

ANNUAL REPORT 1990

International Irrigation Management Institute

CONTENTS

FOREWORD	iii
INTRODUCTION	iv
THEMATIC RESEARCH PROGRAMS	
Overview	1
Highlights	1
Performance Assessment	2
Design-Management Interactions	3
Canal Simulation Models	3
Rice-Based Systems	4
Crop Diversification Network	5
Farmer-Managed Irrigation Systems	5
COUNTRY PROGRAMS	
Overview	7
South and Southeast Asia	
Highlights	7
Sri Lanka	8
Philippines	10
Nepal	11
India	13
Bangladesh	14
West Asia and Northeast Africa	
Highlights	15
Pakistan	16
Sudan	18
Northwest and West Africa	
Highlights	19
West Africa	19
Morocco	20
Latin America and the Caribbean	21
MANAGEMENT TRAINING	
Overview	21
Highlights	21
INFORMATION	
Overview	22
FINANCE AND ADMINISTRATION	23
ANNEXES	30

FOREWORD

During 1990, the Institute progressed steadily toward translating ideas into results, the goal I referred to in last year's Annual Report. As you will read, several important projects were successfully completed: the first stage of our program on Farmer-Managed Irrigation Systems, our collaboration with IRRI on Irrigation Management for Rice-Based Systems, the first phase of a key project on Irrigation Management for Crop Diversification in Southern Sri Lanka and the first part of our Training Needs Assessment in Malaysia.

At the same time, several new projects, that hold promise for significant output were initiated during the year: a collaborative program with the Gezira Board in Sudan involving the posting of a Senior Water Management Advisor to Wad Medani, a new "Irrigation Management Policy Support Activity" that supports Government of Sri Lanka efforts to implement its policy of participatory management, and a new series of studies on the interactions among irrigation design, management and performance.

Our growing emphasis on results was reflected in our publication output, which during 1990 was significantly greater than that of previous years. A total of 54 Institute publications were issued, including the proceedings of three important IIMI workshops.

From an international point of view, 1990 also saw several positive new turns. In January, the External Review Panel commissioned by our donor Support Group completed its review of our program and management, and concluded that we are "performing a vital function in promoting food security around the globe," and that IIMI "has the potential for even greater contributions as it gains further experience and knowledge concerning the difficult problems with which it is dealing."

Following the Panel's suggestion that IIMI sharpen its program focus, in June, our Board of Governors approved a major, new, long-term program to improve procedures and practices in the assessment of the performance of irrigation systems at all levels. The new program, drawing on the best knowledge and experience around the world, will aim to develop and field-test new procedures in several systems and disseminate the results through a wide network during the coming years.

In November, the Government of Sri Lanka confirmed that it would make available to IIMI an impressive new building located in an attractive area close to the nation's Parliament on the outskirts of Colombo. IIMI plans to move into its new

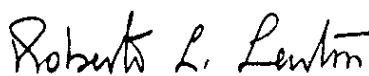
headquarters facilities, which will meet the Institute's needs well into the 21st century, during 1991.

In December, in follow-up to a further External Review Panel recommendation that IIMI should take steps to integrate its worldwide research programs, IIMI selected Mr. Khalid Mohtadullah, formerly General Manager (Planning) of the Pakistan Water and Power Development Authority, to the newly created position of Director for Research. The new position will provide overall leadership to the Institute's research programs, by directing thematic research programs and by advising on country-specific projects.

Also in December came what was perhaps the most significant institutional development in the first seven years of our existence: our incorporation into the network of International Agricultural Research Centers supported by the Consultative Group on International Agricultural Research (CGIAR). Established in 1971, the CGIAR is an association of countries, international and regional organizations, and private foundations dedicated to supporting a system of agricultural research centers and programs around the world. Membership in the CGIAR network not only bestows a degree of core funding assurance; it also means that IIMI researchers will in future work more interactively with other scientists in a worldwide multidisciplinary effort to improve food production and its sustainability within natural resource systems.

The shift will raise IIMI's research horizons in several directions. It will mean an added review dimension, with the CGIAR's Technical Advisory Committee examining IIMI programs in much greater detail than before. Our programs of thematic research will expand to include the bigger picture that encompassed resource management, policy issues and a sectoral approach. Our work will combine disparate realms of knowledge in original ways, and the quality of our research will be judged against ever more rigorous standards.

With the future now firm, IIMI has an unique chance to make decisive breakthroughs on all fronts. The 1990s will be a decade of great challenge to our Institute; we look forward to rich opportunities to further translate our ideas into results, and our results into improvements in the quality of life throughout the developing world.

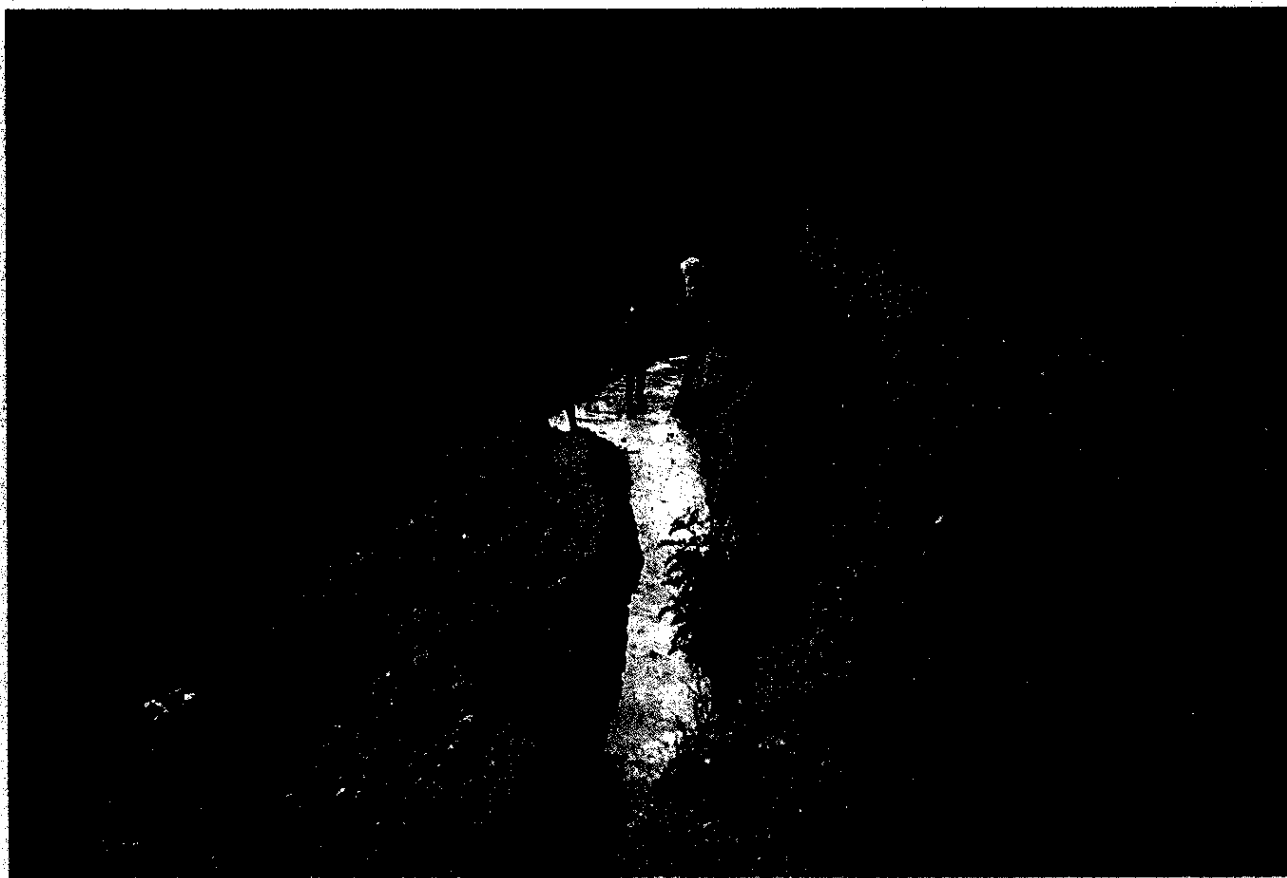


Roberto Lenton
Director General

INTRODUCTION

The structure of this report departs from previous Annual Report formats. The Thematic Research Programs section precedes the Country Programs section, which has been reorganized in order of broad geographical zones. Each group of reports is preceded by an executive summary to highlight achievements during the period under review.

There are separate sections describing activities and results in Management Training, Information and Finance and Administration. A concluding Annexes section provides details of projects, funding sources, publications, meetings, awards and other matters of record.



Hill irrigation system, Sindhupalchok.

THEMATIC RESEARCH PROGRAMS

OVERVIEW

IIMI's research program is aimed at yielding widely applicable results that promote better ways to manage irrigation systems and increase performance. Unlike many other kinds of agricultural research, nothing of significance in irrigation management can be studied in a laboratory. IIMI must therefore put its staff into direct contact with diverse irrigation management situations in the field, and must seek out appropriate openings to this end.

For this reason, one of the two principal methodologies employed by IIMI in its research program is *collaborative field and action research*. Such research involves IIMI staff working on specific projects in active collaboration with national irrigation agencies or other suitable organizations, and according to established criteria for project selection. The findings and results that emerge from this type of research are evaluated and compared across countries and regions through *thematic research*, the second of IIMI's research methodologies. IIMI seeks to combine thematic research and collaborative field and action research to form an integrated, coherent program. The desired results are a body of overview knowledge from which conclusions can be drawn of direct and practical relevance to irrigation management.

IIMI's thematic research program, usually conducted at the regional, zonal or global level, is designed to ensure that research outputs build on and reinforce national research efforts.

HIGHLIGHTS

As part of IIMI's work on **Performance Assessment** in irrigation systems, an International Expert Consultation was held at Pangbourne, UK, in February 1990 to review a framework for performance assessment that has been completed under this project. IIMI and the International Food Policy Research Institute (IFPRI) staff, who jointly sponsored this meeting, tested various performance indicators that result from this framework, based on data sets available to IIMI from Indonesia, Sri Lanka, Sudan and Pakistan. A project on Performance Assessment and diagnosis, conducted in collaboration with two

leading Netherlands institutions, was also started up in September.

IIMI studies on the closely related question of **Design-Management Interactions**, which are being conducted as part of a larger series coordinated by the World Bank, were launched in Malaysia; their focus is on the Kerian and Kemubu systems. A Malaysian professional from IIMI's collaborating body spent several weeks at IIMI headquarters in May/June 1990 to perform data analysis. Initial reports on the study were prepared in draft. A new study on **Organizational Dynamics**, under which the management processes of the National Irrigation Administration (NIA) in the Philippines, the Irrigation Department of Sri Lanka and the Mahaweli Authority of Sri Lanka are being studied, was begun in August 1990: final results will appear in 1991.



