governments. Each time a government fell, approvals and responses to requests for information were significantly delayed. Some of the delays were petty, e.g., 5 litre limits on purchasing petrol during video field production. They added up to large delays in work schedule, however, and enormous pressure on the entire project staff.

4.2 PROCUREMENT AND TRANSFER OF IVD SYSTEMS

The IVD systems were originally scheduled to leave the U.S. by July 1990. Due to the delay in GOI's processing the NMIC, the systems did not leave the U.S. until July 1992. This delay had enormous implications and raised massive difficulties for all project activities, as described in other parts of this section.

An additional problem was that local Indian vendors could not, as claimed, provide service for the IVD systems that was of acceptable quality. Therefore, it was necessary for the project to train someone at each site in maintenance and troubleshooting. This required sending a technical expert from the U.S. to provide that training in India. Although the cost implications of this requirement are relatively small, it did extend the time involved in installing the equipment.

4.3 IVD TRAINING

Originally, the project anticipated training a nucleus of skilled faculty at WALMI, Aurangabad or at CTAE. Based on USAID's experience, it was anticipated that a single nucleus Core Team, drawn from the WALMI and CTAE, could achieve project goals.

Project experience revealed, however, that training of at least two Core Teams having independent IVD courseware design and development skills would have to be carried out at two sites, WALMI, Aurangabad and CTAE. The two sites–a WALMI and a university–were essential to building the nucleus of skills envisioned in the project objectives.

Having two sites rather than one, more than doubled the complexity of communications, production logistics, travel, and quality control. The added difficulty of running an additional training and production site, compounded by the dearth of IVD systems due to the delay in the NMIC approval, limited the amount of training that could be conducted at either site.

4.4 EVALUATION OF IVD TECHNOLOGY

The IVD evaluation, which was to be a crucial part of the project, could not proceed as scheduled due to the delay in the NMIC. Although all of the baseline data were collected, IVD data could not be collected on a timely basis because there were no IVD systems for use for testing.

5 RECOMMENDATIONS

5.1 LEVERAGE INVESTMENT AND IDENTIFY "LESSONS LEARNED" AND FUTURE OPPORTUNITIES

There are many areas in which IVD can contribute to improving training in India. Given the seeds of IVD expertise that have been sown in India, it would be valuable to leverage the investment already made and identify other areas where IVD training could contribute to India's development goals. These areas include population, health, manufacturing, safety procedures, etc. Decisions should be made about whether and how to use IVD to help meet training goals of these other important areas.

To do so, a full evaluation is necessary to rigorously examine opportunities and requirements for the future. Such an effort should suggest priorities for future activities, including the precise subject matter that should be developed.

In order to conduct this effort, it would be valuable for USAID to support the conduct of five major tasks:

(1) Use the data already collected by the MCBIVD project to evaluate IVD to determine the appropriateness and effectiveness of IVD in India.

(2) Identify opportunities for IVD to help improve irrigation management.

(3) Systematically field test the videodisc programs that have been developed. As is the case when any new technology is introduced, IVD must be tested in the field in order to identify and implement minor modifications (such as changes in user interface) that will greatly enhance its impact under those field conditions.

(4) Identify important opportunities to contribute to other areas, including training in population, health, environment, and the private sector.

(5) Recommend "next steps" for the use of IVD in training in India in order to gain greatest value from the technology.

(6) Identify the "lessons learned" about the development and use of IVD in India as they apply more widely to other developing countries.

5.2 CONTINUE TO EXPAND SKILLS IN IVD DEVELOPMENT

At the close of the contract and termination of Consultant support, the Core Teams at WALMI Aurangabad and CTAE will be able to carry out basic IVD production activities. These skills were developed

over a long period and with great effort both by the project team and the Core Teams. It would be unfortunate if those skills were lost rather than enhanced.

IVD skills are complex and demand considerable time to develop; they must also be used on a continuing basis or they will be lost. In order to continue the development of those skills, the Core Teams need to receive support for pursuing their work on IVD development, at least part-time. In the past, they have not been able to work on the IVD courseware production due to other heavy responsibilities. They will need regular time that is to be devoted to IVD production if they are to develop good IVD development skills.

One recommendation is to contract with NIIT to provide some training and support. However, both NIIT and the Core Teams will also need support from an experienced IVD professional. That support is best provided while the Core Teams are in the process of developing IVD courseware. For example, one alternative is to arrange for the Core Teams to continue to work on developing IVD courseware, and during that activity to have access to short-term consultant support by mailing documents between India and the U.S. There should also be some face-to-face instruction and support focused on the particular courseware effort being conducted by the Core Teams.

MOWR and CWC should be encouraged to continue to support the development of IVD courseware by the Core Teams and by NIIT, and provide the Core Teams with additional training support required to continue to expand India's capability in this area. This might involve contracting with NIIT to provide support to the WALMI Aurangabad and CTAE, and to develop IVD courseware that is needed by WALMIs generally. The Core Teams should also be involved in development of such IVD courseware.