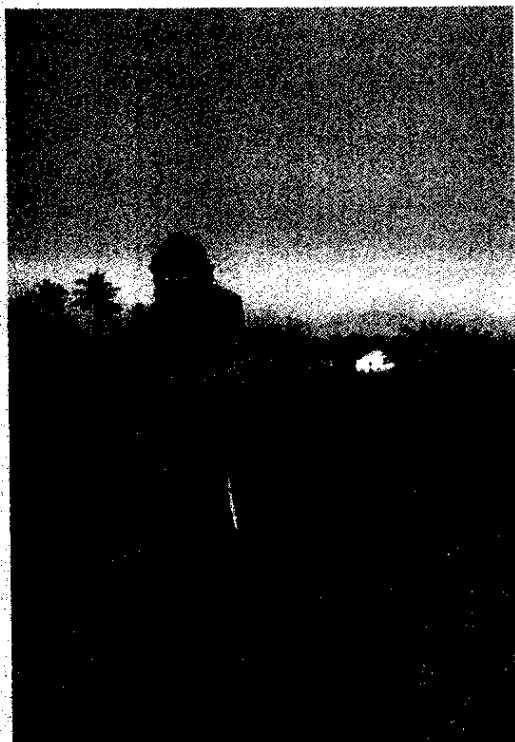
Mahaweli irrigation structure.

Development of a **Canal Simulation Model** in collaboration with Centre National du Mechanisme Agricole du Genie Rural des Eaux et des Forets (CEMAGREF) of France continued apace during 1990. The software development phase of this project ended in June with the handover of the Programmers and Users Manuals in English by CEMAGREF. The Government of France agreed to provide a junior expert and some funds towards a second phase aimed at application of the model in support of management in the Kirindi Oya project in Southern Sri Lanka. A graduate student from Ecole National du Genie Rural des Eaux et des Forets (ENGREF), France, visited

IIMI's headquarters to undertake studies of specific operational scenarios.

IIMI's collaboration with IRRI, the International Rice Research Institute, on **Irrigation Management for Rice-Based Systems** reached its final stages during 1990. A workshop at national level was held in the Philippines in September, and a three-country major workshop was held in Colombo in November to integrate the findings of the project.

The first stage of an IIMI project on **Farmer-Managed Irrigation Systems** (FMIS) approached completion at the end of the year. An issue of the *FMIS Newsletter* was produced in August 1990, and another was in preparation for publication in early 1991. Studies were initiated in Chitral, Pakistan, in support of the IFAD/ADB Chitral Area Development Project. Study reports received from research collaborators in Morocco and Thailand, were incorporated into IIMI's final project report. The Fourth Annual meeting of the FMIS Network Committee was held in Kathmandu in March; at this meeting, a series of international and regional workshops on specific aspects of Farmer-Managed Irrigation Systems to be conducted in 1991-93 were agreed upon.



Crop diversification on traditional paddies.

The Crop Diversification Network for Southeast Asian countries continued to develop steadily. The first issue of a newsletter for the network was produced in July 1990. The second meeting of the Network Committee and the First Annual Network Workshop were held in the Philippines in December.

PERFORMANCE ASSESSMENT

Unless objective yardsticks can be developed for measuring performance of irrigation systems before and after management interventions, IIMI's innovative research in many areas will be denied consistency and force. IIMI's Performance Assessment program seeks to remove the guesswork from irrigation management research by means of major data marshaling, comparison and analysis efforts spread across many countries.

Initiatives under this heading during 1990 were planned as a first phase of a comprehensive study and development of a performance evaluation methodology for measuring the effectiveness of irrigation systems. The first phase, completed by the end of the year, included among its major components the development of a typology which will define the boundaries, structures, dimensions and other parameters of irrigation, a stocktaking and review of measurements presently used or suggested for use to judge performance and a survey of relevant data available in irrigation agencies and related institutions in selected countries.

The first two components were established in 1989, culminating in the Symposium on Performance Evaluation in Irrigation held in Colombo, Sri Lanka in November as part of the 1989 IIMI Internal Program Review. Data availability surveys in Sudan and Madras, India were completed respectively in December 1989 and January 1990.

An International Expert Consultation to assess results of the project and map its future course was convened in Pangbourne, UK in February. Papers presented included contributions to a framework for assessing irrigation system performance, an overview of indicators of the performance of irrigation systems and a digest of data availability investigations. Fourteen irrigation scientists and professionals from EC countries, the USA and Asia attended the two-day meeting alongside six researchers on the IIMI team.

During 1990, work began on applying established measures to the data archive. The second, field-trial phase of this project will form part of a proposed new ten-year program to introduce performance evaluation and monitoring into irrigation policy, planning and practice, to begin in 1991.

A project on **Performance Assessment and Diagnosis** began in September. The purpose of this six-month study was to develop a number of hypotheses about the factors which influence performance, and to prepare practical guidance for managers on management actions to improve performance, for subsequent testing in the field. The study was conducted in collaboration with the International Institute for Land Reclamation and Improvement and the International Institute for Hydraulic and Environmental Engineering, both Netherlands-based.

DESIGN-MANAGEMENT INTERACTIONS

The objective of this program was to draw general conclusions about mutual interactions of system design characteristics and system management arrangements, and their effects upon system performance. Study of these interactions can make a significant contribution to improved irrigation management, especially in the context of rehabilitation and modernization of systems. IIMI's findings on this topic, based on work begun early in 1990 in Malaysia's Kerian System, and on a second study conducted at Kemubu in Kelantan State, are now complete. A report on both studies is in preparation following the visit of a Malaysian professional to IIMI headquarters for the purpose of analyzing data.

The Kerian Scheme — a rehabilitation program — is managed by the Drainage and Irrigation Department (DID), a line agency directly under the Ministry of Agriculture. The Kemubu Scheme — a construction project — is managed by the Kemubu Agricultural Development Authority (KADA), a parastatal agency.

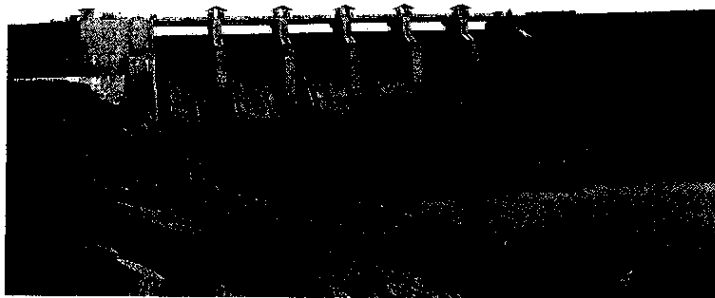
The project was started in March. Visits and discussions with staff at DID head office in Kuala Lumpur and KADA office in Kota Bharu were made to explain the purposes and requirements of the study and field visits were also paid to both schemes.

The report resulting from the Kerian study was presented in a half-day seminar to the DID staff who

were associated with the Kerian Project and with other appropriate target groups such as the Monitoring and Evaluation Unit of the Ministry of Agriculture.

CANAL SIMULATION MODELS

The development and application of a mathematical flow simulation model to the Kirindi Oya Right Bank Main Canal in Southern Sri Lanka constitute the first stage of a project intended to be of international scope. IIMI's partners in this project were CEMAGREF, France and the Sri Lanka Irrigation Department. The aim of the work was to demonstrate the feasibility of using simulation models as decision-support tools to identify innovative operational practices that promise improved performance of manually operated irrigation systems.



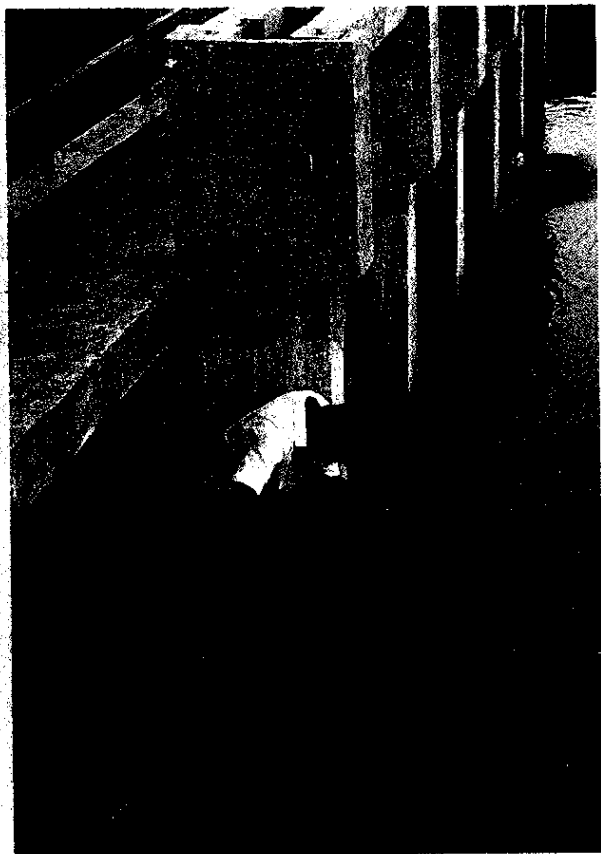
Kirindi Oya spillway; southern Sri Lanka.

The first phase, consisting of software development, field calibration of the model, and production of a comprehensive set of manuals, was completed by June 1990. IIMI began applying the model during 1990 to identify appropriate operational responses to some typical canal management problems such as how to stabilize the canal water level following a transition from one steady state to another, how to manage the canal filling phase and what strategy to adopt in response to rainfall fluctuations. A student sponsored by ENGREF, France spent 10 weeks with IIMI analyzing some of these problems as part of a course of postgraduate study.

Sri Lanka Irrigation Department staffs have responded enthusiastically and are in the process of upgrading

their hardware in order to have access to all the model's capabilities. Two seminars were delivered at IIMI Headquarters on the development and application of the model: the second seminar was co-presented by the Senior Irrigation Department Engineer responsible for water management in Kirindi Oya.

A prototype version of a mathematical model for Canal Operation and Management Assessment (COMA) was also brought to an advanced state of development in 1990. It is designed to run on a personal computer, using Lotus 1-2-3 spreadsheet software and is aimed at evaluating alternative water allocation plans from the points of view of management effort (that is, numbers of gate interventions and checks run to see that gate settings are maintained) associated with implementing the plan, and the hydraulic problems (such as water supply excess or shortfall) and water distribution equity that will result from the plan under scrutiny.



Kirindi Oya canal measurements by high school students.

RICE-BASED SYSTEMS

Three options were considered in tackling the second generation problem of reduced returns from irrigated

rice lands spawned by the "Green Revolution:" increasing the yield of rice, or increasing the area served by scarce water resources through more effective and efficient irrigation system management, or introducing crops of higher market value than rice into the irrigated rice farming systems, particularly outside peak production seasons. IIMI's program on rice-based systems has been tuned principally to explore the latter option in a number of countries in South and Southeast Asia.

Activities have been framed within two main projects: an eight-country regional network for crop diversification interest groups and a three-country program of studies conducted in harness with the International Rice Research Institute, mainly through national universities and research groups.

The latter program is now coming to term after three years of operations in the Philippines, Indonesia and Bangladesh, culminating in national-level workshops, and an omnibus workshop in Colombo in November. The Bangladesh component will continue during 1991.

The agenda for 1990 in Indonesia and the Philippines centered mainly on field testing promising innovative irrigation management procedures. After analysis, national workshops were convened in Yogyakarta, Java, Indonesia in June, and in September in Los Banos, Laguna, the Philippines, to discuss research findings.

In Bangladesh, more fundamental studies intended to assess the practical applicability and impact of some innovative irrigation management recommendations were conducted.

For all three countries, an intercountry workshop was held in November in Colombo to review and integrate research findings, recommendations, and other project outputs. The 43 participants included IIMI and IRRI researchers, national collaborators from Bangladesh, Indonesia and the Philippines, and special invitees from Sri Lanka. The workshop resulted in practical recommendations on main irrigation system management, farm-level water management and economics and institutional issues in irrigated rice-based farming systems. Proceedings will be published during 1991 and an end-of-project report will also be prepared.

Ongoing work in Bangladesh will consist mostly of pilot testing promising irrigation management innovations over one cropping season with the active participation of irrigation agency officials and farmers,

during the critical period on either side of the dry season.

CROP DIVERSIFICATION NETWORK

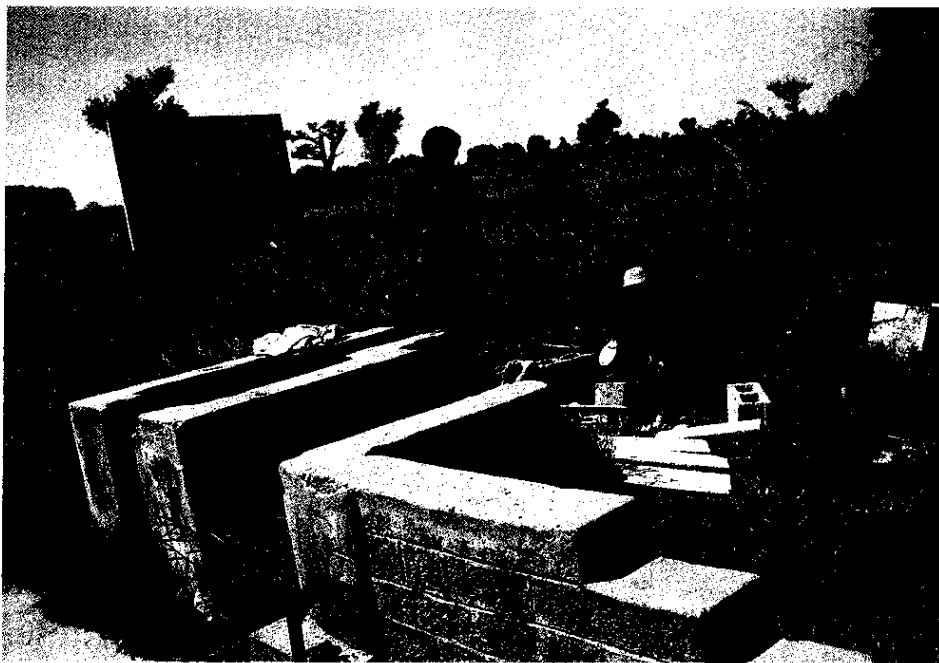
The idea of forming a research network of crop diversification interest groups was raised in a 1986 workshop meeting and the network was inaugurated in late 1988. Today it links together researchers, irrigation and agricultural agency officials, and others involved in irrigation management for crop diversification. It promotes research and information exchange in areas of key concern to all who struggle with the problem of adapting irrigated monocrop systems to mixed use.

The Network issued its first newsletter in June and held its first annual review and coordination workshop in December 1990 in Manila. The workshop theme was *Management Arrangements for Accommodating Non-rice Crops in Rice-Based Systems*.

Country reports were presented from Bangladesh, India, Indonesia, Malaysia, Nepal, the Philippines, Sri Lanka and Thailand. These reports described varied experiences in irrigation management for rice-based cropping as these relate to planning and implementation at both system and farm levels. The workshop offered a chance for participants to discuss how irrigation agencies and farmers set and achieve objectives and conditions for steps towards crop diversification in irrigated agriculture.

FARMER-MANAGED IRRIGATION SYSTEMS

The year under review saw the culmination of more than four years of IIMI research into irrigation systems managed independently by their users. Significant outputs during 1990 included further development of an FMIS Network, the continuing dissemination of FMIS knowledge through the *FMIS Newsletter*, other publications and several workshop events, and an extensive program of direct research in several countries. Studies were begun in Chitral, Pakistan, in



FMIS, Nigeria.

support of the Chitral Area Development Project. Work in Morocco, Thailand and Bhutan will feature alongside results from the Chitral studies in the final report, due to appear in 1991.

In Thailand, the object was to strengthen the nationwide People's Irrigation Project. The work was done by a local consultant from the Chiang Mai University. A unique feature of this project was the "Mobile Campaign Unit" format of the multi-disciplinary research team. In collaboration with Wageningen University, the Netherlands, an IIMI-sponsored graduate student began an internship in October in Chiang Mai University, with a view to boosting the capacity of this team to run performance impact assessments.

In Bhutan, IIMI conducted a two-day training program in June on research methodology in FMIS for field researchers — in this case section officers of the Department of Agriculture and graduate students of Dutch universities and the Netherlands voluntary service. With IIMI guidance, a handbook for field research based on guidelines for conducting rapid appraisals was prepared by the team of researchers. The Royal Government of Bhutan intends to use this and other information collected during 1989 and 1990 to develop a training program for district officials.

Established in 1986, the FMIS Network currently links more than 700 irrigation professionals from 55 countries, representing a wide variety of disciplines,



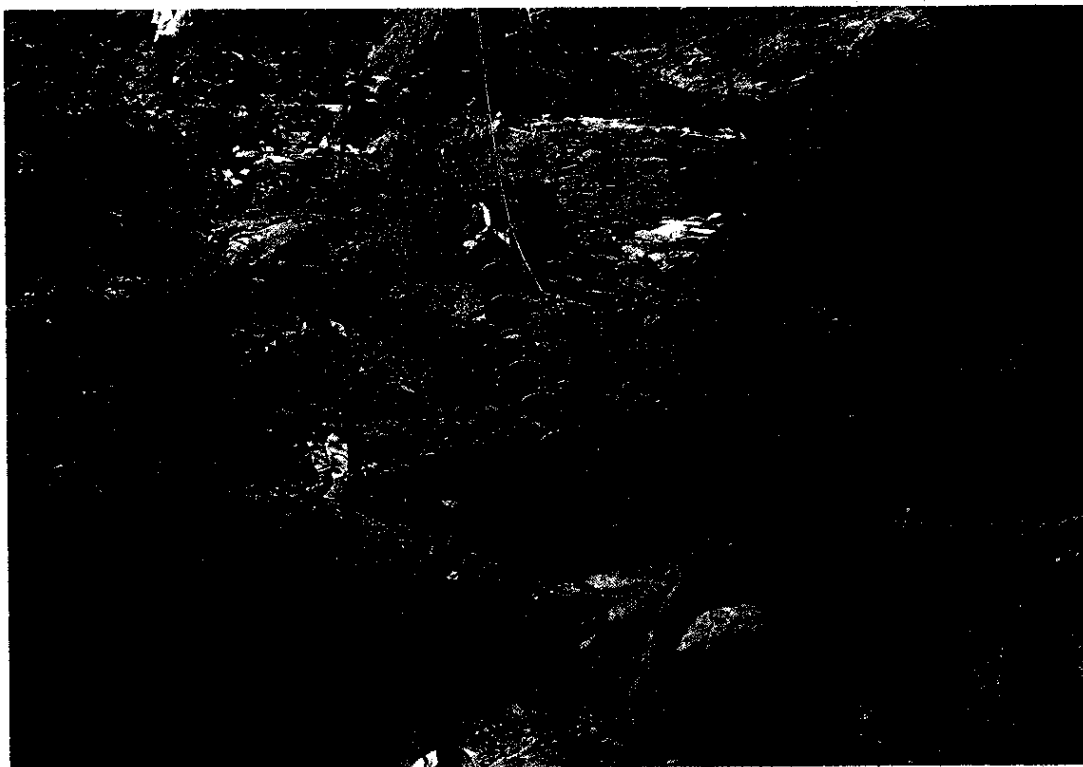
Nigerian farmers in FMIS.

professions and geographical backgrounds. The network brings together researchers, practitioners, agency officials and donors, to share experience and develop ideas for new research and practices in the FMIS field.

The fourth meeting of the FMIS Network Advisory Committee took place in March in Kathmandu, Nepal, to hear reports by committee members on the status of FMIS in their countries and plan future research, workshops and information activities.

A three-year program of workshops on critical issues affecting FMIS at global, regional and national levels was agreed. The global workshops will address the topics of performance indicators in FMIS, turnover of agency-managed systems to farmers and resource mobilization in FMIS. An issue of the FMIS Newsletter, the main link between network members, appeared in August 1990: more frequent issues and other language versions are planned for the future.

An international workshop on Developing and Assisting FMIS in North and West Africa was held in Rabat, Morocco, in May. Plans are in hand for the next major international workshop in the series sponsored by the network, which will be held in Mendoza, Argentina, in November 1991.



Cross drainage polyethylene pipe across gully, Nepal.

COUNTRY PROGRAMS

OVERVIEW

Much of IIMI's research is conducted through collaborative field and action research at country level. IIMI's country programs are designed to:

- # contribute to IIMI's strategic and thematic objectives;
- # contribute to the growth of national efforts, especially in irrigation management research and development; and
- # maintain effective and productive relationships with all significant national organizations concerned with the management of irrigation.

To achieve these aims, IIMI's country operations are normally founded on three regulatory elements: a Memorandum of Understanding with the national government that regulates IIMI's legal and fiscal status;

a Technical Agreement with the key national irrigation organizations, that provides the framework for institutional collaboration in fieldwork; and a Consultative Committee of senior national irrigation and research managers to guide and facilitate the collaborative programs.

Prior to 1990, IIMI's country programs were heavily concentrated in the humid tropics of South and Southeast Asia, where rice-growing irrigation systems predominate, and West Asia and Northeast Africa, where major rivers traverse large areas with generally very low rainfall. During 1990, the program expanded to incorporate work in countries in West and Northwest Africa, where irrigation is relatively new and irrigation bureaucracies are not yet a major feature on the agricultural development scene. IIMI also began taking steps during 1990 to inaugurate collaborative research activities in parts of Latin America and the Caribbean, where governments face growing pressure to improve irrigation performance and reduce costs.