There would also be a need for USAID to support provision of IVD expert consultant on short-term bases. The consultant would review the design documents of the Core Teams and NIIT, provide advice on the most effective and efficient ways to implement those designs, and go to India on short term assignments to help in production and post-production activities.

5.3 DISSEMINATE PROJECT OUTPUTS

Within India

The IVD project introduced IVD training technology to three WALMIs and an Agricultural University. The extremely positive response to the technology, and the great training need in other WALMIs and other agricultural training institutes suggests that it would be valuable to develop a plan for disseminating the IVD training programs to other institutes.

Outside India

Multimedia is of growing interest all over the world. The India Mission has supported a landmark project in the MCBIVD project, and produced results that are of value to other countries in addition to India. Furthermore, much of the content for the IVD programs was developed by the project and is highly innovative and valuable, according to experts in the field. The final recommendation drawn from the MCBIVD project is to package all of these products in a way that will be accessible to other countries and to inform other countries of the products that have been developed, what they contribute, how they can be used. In addition, a very steep learning curve was climbed to develop the videodisc programs. With relatively little effort, the "lessons learned" from that experience can be made available to other countries.

Annex A

IVD Equipment Specifications

The following specifies the equipment procured for this project.

QUANTITY ORDERED	QUANTITY RECEIVED	ITEM DESCRIPTION	UNIT PRICE (US$)
50	50	Sony PAL/NTSC-compatible laserdisc player LDP-3600D	2,045
50	50	Everex STEP IVD system - Intel 80286 processor - 1 megabyte RAM memory - 40 megabyte hard drive - one 1/2 mb 5.25 floppy drive - eight industry standard expansion slots - 2 serial ports - 1 parallel port - 1 video controller - 1 mouse - windows overlay board - Magnavox analog RGB multiscan monitor	4,073
50	50	Cables: - Screen to serial port - Player controller cable - Player video output cable - Video windows to monitor cable - Video windows VGA loop cable - Screen to player cable - Player video input cable	200
Software:			
50	50	MS-DOS 3.3	incl.
50	50	Video overlay software	incl.
5	5	C compiler	398
2	2	Graphics package	486
Accessories:			
6.	6	PC tool kit	30
50	50	Equipment covers	43
50	50	Stepdown transformers	210

24

EDUCATION DEVELOPMENT CENTER, INC.

BOSTON, MASSACHUSETTS, USA

TOTAL DISTRIBUTION OF EQUIPMENT

Description of Equipment	Quantity	Proposed Location as of 9/30/92	Remarks
Everex STEP 286/12 with Mouse and Monitor	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	1 broken CPU and Monitor 1 broken CPU and Monitor
PC Toolkit	7	1-WALMI, Anand 2-WALMI, Aurangabad 2-IMTI, Tiruchy 2-CTAE, Udaipur	
Sony LDP 3600D	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	1 broken 1 broken 1 broken 1 broken
C Compiler	5	1-WALMI, Aurangabad 4-CTAE, Udaipur	
Step Down Transformer	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	
Equipment Cover	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	
Module 1 Videodisc w/cover	86	14-WALMI, Anand 23-WALMI, Aurangabad 14-IMTI, Tiruchy 23-CTAE, Udaipur 10-MWR 2-USAID	
Module 2 Videodisc w/cover	102	20-WALMI, Anand 25-WALMI, Aurangabad 20-IMTI, Tiruchy 25-CTAE, Udaipur 10-MWR 2-USAID	

25

Description of Equipment	Quantity	Proposed Location as of 9/30/92	Remarks
Module 3 Videodisc w/cover	102	20-WALMI, Anand 25-WALMI, Aurangabad 20-IMTI, Tiruchy 25-CTAE, Udaipur 10-MWR 2-USAID	
Module 4 Videodisc w/cover	102	20-WALMI, Anand 25-WALMI, Aurangabad 20-IMTI, Tiruchy 25-CTAE, Udaipur 10-MWR 2-USAID	
Module 5 Videodisc w/cover	102	20-WALMI, Anand 25-WALMI, Aurangabad 20-IMTI, Tiruchy 25-CTAE, Udaipur 10-MWR 2-USAID	
WALMI videodisc	1	1-WALMI, Aurangabad	
CTAE videodisc	1	1-CTAE, Udaipur	
Visage Software	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	
MS DOS Software	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	
CVT	14	3-WALMI, Anand 4-WALMI, Aurangabad 3-IMTI, Tiruchy 4-CTAE, Udaipur	
Brief Software	1	1-WALMI, Anand	
National M7EN Camcorder	2	1-WALMI, Anand 1-CTAE, Udaipur	broken
National Camcorder Case	2	1-WALMI, Anand 1-CTAE, Udaipur	