SOUTH AND SOUTHEAST ASIA

HIGHLIGHTS

In **Sri Lanka** a study on irrigation management for crop diversification was completed, which recommended changes to the organizational structure of the management of an irrigation system in the south of the country. This work was in the area management of organizations, but was designed to provide improved livelihood opportunities for farmers by allowing nonrice cropping during the dry season. Also in Sri Lanka, a policy paper on irrigation investment trends, suggesting that investments in irrigation management have far greater returns than investments in irrigation infrastructure, was of great interest to national decisionmakers. This paper came on the heels of a well-attended and lively workshop on resource mobilization. The result was the formation of a special relationship between IIMI and government officials in overall irrigation sector policy and planning, expressed by IIMI's involvement in the nation's Irrigation Management Policy Support Activity

(IMPISA) which started at the end of the year. Work on management of organizations in Sri Lanka continued with publication of an interim report offering an analytical framework for evaluation of decision-making processes in irrigation management agencies.

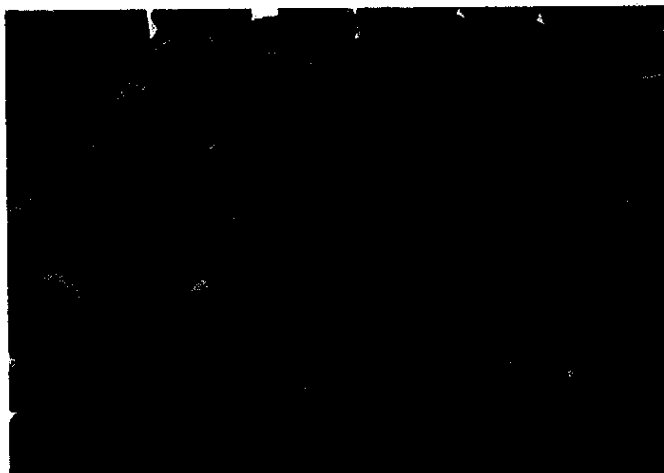
In the **Philippines**, work on management of organizations continued through support for the institutional strengthening of NIA and a series of studies conducted by local research institutions with support and assistance from IIMI. The Philippines were also the site of a number of multi-country programs and were therefore involved in three comparative studies on crop diversification for rice-based systems, organizational dynamics and resource mobilization, respectively.

In **Nepal**, where work had focused on the nation's vibrant farmer-managed irrigation system sector for the previous four years, IIMI made a programmatic shift by signing a Memorandum of Understanding with

the Department of Irrigation, which began to concentrate its efforts on topics such as turnover and joint management of systems and decentralization as a strategy in the management of the department. Also in Nepal IIMI began a study of irrigation performance as effected by programs of the Agricultural Development Bank of Nepal.

In **India**, IIMI's collaborative research program gathered momentum with the holding of two workshops attended by senior policymakers and representatives of the partner institutions. Plans were finalized for the studies which will be carried out, identifying topics of mutual interest in the areas of management of water and management of organizations.

In **Bangladesh**, IIMI took a key role in conducting a workshop on performance evaluation for the University of Engineering and Technology and the Bangladesh Water Development Board (BWDB).



Farmers in FMIS in Nepal.

Bangladesh was also the site selected by IIMI's Training Unit as a second Asian country to pilot test the Institute's management training methodology.

SRI LANKA

IIMI completed three major projects with partner agencies in Sri Lanka during 1990. IIMI's Sri Lanka Field Office moved into separate premises close to the Irrigation Department in mid-year, to enhance the Institute's visibility and responsiveness to national agencies' concerns.

The Irrigation Management Policy Support Activity (IMPSA), which aims to help the Government of Sri Lanka realize its goal of **participatory management**, got off to a promising start in June. The first national workshop for key policymakers was held in October, to review a draft policy paper on this topic. Participants agreed on an ambitious vision of the future of irrigated agriculture in Sri Lanka and on a workplan for the remainder of the Activity, to the end of 1991. IIMI will play a significant part in assisting IMPSA's Secretariat (Sri Lankan irrigation specialists located in the Sri Lanka Field Operations office) in elaborating the policies and strategies that will be required to turn vision into reality.

A final report on **irrigation management for crop diversification** was presented to the Government of Sri Lanka and to the Asian Development Bank (ADB), principal supporters of this recently completed two-and-a-half-year investigation. The report's findings and

recommendations were used by the Government of Sri Lanka and ADB as a basis for making important changes in the two major schemes studied. The modernization of the Walawe Right Bank project was reformulated to include more farmer participation, while the management structure of the Kirindi Oya Irrigation and Settlement Scheme was reorganized to improve interdepartmental planning and implementation.

The recommendations also guide the "action research" phase of work in this area, begun in late 1990. The new work will concentrate on finding ways to assure sustainable use of the systems under study, by collaborating with irrigation agencies to field-test innovations identified earlier.

A February workshop on **resource mobilization**, sponsored by the Sri Lanka Consultative Committee with financial support from ADB, sought to help national authorities achieve consensus on institutional (agency) reforms required for successful implementation of the government's participatory management policy. Members of the various agencies wrote the papers which formed the bases for discussions.

Some of the proposed reforms are already reported to be under way, others will require further shaping under IMPSA (see above). In the case of the Irrigation Department, a restructuring based on a Department member's workshop paper is slated for implementation in early 1991.

As part of a larger program of IIMI work addressing the question of social and economic sustainability of small village irrigation systems, a field study analyzing two assistance strategies was carried out during 1990 in western Sri Lanka by a postgraduate research student. Fieldwork was also completed on **social organization and decision making** in reservoir systems near Anuradhapura by a second postgraduate student and his professor, under an IIMI collaborative agreement. Results of these studies will appear in 1991. In collaboration with the Department of Agrarian Services and the Irrigation Department, a study to evaluate the performance of rehabilitated FMIS under the World Bank supported Village Irrigation Rehabilitation Project was designed for implementation in 1991.

As a follow-up to findings of an earlier workshop on the role of **NonGovernmental Organizations** (NGOs) in Sri Lanka's FMIS, an action research initiative was launched to assess ways to ensure the sustainability of NGO-run improvements in recently rehabilitated tank systems. Results were discussed with participating NGOs and donors at a workshop in November.

During 1990, three of four studies supported by the **Irrigation Systems Management Project** were completed by private national firms working in a client relationship with IIMI. A study of **institution-building** activities under the project in four major schemes in Polonnaruwa District, carried out by Technology Evaluation and Management Services Pvt. Ltd., (TEAMS) established that these activities were having a significant impact on developing effective farmers' organizations; many of the recommendations contained in the 1989 draft final report were implemented in 1990. A study of **water delivery systems** in Polonnaruwa resulted in a draft handbook, prepared by IIMI and Lanka Hydraulics, on methods for calibrating drop structures as water measurement devices; this output will be used as a field and training manual in the future.

Investigations into **water management institution building** in two medium-sized schemes by Associated Development Research Consultants, found that the NGO collaborator had been very effective in

developing farmers' organizations. However, institutional gains were short-lived on one of the sites, because of inadequate continuing support by management agencies.

A study by TEAMS of **operation and maintenance costs** of five agency-run systems reached draft report stage in early November. The draft provides an analysis of the actual costs of operations and maintenance over the past few years, how the funds were deployed and how accounted, as a basis for improving, streamlining and monitoring these procedures.

Reports on two Sri Lankan schemes used as case studies to help refine an **analytical framework for irrigation management**, were finalized and the findings were presented to national officials at seminars and meetings held in late 1990. Results suggest that far-reaching changes are required in the interaction among donors, government and agencies to raise commitment and accountability in step with irrigation system performance.

Results of an IIMI investigation into **irrigation investment trends** established that investments in new system construction yielded high returns in Sri Lanka after Independence and up to about 1980, as new rice technologies came along. Since that time, investment in rehabilitation or modernization and particularly in water management improvements (including institution-building) of existing systems, has yielded far better value for money than new construction. These findings have already been used to support important recent changes in official investment strategies and policies, and have also provided a key input to the ongoing IMPSA project.

As part of the investment trends project, **farm-level fertilizer response functions** were derived from nearly forty years of data supplied by experimental stations around the country. Past fertilizer use recommendations were judged appropriate but withdrawal of the subsidy was — more controversially — considered unlikely to cause a significant slump in rice production under present market conditions.

The Government of Sri Lanka is preparing a seven-year \$40 million National Irrigation Rehabilitation Project to improve some 1,200 small and medium irrigation systems, with World Bank support. IIMI has been assisting the national authorities informally in the development of the project and has been invited to submit a proposal for designing its research

component, including measures to establish a Research Management Unit in the Irrigation Department as part of a planned restructuring program. IIMI has also been invited to play a role in helping establish ways and means to monitor the

turnover of responsibility to farmers for **operation and maintenance of distributary channels** and its impact on system performance. A proposal was submitted for using modified rapid rural appraisal techniques to monitor the turnover program.

PHILIPPINES

IIMI's field operations in the Philippines underwent notable transitions in 1990, including the transfer of the main IIMI office from the Philippine Council for Agriculture, Forestry, Resources Research and Development (PCARRD) at Los Banos, Laguna to the National Irrigation Administration (NIA) compound in Quezon City.

Much was done to forge close working links with private irrigators and with official agencies at national and regional levels. Good progress was made on the Accelerated Agricultural Production Project (AAPP). The principal goal of this project is to strengthen the capacity of Irrigators' Associations (IA) and of the National Irrigation Administration (NIA) to improve and sustain the performance of irrigation systems in cost-effective ways. The project, which also aims to boost the capacity of NIA to design-manage productive irrigation research, is now in its second year.

The research agenda in 1990 ranged from assessment of the performance of a **farmer irrigator organizer program** in AAPP regions, through investigations into the **performance and sustainability of Irrigators' Associations** in communal and state-owned systems, to trial efforts to streamline and strengthen the operations of Provincial Irrigation Offices. Work was also started to assess the impact of **NIA training** and contribute to knowledge on **monitoring the performance of irrigation systems**.

Initiatives to field-test potentially productive management changes identified by the Irrigation



ADB Field mission to IIMI field sites in the Philippines.

Research Component of the AAPP were mounted jointly with NIA and participating universities.

To augment the performance evaluation initiative, a comprehensive program of water flow measurement was introduced in selected irrigation systems. Work to assess the performance of Irrigators' Associations (and the systems they operate) has revealed both the strengths and frailties of management strategies adopted by NIA and IAs.

In October, IIMI worked with NIA and associated university groups to translate major findings into intervention strategies and detailed implementation schedules, and in November the results were presented to NIA's top management.

Seminars, workshops and review meetings at the regional and national level have also helped to improve the quality of the research approach and its

impact. Two major outputs, *AAPP Research Findings* and a *Manual on Farmers Organizing Farmers* are expected to appear in print in 1991. USAID gave a commitment to extend financial assistance for AAPP through 1991.

The IIMI-IRRI Collaborative Project on **irrigation management for crop diversification in rice-based farming systems** also entered a concluding intervention phase by involving farmer-beneficiaries in planning and system management. By the end of 1990, crop diversification studies under the project were complete. Three years of research and at least three dry seasons of data collection and field monitoring have yielded much utile information. Better water control at system level, water augmentation through the use of shallow groundwater, system characterization and mapping, more accurate methods of predicting available water, crop scheduling, and simulation are among the strategies which could be used further to enhance irrigation system performance, particularly during the dry season.

Active participation by farmers in field tests of system management and planning improvements led to much improved water distribution in many cases. In one system, earlier planting schedules resulted in a greatly increased irrigated area. It is likely that further improvements (both in supply reliability and equity of distribution) could be attained through the use of rotational method of irrigation when the water supply is scarce.

Significant professional development opportunities were also opened up by the IIMI/IRRI project. By the end of 1990, a total of 27 local staff and researchers representing 13 agencies had derived training benefits from the project, not counting the many NIA and Department of Agriculture field staff who participated in the project in a number of challenging ways. One

student successfully completed his doctoral studies in April and three others by the end of the year. Six national staff attended the six-week training course on Irrigation Water Management conducted by IRRI from August to October.

In 1990, 18 major investigations were completed. Highlights of the resulting findings were presented during the final workshop for the Project held on 10 and 11 September 1990 at the Continuing Education Center of the University of the Philippines at Los Banos.

Another notable achievement of this project was the appointment of a high-level policymaking Committee on Irrigation Management for Diversified Cropping in Rice-Based Systems in the Philippines. This will work in close collaboration with the regional network already established. A regional network meeting was held in the Philippines in December 1990.

A four-year project was designed jointly by IIMI and NIA in 1990. Its goal is to develop and field-test a package of **low-cost management changes** to improve and sustain the performance of a representative sample of national and communal irrigation systems in the Philippines. Unlike many other projects where only a few factors related to performance are considered, the proposed project will follow a systems approach. IIMI will also help NIA promote the tested approach nationwide.

A proposal on **irrigation management innovations to cope with recurrent drought** was also developed. IIMI Philippine-based researchers participated in the Philippine component of the study on **organizational dynamics in irrigation organizations**. A draft report on **financing irrigation services**, based on a Philippine case study, was submitted to NIA directors and key government officials.

NEPAL

During 1990, Nepal's Department of Irrigation (DOI) began work with IIMI on a proposed program of joint studies to develop more **participatory approaches to joint management** of irrigation systems. The work's initial focus is a pilot project in the Banganga Irrigation System. The Department also sought inputs from IIMI into plans for **participatory irrigation management and system** turnover to farmers.

The draft final report on IIMI's five-year project in the Sindhupalchok district of Nepal in cooperation with the Water and Energy Commission Secretariat (WECS), was completed in May and its findings are in print.

In brief, the work in Sindhupalchok was aimed at testing and evaluating alternatives to conventional

assistance strategies for farmer-managed irrigation systems. Researchers sought how improvements could be made in the ways irrigation systems are designed, run and financed, with a view to boosting their productivity. In the final phase of these investigations, IIMI worked with WECS to assess yields and cropping patterns through the Winter 1989-90 growing season.

A major output of this work has been a series of final reports, prepared by WECS staff and local consultants under IIMI's guidance that log results in ways that enable valuable lessons to be extracted from them. A digest of these reports is in preparation. Among other important findings, the work highlights the need to involve official accounting and auditing authorities in adjusting policies and procedures for financial control. Rigid procedures run counter to the flexibility at irrigation system level that matters most in getting and sustaining farmer participation. Other recommendations included the need to keep accounts open for inspection, supervise work closely and make supervisors more accountable to farmers.

IIMI researchers visited several systems in company with DOI officials to identify areas for new work on ironing management problems out of large-scale irrigation systems. DOI had identified the Banganga Irrigation System in Kapilbastu District as a representative "problem system." IIMI is now working with DOI staff on this site to introduce methods for strengthening water user groups and building up the users' role in day-to-day operation and maintenance of the system.

Main canal management will also be upgraded, using a variety of innovative approaches. The emphasis lies on forming a team of DOI professionals with the necessary skills to develop and implement sustainable management improvements in jointly managed systems throughout Nepal.

In late May, a planning session for a review of the irrigation-oriented activities of the Agricultural Development Bank of Nepal led to proposals for a nine-month evaluation project. IIMI is helping to assess the way bank-funded irrigation schemes are developed and implemented, not least in terms of impact on the well-being of irrigator families and communities.

Rapid appraisals of 16 surface irrigation systems were undertaken during 1990, along with the study of shallow tubewells, sprinkler systems and rowler pumps. Detailed investigations were made into six systems, including water measurements in the main canal, moisture status of 30 sample plots in each system, rainfall records, soil types and yield record. Comprehensive results are expected in early 1991; they should prove a useful framework for implementing irrigation sector projects now being developed by Nepal in association with Asian Development Bank (ADB) and International Fund for Agricultural Development (IFAD).

Recommendations arising from work in several of these trial areas have already led to sizeable increases in the production of food crops, mainly rice and wheat. However, the prevalent food deficit meant that diversification towards cash crops was not ventured and most of the increased food output was consumed on the spot rather than taken to market, leaving bank loans largely unredeemed.

Nepal has established 75 district-level irrigation offices charged mainly with undertaking feasibility studies leading to the construction and commissioning of local irrigation schemes. Other responsibilities include training and organizing beneficiary groups to manage the new systems on completion and providing backup for system repair, rehabilitation and improvement, and mobilizing local resources to do the work wherever possible.

Funding is being sought for pilot work by IIMI to build a computer inventory of irrigation systems in two districts, intended to help district officials select candidate systems in need of assistance, with greater confidence. Gulmi and Kapilbastu Districts have been earmarked by DOI as suitable start-up sites for this exercise in institution-building.

As part of an exercise intended to disseminate lessons learned from project activities in Sindhupalchok, a one-day seminar was organized in collaboration with WECS and the Department of Irrigation in June 1990. It was inaugurated by the Minister of Water Resources and attracted more than 60 participants, who joined in vigorous discussions on irrigation development and management in a number of other project areas.

INDIA

During the period under review, the Government of India agreed to support a number of proposed collaborative projects with IIMI. The Institute played the role of catalyst to bring various parties together in joint research projects and assisted in framing key research questions and developing workable research methodologies in several areas. In the early part of 1990 there were meetings in Colombo and Anand (Gujarat) to help develop the collaborative program, involving more than 40 participants from collaborating institutions, donor agencies and the IIMI/India Co-ordinating Committee, in addition to IIMI researchers.

The collaborative research work is designed to be implemented by Indian institutions with the objective of achieving significant research results that can be feasibly implemented, while further developing and strengthening the capacity of India's irrigation management institutions to do field-oriented irrigation management research.

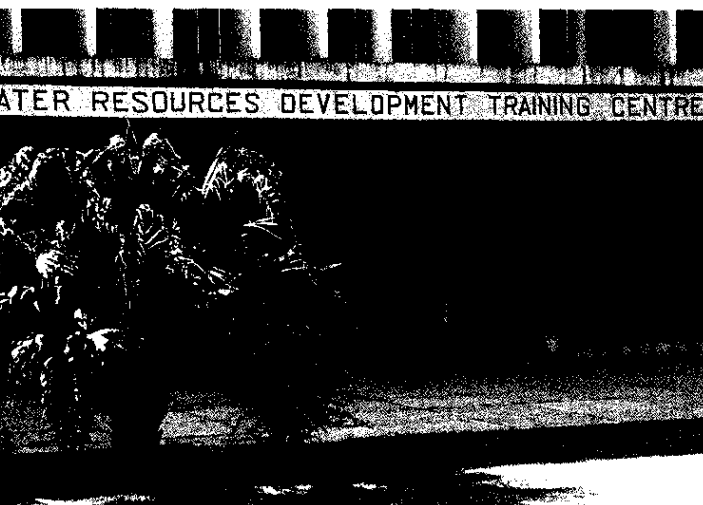
In Gujarat, the Water and Land Management Institute and the Institute for Rural Management, Anand, collaborated with the Water Resources Department of Gujarat to prepare a research project on **main system management processes** in the Mahi-Kadana project, and on developing and implementing an interactive methodology of **water delivery schedules** on minors. The main system management component will combine measures of actual water delivery



Bihari farm hand in paddy.

performance with an analysis of decision making, performance assessment and other management processes.

In Tamil Nadu, Anna University (Madras), the Trichy-based Irrigation Management and Training Institute, and the Irrigation Wing of the Public Works Department prepared a joint research proposal on **main system management and performance evaluation** of Sathanur Reservoir Project, a system being improved with World Bank funding under the National Water Management Project. Like the Gujarat project, this study will link water and human resource management processes. Its outcome will be of special interest in view of emerging plans to extend the National Water Management Project concept to other states in India.



Water Resources Development Training Centre, Roorkee.

In Uttar Pradesh, the University of Roorkee, UP Water and Land Management Institute and the Irrigation Department joined in preparing a proposal to carry out research on various issues of **conjunctive use management of surface water and groundwater** for irrigation in the Madhya Ganga project area, presently under development. The study will assess current groundwater conditions and model potential interactions between surface water and groundwater supplies with a view to establishing a range of future scenarios for conjunctive use management.

In Bihar, the Bihar College of Engineering (Patna), the Bihar Water and Land Management Institute and the Irrigation Department developed a research proposal for analyzing issues related to **conjunctive management** of irrigation in the Eastern Gandak Project system, a system never completed owing to severe waterlogging problems. It is hoped that results of this work will boost the extent and returns of agriculture on this system, and yield a methodology

for making similar improvements in other systems in eastern India.

With a view to strengthening links between India's researchers and larger international networks, IIMI invited a member of the collaborative research team from Anna University to visit IIMI headquarters to observe the survey on Organizational Dynamics conducted by IIMI management specialists in Sri Lanka during November 1990. It is likely that similar methodologies will be adopted and applied in the Sathanur Project.

A special issue on irrigation in India was published in the *IIMI Review* 1990 March issue. It included commentaries on progress in food production, training, water markets, groundwater and poverty alleviation.

IIMI also contributed to an exhibition on irrigation management mounted at a National Seminar on **rainwater in agriculture** held in Madras during March 1990, and a paper on equitable distribution in India's irrigation was presented.

BANGLADESH

Multi-country investigations by IIMI and IRRI into problems of **irrigation management in rice-based farming systems** made conspicuous progress during 1990 in Bangladesh, where the Bangladesh Rice Research Institute (BRRI) represented IRRI.