Description of Equipment	Quantity	Proposed Location as of 9/30/92	Remarks
Documentation Package for IVD System	4	1-WALMI, Anand 1-WALMI, Aurangabad 1-IMTI, Tiruchy 1-CTAE, Udaipur	
Lantastic Voice Adaptors-installed	50	10-WALMI, Anand 12-WALMI, Aurangabad 10-IMTI, Tiruchy 13-CTAE, Udaipur 5-MWR	
Lantastic Voice Adaptors-Handset w/DOC	9	2-WALMI, Anand 2-WALMI, Aurangabad 2-IMTI, Tiruchy 2-CTAE, Udaipur 1-MWR	
Grey Storage Cabinet	1	1-WALMI, Aurangabad	
Desk with Three Drawers	2	2-WALMI, Aurangabad	
Chair	2	2-WALMI, Aurangabad	1 broken
Mobile Hanging File Cabinet	1	1-WALMI, Aurangabad	
Utility Table	2	2-WALMI, Aurangabad	
Mini Table Fan	2	2-WALMI, Aurangabad	
Apex Cooler	1	1-WALMI, Aurangabad	
Coolair Royal Cooler	1	1-WALMI, Aurangabad	
Dining Table and 6 Chairs	1	1-WALMI, Aurangabad	
Kelvinator Fridge	1	1-WALMI, Aurangabad	
Beige Kelvinator Fridge	1	1-WALMI, Aurangabad	
Table	1	1-WALMI, Aurangabad	
Beds	2	2-WALMI, Aurangabad	Broken
Coffee Table	1	1-WALMI, Aurangabad	
Wooden Platform Couch	1	1-WALMI, Aurangabad	
Kitchen Table	1	1-WALMI, Aurangabad	

27

Description of Equipment	Quantity	Proposed Location as of 9/30/92	Remarks
Cease Fire	1	1-WALMI, Aurangabad	
Blender	1	1-WALMI, Aurangabad	
Hot Plate	1	1-WALMI, Aurangabad	
Mitaso Gas Stove	1	1-WALMI, Aurangabad	No regulators
Cupboards	3	3-WALMI, Aurangabad	
UPS Stabilizer, Case and Battery Box	2	1-WALMI, Aurangabad 1-CTAE, Udaipur	
PC/AT with VGA monitor, 40 MB Hard Drive	2	1-WALMI, Aurangabad 1-IMTI, Tiruchy	
DotMatrix Printer	1	1-WALMI, Aurangabad	Head missing
TenCORE Authoring System	2	1-WALMI, Aurangabad 1-CTAE, Udaipur	
Testrite Lighttable	1	1-WALMI, Aurangabad	Damaged
Microsoft Paintbrush Package	1	1-WALMI, Aurangabad	
Paradise Software	1	1-WALMI, Aurangabad	
Dr.Halo Paint Package	2	1-WALMI, Aurangabad 1-CTAE, Udaipur	
Dr.Halo runtime font and graphics C tools	2	1-WALMI, Aurangabad 1-CTAE, Udaipur	
Methodex PC/XT	1	1-WALMI, Aurangabad	
Hijaak Software	1	1-WALMI, Aurangabad	
CheckIT Software	1	1-IMTI, Tiruchy	
Yashica Samurai X4.0 Camera	1	1-CTAE, Udaipur	
Yashica Samurai Camera Case	1	1-CTAE, Udaipur	
PC Tools (Paintbrush & Reference Manual)	1	1-CTAE, Udaipur	

28

Description of Equipment	Quantity	Proposed Location as of 9/30/92	Remarks
PC Tools (FX Code)	1	1-CTAE, Udaipur	
PCX Utilities V5.0	1	1-CTAE, Udaipur	
Metawindows & Menuet software	1	1-CTAE, Udaipur	
Microsoft Macro Assembler	1	1-CTAE, Udaipur	
C Tree Software	1	1-CTAE, Udaipur	
Brooklyn Bridge	1	1-CATE, Udaipur	
IVD Master Documentation Manuals	2	1-USAID 1-MWR	
Honda Generator	1	1-MWR	
Bajaj Oven	1	1-MWR	

-29

Annex C

PROGRESS REPORTS

EDC prepared and issued Monthly and Semi-annual Progress Reports and Project Implementation Plans, as well as the Project Final Report. A list of reports with the date submitted for each is presented below.

		Date Submitted
A.	Monthly Reports	
1.	July 1991	August 1991
2.	August 1991	September 1991
3.	September 1991	December 1991
4.	October 1991	December 1991
5.	November 1991	December 1991
6.	January 1992	
B.	Quarterly Reports	
1.	May - August 1989	October 1989
2.	July - September 1990	October 1990
3.	January - March 1991	April 1991
C.	Semi-annual Reports	
1.	May - December 1989	January 1990
2.	January - June 1990	August 1990
3.	July - December 1990	March 1991
4.	January - June 1991	August 1991
5.	July - December 1991	February 1992
6.	January - June 1992	September 1992
D.	Final Report	
1.	May 1, 1989 - September 30, 1992	January 1993

-30