Field research took place in the Ganges-Kobadak major lift canal irrigation system operated by the Bangladesh Water Development Board (BWDB), in a deep tubewell project in North Bengal also operated by BWDB, and in a number of tubewell sites in the Rajshahi region under varying management auspices — including privately owned or rented wells and wells run by the parastatal Bangladesh Agricultural Development Corporation (BADC).

In the Ganges-Kobadak project an experiment with the establishment of a ten-day rotation on one canal, yielded striking results. The combination of the project management's commitment to deliver water unfailingly to the secondary during its turn and the involvement of farmers from all parts of the secondary in the planning and implementation of the rotation, resulted in a large increase in irrigated area compared to previous dry seasons.

Even farmers in the tail-end tertiary received water regularly and consequent gross rice yield figures were

most encouraging. However, as the experience of only the 1990 dry season was examined, the sustainability of these results remains to be established.

In the North Bengal Tubewell Project location, IIMI was involved in the monitoring and assessment of another command area utilization experiment — that of a minimum irrigated cropped acreage rule. BWDB had instituted a program whereby a given tubewell would be operated in any season only if cultivators signed up to use a certain minimum proportion of its command area for irrigation. While this change of rule initially brought modest increases in irrigated area, there were problems.

Timing of farmer involvement was late and irrigation reliability scored no improvement over previous years. Irrigators fell short of the agreed utilization target with impunity, for by the time the shortfall was evident it was too late to close the well without penalizing those who had lived up to their pledge.

Issues of farmer participation in irrigation management and of irrigation fee collection were examined in all three research locations. In projects with full agency control of irrigation functions, levels

of farmer involvement and fee collection were very low. Costs were much more likely to be recovered in the BADC rental and project tubewells where farmers (whether groups or individuals) had more say in tubewell management.

IIMI was asked to help stage a workshop to evaluate projects under a pilot scheme to improve **management of flood control, drainage and irrigation** projects in Bangladesh. This collaborative research program involves BWDB and the Bangladesh University of Engineering and Technology (BUET) and is examining management situations ripe for improvement in six BWDB projects in different parts of the country. During the workshop, progress was made in defining management objectives of ongoing projects and listing possible issues that could be affected by management innovations during the life of the study.

As part of IIMI's program in Bangladesh, the issues of **groundwater irrigation benefits to the landless and rural poor** will receive high priority. A regional workshop on farmer-managed groundwater irrigation systems is planned for 1992.

IIMI helped lead a workshop on **performance evaluation** for the Bangladesh University of

Engineering and Technology and the Bangladesh Water Development Board, which was held in August.

Several participants from Bangladesh attended a workshop on **irrigation management for rice-based farming systems** held in Colombo in November under the IIMI-IRRI Project. Research results from Bangladesh, Indonesia and the Philippines were compared. The IIMI-IRRI program involved a **training program for irrigation managers** drawn from several irrigation agencies and one NGO and IIMI's training concepts were introduced to senior managers of national agencies at a one-day workshop.

A number of Bangladeshi researchers and project management personnel took up invitations from IIMI to join a study tour of the Philippines and Thailand in March to look at methods of irrigation management involving diversified cropping. Others participated in an **irrigation management for crop diversification** research network review and workshop in the Philippines in December. Funds permitting, research, design and work on tubewell privatization in the northeastern part of Bangladesh will proceed through 1991. It is expected that IIMI will be able to respond to the enthusiasm for training involvement now current in Bangladesh, by conducting a **training needs assessment** program in the country.

WEST ASIA AND NORTHEAST AFRICA

HIGHLIGHTS

In **Pakistan**, new collaborative research initiatives were developed with the International Waterlogging and Salinity Research Institute (IWASRI) in the areas of management of water and study of environmental issues. A number of supporting studies in management of canal operations and waterlogging and salinity were started with such partners as the Drainage Research Institute of Pakistan (DRIP), the Irrigation Research Institute (IRI) and the nation's universities. A study of farmer-managed irrigation systems in the Northwest Frontier Province was undertaken with the University of Peshawar. 1990 saw much project development work for future studies of a wider scope requiring major donor support.

IIMI had assigned an international irrigation specialist to **Sudan** in 1989. During 1990 he was joined by

another IIMI professional who took up the position of Senior Water Management Advisor to the Sudan Gezira Board (SGB). In seeking to develop a program of collaborative research with partner bodies, IIMI's staff explored optional topics in management of organizations, farmer issues and management of water; research was begun during 1990 starting with a study of **water indenting practices** as they relate to irrigation management objectives.

IIMI sent a mission to **Egypt** in 1990 to explore the possibilities of establishing a three-person resident field operation to undertake studies in several IIMI program areas. The mission was well received, and appears likely to lead to increasing collaboration between IIMI and the Egyptian Water Research Center during 1991.

PAKISTAN

In view of the great size and complexity of Pakistan's irrigation systems and their crucial significance to the nation's economy, IIMI has established a major country program in Pakistan. Special efforts were made during 1990 to explore the mutual relevance of results obtained by IIMI and Pakistani collaborators from the wide range of ongoing investigations.



Crowded street, Lahore, Pakistan.

Recent research findings in connection with field studies, begun in 1989, which aim to identify management initiatives that minimize **waterlogging and salinity** problems in irrigation systems, indicate a disturbing pattern of growing salinity-related problems in irrigated agriculture.

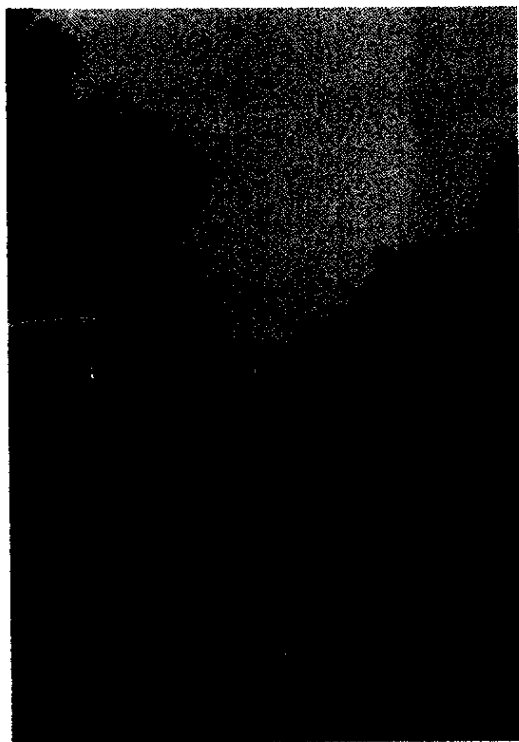
Changes in soil salinity conditions have been found over large areas, that mirror changes in surface irrigation system performance between head, middle and tail reaches within distributary channels and watercourse commands. Serious and persistent inequity in the distribution of high quality canal water within distributaries and watercourse commands has meant that tail-end farmers use greater proportions of tubewell water to meet crop irrigation needs. The apparent source of salt accumulation in the root zone of soils in these locations is the same tubewell water, frequently of doubtful quality.

Irrigated agriculture can successfully use water for irrigation that is more saline than that pumped by tubewells in the study areas of the Lower Chenab Canal system. However, that would require important

changes in current irrigated agriculture practices, such as diluting poorer quality tubewell water with better quality canal water during sensitive germination and other crop growth stages, or changing production to more salt-tolerant crops. Whether or not a productive irrigated agriculture can be sustained through these and other such changes in irrigation and production practices remains to be established.

Research on the **impact of lining on performance** of distributary channels in a Punjab canal system, continued during 1990 into its final phase. This work was initiated in 1987 at the suggestion of the Punjab Irrigation Department, with baseline measurements of water delivery performance in the tail reach of Khikhi Distributary carried out in association with Punjab Irrigation and Power Department staff of Bhagat Sub-Division.

Further measurements have been taken before and after lining operations during the subsequent three main phases of the work, spread over the past three years. Final analysis of all performance data will begin early next year.



Horse-drawn farm cart going over irrigation canal.

Future research collaboration was agreed with the International Waterlogging and Salinity Research Institute and with the Drainage Reclamation Institute of Pakistan, on reviews of information, diagnostic methodologies and management practices for the control of **waterlogging and salinity** in Pakistan. Collaborative work was initiated with the Soil Survey of Pakistan on a baseline survey of soils and salinity conditions in the command area of the Guni Branch of the Fuleli Canal System in Southern Sindh. Joint work was also started up with the Irrigation Research Institute, Punjab Irrigation and Power Department, on a private tubewell measurement and water quality survey in selected areas of the Mananwala Distributary command. A new field research site was established in Punjab near Hasilpur in a non-perennial irrigation environment; this site will be used for further work on waterlogging and salinity problems.

Studies on **irrigation constraints on production of wheat** and other crops were continued during 1990 in sample watercourses and farms in two large distributary commands. Since 1989, crops other than wheat, and farms in a low-rainfall area (Toba Tek Singh District), have been included in the scope of these investigations. Findings have substantiated previous results emphasizing the importance to wheat production of the first irrigation, which frequently conflicts with the period of annual closure of the canal system (January), and the early termination of irrigation combined with inadequate rainfall during March, when wheat is still sensitive to water shortage.

The results indicate that the man irrigation depth applied is considerably less than the average gross



Patchy salinity in cotton field, Hasilpur, Punjab.

water requirement of wheat. This indicates that farmers deliberately underirrigate in their effort to make maximum use of the (hopefully abundant) winter rains. Optimization per unit of irrigation water rather than per unit of land is the farmers' main objective.

Research further indicated large variations in the magnitude of the particular discharges delivered to the individual farmers, ranging from less than 0.5 cfs. to more than 5 cfs. This large variation in discharge is a key obstacle in applying appropriate amounts of water during any given irrigation.

Research was begun in September 1990 in collaboration with Development Research and Management Services (DRMS), a private consultant enterprise, on a new initiative to develop a knowledge base of both physical components and institutional features of indigenous irrigation system management in Chitral District, North West Frontier Province. There the Chitral Area Development Project is underway; among the project's important aims is the development of 5,000 hectares of irrigated farmland through the rehabilitation and improvement of 80 farmer-managed irrigation systems and the construction of another 80 new systems. The DRMS and IIMI work is designed to support this project component.



Concrete lining irrigation canal, NWFP., Pakistan.

SUDAN

Runaway population growth combined with increasing pressure for economic growth are placing ever greater stress on the irrigation sector in Sudan. Yet the country's use of Nile waters is approaching the limits of its allotted share, the frail state of the economy is limiting financial appropriations for irrigation system maintenance and operation, and the productivity of existing systems is declining.

Sudan has giant irrigation facilities where mixed subsistence and cash cropping is beginning to compete with exclusive cash cropping as the typical pattern of use. There is growing competition among different users and crops for water, labor and other inputs. Yet the power of official and parastatal bodies to dictate virtually all aspects of on-farm irrigation management, leaves the farmer little freedom of choice. The realization is growing that more flexible irrigation management strategies will be needed to reconcile the clashing objectives of command and demand economics.

IIMI's first full year of activities in Sudan took its cue from a national policy workshop organized late in 1989 to allow Sudanese experts to air their views on priority issues to be addressed jointly with IIMI over the next five years. Top priorities that emerged included farmer participation in irrigation management, better institutional liaison and other, more general management essentials such as equity, sustainability and reliable financing of systems.

March 1990 saw the inaugural meeting of a Sudan Consultative Committee formed of IIMI researchers and nine Sudanese experts selected from a representative range of disciplines and institutions. They discussed and approved a 1990 workplan. The appointment of an IIMI researcher as Senior Water Management Advisor to the Sudan Gezira Board took place in August, following agreement with the Rehabilitation Project Management Unit of the Sudan Gezira Board. A major command area in the Rahad Irrigation Scheme has been selected for investigations of **water indenting practices** in relation to irrigation management goals. A special cooperative



Innovative irrigation device Gezira Project, Sudan.

understanding has been worked out with the management of Rahad Scheme, the Ministry of Irrigation and the University of Gezira to log the entire forthcoming irrigation season. Initial arrangements to install flow measuring devices have been made. Work on **sedimentation management** and on **potential links between labor supply and irrigation performance** is under discussion. A report based on a comprehensive review of available data on labor supply in the irrigated sector of Sudan will be released shortly.

An **organizational case study** on the Kanana Sugarcane Scheme made progress towards the report stage, due in 1991, to be followed through to completion with the assistance of a researcher from the University of Gezira. A working paper on the **management of surface waterlogging** was also prepared.

In order to acquaint managers and researchers in Sudan with IIMI's outlook on management choices and practices under different field conditions, two study tours to Pakistan and Sri Lanka were conducted. The first (in December 1989) took staff of the University of Gezira and the Socio-economic Research Unit of the Sudan Gezira Board and the second, in March 1990, took officials from the Hydraulic Research Station to see irrigation management related activities underway in Pakistan and Sri Lanka.

NORTHWEST AND WEST AFRICA

HIGHLIGHTS

In **Nigeria**, IIMI continued to collaborate with the Institute for Agricultural Research of Ahmadu Bello University on a research study to determine the feasibility of joint management in a River Basin Authority in the northern part of the country. During 1990, the Federal Ministry of Water Resources showed strong interest in broadening this work following a government decision that agencies should become financially self-sufficient as of 1 January 1991. IIMI has therefore proposed the posting of a full time international research scientist in Kano from 1991.

The African Development Bank (AFDB) made a favorable appraisal of projects proposed by IIMI with several national partners for action research programs in **Burkina Faso** and **Niger**. Programmatically, the research will focus on issues of management of water and of organizations. The two programs will allow comparison within the zone of progress in small-scale systems (Burkina Faso) and a large river system (Niger). Both programs are scheduled to begin in 1991.

An international workshop on strategies for developing and improving farmer-managed irrigation systems was held in Rabat, **Morocco**, in July 1990. The workshop was primarily designed to bring together participants from North and West Africa, although strong inputs were made from other areas.



In Ouagadougou, Burkina Faso – a farmer by his farm lot.

WEST AFRICA

Chronic and increasing food deficits in the countries of West Africa's dry zone have prompted many ambitious aid and technical cooperation programs over the past thirty years, in many of which irrigation has formed an important thread. Yet, despite heavy investment in irrigation projects, food imports have steadily increased in volume and in internal market share.

The failure of rural development policies implemented since Independence has led development planners to reconsider every detail of established strategies for West Africa — irrigation management strategies in particular. The conclusions and recommendations of many such diagnostic studies have gone into the national and regional investigations proposed by IIMI as part of its fledgling program of collaborative work

in the region. In each case, the localized projects in hand are intended to lead on to broader-based country programs.

In Nigeria, IIMI is working with the Institute for Agricultural Research at Ahmadu Bello University in Kano, on the implementation of a **farmer-managed irrigation system** project. Action research is underway to support the turnover of irrigation management to farmer associations in the Kano River and Bakolori project areas. IIMI's main role is to provide assistance in preparatory phases, mainly on social and institutional issues.

In Burkina Faso, a program prepared by IIMI in collaboration with the *Institut d'Etudes et de Recherches Agricoles* and the *Office National des*

Barrages et des Aménagements Hydro-Agricoles was set on course for implementation from 1991. It concerns **small dams and irrigated command areas** in the north-central area of the country, where there are some 20,000 ha of irrigable land of which less than 15 percent is currently under irrigation. The project seeks to develop methods to analyze the performance of existing systems and diagnose specific problems, then recommend ways and means to improve performance and develop innovations for use in the farming community. Recommendations will subsequently be tested in the field. Technical and socioeconomic factors influencing rehabilitation, supply of agricultural credit, water fees and the participation of farmers in management will also be examined.

In Niger, IIMI and the national Institute of Agricultural Research and the *Office National des Aménagements Hydro-Agricoles* have jointly prepared a proposal for an action research project on irrigation management in the **farmer-managed systems of the Niger River**

Valley. This project covers a big river basin in contrast to the small command areas in Burkina Faso. The Government of Niger has already turned over management of substantial parts of the river irrigation system to its users. The purpose of the project will be to analyze the existing system and make recommendations for improvements that will reduce operational costs, diversify crop production and strengthen irrigation management capacity at national, agency and farmers' cooperative levels. Similar studies have also been proposed for Senegal and Mali.

A West Africa Irrigation Management Network has now been established in one region, serviced by IIMI from its regional office in Ouagadougou. By uniting research and dissemination functions from the start, the network invites an interactive approach in which information is channeled directly into research and *vice versa*. The network's main vehicle is a quarterly Bulletin, a pilot issue of which appeared in 1990.

MOROCCO

The technical mastery of irrigation in Morocco is of high caliber but farmer participation in water management and related human resource goals remain elusive and it is in this direction that much of IIMI's collaborative work is aimed.

IIMI forged many fruitful links with research organizations and senior irrigation management during 1990. Important steps were taken to coordinate IIMI's work with that of other international organizations — notably Food and Agriculture Organization of the United Nations (FAO) and United Nations Development Programme (UNDP) —working in the same area. Two new projects were made ready for launching and ongoing work on farmer-managed irrigation systems bore fruit during the year in the form of a much expanded knowledge base.

IIMI and MARA (*Ministère de l'Agriculture et de la Réforme Agraire*) jointly organized a successful international workshop on African experiences of FMIS. Held in Rabat during May, the workshop was devoted to strategies for developing and improving farmer-managed irrigation systems in North and West Africa. Important conclusions included a plea for

greater attention to traditional techniques, social conventions and management processes applied by African farmer-managers.

Governments were specially urged to provide a favorable environment for the development of existing and new farmer-managed irrigation systems. An international network managed by an independent organization like IIMI might greatly benefit farmer-managed irrigation systems in Africa, delegates said. Proceedings of the workshop will be published in 1991.

Work on the first phase of a project on **farmer-managed irrigation systems performance** in the Tessaout valley was completed by a researcher from the Human Sciences department of the *Institut Agronomique et Vétérinaire Hassan II*. The work was intended to establish ways to evaluate and improve farmer management in traditional FMIS that are being modernized and included in larger systems. A final report on this first phase of research is in preparation.

Findings to date show that evaluation is greatly complicated by strikingly varied irrigation techniques, physical features and land and water tenure

conventions in the project area. Problems in irrigation management tend to arise at the interface between these concerns. Suggestions were made about possible improvements at each level and these will be put to practical test during later phases of the project.

A group of senior irrigation specialists from Pakistan was invited to Morocco at the end of the year to see and discuss irrigation techniques and allied management practices, such as semicircular elevated canals, that might transfer to Pakistan.

LATIN AMERICA AND THE CARIBBEAN

This is a zone identified in IIMI's strategy as an important target area for future activities. During 1990 IIMI conducted a symposium on irrigation management in Latin America in Rio de Janeiro, **Brazil**. It was cosponsored by the International Commission on Irrigation and Drainage (ICID).

Sessions were conducted in Spanish and Portuguese and papers published in Spanish as well as English and French. As a result of the symposium, many institutions and governments in the zone have expressed interest in research collaboration with IIMI, and such links are to be explored during 1991.

MANAGEMENT TRAINING

OVERVIEW

IIMI's mission hinges on the enhancement of national capacity to manage irrigation systems effectively. This process in turn requires the strengthening of national irrigation management institutions and the strengthening of national research capacity. IIMI approaches the first of these concerns in two ways: strengthening national institutions and training individual managers or policymakers. Typically, IIMI tackles the institutional challenge by means of an initial **training needs assessment**, followed by **curriculum development** measures, development of tailor-made **training materials and training of trainers**. A rigorous **monitoring and evaluation** process then ensures that training objectives are achieved and mid-course corrections made when needed. These steps are backed up by **training and development programs** aimed at **individual managers and policymakers**. They can take several forms, including formal course-work at national or regional training centers, study tours and attendance at workshop or conference events.

The strengthening of national research capacity likewise entails boosting both research institutions and individual researchers. IIMI works to strengthen national research institutions by such means as

tailoring collaborative research activities in the field to maximize their instructional effects, developing complementary programs that purposely aim at strengthening national research capacity and promoting cooperative action research programs in which national institutions take on primary responsibility for the conduct of research.

Training of individual researchers usually takes the form of in-service training of staff of partner or client institutions seconded to IIMI for active participation in collaborative projects, fellowships for staff of national research institutions in developing countries and career internships for postdoctoral and other highly qualified staff of national research and training institutes. In addition, IIMI's research networks on Farmer-Managed Irrigation Systems and on Irrigation Management for Crop Diversification aim at encouraging, motivating and instructing researchers around the world engaged in research on these topics.

HIGHLIGHTS

At the end of 1989, a Training Needs Assessment was conducted in **Malaysia** by IIMI for the Department of Irrigation and Drainage, aimed at identifying factors that affect individual performance in irrigation management and suggesting solutions. A workshop

on the results of the Malaysian assessment was held in Malacca, Malaysia in February and a report on the assessment was published in mid-year.

In October, IIMI helped present a seminar at the Universiti Pertanian Malaysia, Kuala Lumpur, intended to offer faculty members insights into professional needs and curriculum development in irrigation management training. IIMI met representatives of Malaysia's Department of Irrigation and Drainage in November to discuss the results of the earlier Training Needs Assessment and establish departmental staffing, curriculum design and institutional development priorities. A meeting at Universiti Pertanian Malaysia during the same month established opportunities for faculty members in the Engineering and Continuing Education Departments to participate in the Department's training program as trainers, with a view to involving 100 engineers in improved irrigation management training during 1991.

In March, contact was made by IIMI in Sudan with policymakers in irrigation agencies and trainers from Gezira University, to observe their approach to, and interest in, irrigation management training. Following the visit, internal discussions on training needs in Sudan resulted in plans for a second visit in the future to interview Sudanese field workers and irrigation authorities to identify practical needs and propose suitable training activities to be developed in collaboration with the country's irrigation professionals and institutions.

A visit to **Bangladesh** in March led to fruitful contact between IIMI and several irrigation institutions and

training agencies, including the Rural Development Academy at Bogra. It was agreed that a one-day start-up workshop would take place to discuss IIMI's mission and its management training strategy with the top managers of agencies responsible for irrigation systems in the country. The event itself took place in October. National participants acknowledged the management training need and called on IIMI to assist irrigation agencies and training centers in improving management capacity in the country.

IIMI and the German Foundation for Development (DSE) jointly organized a November workshop in Colombo, **Sri Lanka** on trends and policies in irrigation management, involving policymakers from **Malaysia, Indonesia, the Philippines and Thailand** in addition to Sri Lankan counterparts. Participants agreed that a distinctive regional perspective on training, policies and trends in irrigation management had emerged from the encounter. A further series of joint workshops with DSE was agreed in principle.

IIMI received a grant during 1990 that will allow the Institute to involve irrigation experts from **Australia** in developing appropriate management training materials. IIMI's program of **Special Awards** was reactivated and a selection committee established. Mr Leonardo Gonzales of the **Philippines** was selected as the first awardee. During his three-month stay at IIMI headquarters he wrote up his experiences in the turnover of a pump irrigation system in the Philippines.

INFORMATION

OVERVIEW

IIMI's information program provides channels to disseminate management innovations and research outputs to the points of impact where they are most needed. In addition, it helps enlarge national capacities and the scope of national efforts by directing useful information to and between developing countries and, increasingly, by helping establish national irrigation information systems through IIMI country programs.

As a program support mechanism, IIMI's information activities relate to all IIMI's program areas but are

closely connected to training initiatives. Through its public relations and public information functions, the information program also disseminates news about the research program to the general public. The program has three components: publications, communications and technical information services.

HIGHLIGHTS

Two *IIMI Review* issues, and the 1989 *Annual Report* were published during the review period, in addition to 51 publications, of which 15 were professional

publications or monographs, 6 were governance publications and 33 were reports or similar documents. Landmarks included the proceedings of several important conferences, workshops and symposia, including those on the role of social organizers in farmer-managed irrigation systems, design issues in FMIS, and resource mobilization and irrigation management in Latin America. The March issue of the IIMI Review included a special section on India and other special country issues are planned.

Publications distribution expanded, totaling 56,000 issues — an increase of some 42 percent over 1989.

Despite the decrease in print runs of current productions, this increase has been made possible by quicker distribution of new titles, more complete distribution of titles at the time of publication, and running down of previous years' stocks.

There was a major overhaul of mailing lists. A working group to formulate a language policy for the Institute and a Library Steering Committee are also being established. CD-ROM facilities, and off-line interaction with several agricultural databases including AGRIS, AGRICOLA, SESAME and the CGIAR disc, are now available.

FINANCE AND ADMINISTRATION

During 1990, IIMI's income consisted of US\$2.012 million in unrestricted resources, US\$0.396 million in indirect cost recoveries and US\$4.330 in restricted support, to meet expenditures grossing US\$7.158 million. After allowing for indirect cost recoveries, the Institute's net resources for 1990 were US\$6.342 million, against net expenditures of US\$6.761 million. Reduction of the Institute's retained operating surplus enabled this deficit position, arising from IIMI's move to a new headquarters building and from a shortfall in expected indirect cost recoveries, to be adjusted. A Budget Committee was established in September, with terms of reference that include reviewing and revising the budget for the current year and previewing and amending forward budgets. IIMI's cash assets at the end of 1990 were US\$1,165,692. Over \$2.3 million of new restricted grants to fund IIMI projects had been approved.

Arrangements for a permanent headquarters premises in Colombo were negotiated and the Institute expects to move to its final headquarters home in 1991. Land and buildings for the purpose of constructing a permanent IIMI office in Pakistan were granted by the federal and provincial authorities.

At the close of 1990, IIMI had 28 internationally recruited staff. Some 70 national and international professionals were directly engaged in IIMI's research, training, and information activities in headquarters and overseas units. IIMI's total staff numbered 277, more than half of them working outside Sri Lanka.

Table 1. Unrestricted support - 1990.

Donor	Funds received for 1990 (US\$)
UNRESTRICTED GRANTS	
Canada	217,108
Ford Foundation	400,000
Japan	229,691
Staff secondment-Netherlands	171,706
- Japan	85,000
United States	300,000
World Bank	500,000
Sub Total	1,903,505
Interest income	61,178
Other income	47,784
Total	2,012,467

Source : 1990 Audited Accounts.

Table 2. Statement of indirect cost recoveries - 1990.

	1990 US\$
INDIRECT COST RECOVERIES	
ADB - W/s on Resource Mobilization for Sustain.Irrig.	10,000
AFDB - IIMI Program in Africa	29,985
Ford - Bangladesh	21,890
Ford - Buet Performance Workshop, Bangladesh	5,003
Ford - Conference on Water Law & Administration	564
Ford - India	8,844
Ford - Bridging Support, Nepal	35,000
Ford - IIMI Mission to Nigeria	10,000
Ford - Rio de Janeiro - ICID Workshop	6,000
Ford - Sudan	23,071
France - Support for Morocco & West Africa	51,245
IDRC - Irrigation Management Needs Assessment	250
Netherlands - ICID - Performance Assessment	
Diagnosis	9,534
Netherlands - Waterlogging & Salinity Project, Pakistan	31,019
USAID - Accelerated Agric. Production Proj., Philippines	39,902
USAID - IMPSA	25,967
USAID - India	19,537
USAID - ISM Sri Lanka	16,556
USAID - ISPAN	42,819
World Bank - Senior Water Management Adviser - SGB	9,151
Total	396,337

Source : 1990 Audited Accounts.

See ANNEX I for an explanation of the projects listed above.

Tables 3 and 4 show the breakdown of the total 1990 expenditures of US\$ 6.761 million by expense categories and by organizational units respectively. In both cases, 1990 actual expenditures are compared with 1989 actual expenditures.

Table 3. Expenditures by expense categories, 1990 and 1989.

	Actual expenditure 1990 US\$	Actual expenditure 1989 US\$
International staff salaries & benefits	2,696,303	2,554,360
Consultants	330,516	317,998
National staff salaries & benefits	900,633	976,689
International travel	468,687	460,761
National travel	150,324	271,732
Office & research supplies	1,130,457	911,532
Workshops	183,015	100,439
Fellowships	36,432	89,853
Publication & dissemination	168,844	153,944
Vehicle/equipment	391,683	379,392
Contract research	304,454	131,418
Indirect cost	396,337	288,304
Less : Indirect costs recovered	(396,337)	(288,304)
	6,761,348	6,348,118

Source : 1990 Audited Accounts.

Table 4. Expenditures by organizational units, 1990 and 1989.

	Actual expenditure 1990 US\$	Actual expenditure 1989 US\$
FIELD OPERATIONS DIVISION		
Direction	240,431	160,820
Sri Lanka	572,216	464,997
Indonesia	-	448,348
Philippines	307,618	368,613
Nepal	214,434	160,924
India	142,678	93,876
Bangladesh	147,964	181,140
West Africa	385,453	243,160
Morocco	95,398	40,906
Sudan	345,852	261,806
Egypt	17,689	-
PAKISTAN DIVISION	1,009,298	1,114,086
PROGRAMS DIVISION		
Direction/General	451,397	280,528
Thematic research/Regional projects	984,159	638,491
Management training	248,680	166,038
INFORMATION OFFICE	385,755	346,466
GOVERNING BOARD	198,875	142,767
DIRECTOR GENERAL'S OFFICE	425,709	332,123
PROJECT DEVELOPMENT OFFICE	165,540	80,794
FINANCE & ADMINISTRATION DIVISION	736,790	649,150
SHIFT TO NEW HEADQUARTERS - COLOMBO	81,749	461,389
Less : Indirect costs recovered	(396,337)	(288,304)
Total	6,761,348	6,348,118

Source : 1990 Audited Accounts.

Director General's office expenditure during 1990 includes \$87,331 towards the external review of IIMI.

As reflected in Table 5, 23 restricted projects with a value of over US\$2.3 million were approved during the year. Expenditures of US\$4.330 million on restricted projects in 1990 are shown in Table 6.

Table 5. Restricted projects approved in 1990.

Donor	Project	Budget (for life of project) US \$
AUSTRALIA	Collaboration with Australian Institutions (Aust.\$40,000)	32,836
CCCE	Rabat FMIS Workshop (FCFA 4,470,150)	18,000
FORD	Buet Performance Workshop, Bangladesh	32,000
FORD	IIMI Mission to Egypt	30,000
FORD	IIMI Mission to Nigeria	50,000
FORD	Locally Managed Irrigation Systems	35,000
FORD	Support for Research on Farmer Contributions to Irrig.Costs	3,925
FORD	Rio De Janeiro - ICID workshop	30,000
FORD	Support for a study of the Agricultural Development Bank of Nepal's Irrigation Program	75,000
FORD	Rabat FMIS Workshop	39,000
FRANCE	Model Applications at Kirindi Oya	142,000
FRANCE	Support for IIMI program in Morocco & West Africa(FF800,000)	152,000
FRANCE	Trust fund for staff secondments	105,000
GTZ	DSE - IIMI Policymakers' Workshop	12,000
IDRC	Irrigation Management Information Needs Assessment (Canadian \$196,370)	169,900
IDRC	Rabat FMIS Workshop (Canadian \$3,413)	2,962
IFPRI	Supplementary Grant for Joint Research Project on Assessing Irrigation System Performance	3,000
JICA	Irrigation Investment Trends - Sri Lanka	10,305
NETHERLANDS	ICID-Performance Assessment Diagnosis-Phase I (Dfl 287,458)	166,000
USAID	Supplementary grant for the Accelerated Agricultural Production Project (AAPP) - Philippines	250,070
USAID	Irrigation Management Policy Support Activity (IMPSA) - Sri Lanka	232,743
USAID	Supplementary grant for Irrigation System Management project - Sri Lanka	184,800
WORLD BANK	Senior Water Management Adviser, Sudan Gezira Board	524,808
Total		2,301,349

Table 6. *Restricted expenditures in 1990. (Expenditures include indirect costs charged to donors where applicable).*

Donor	Project	1990 US\$
ADB	Sri Lanka TA	72,615
ADB	Workshop on Resource Mobilization for Sustainable Irrigation	46,986
AFDB	IIMI Program in Africa	202,976
CIDA/France/)	IIMI External Review	87,331
ROCKEFELLER/)		
FORD FOUNDATION/ODA/)		
USAID)		
CCCE)	Rabat FMIS Workshop	18,000
FORD)		39,000
IDRC)		2,962
DSE	IIMI Policymakers' Workshop	9,372
FORD	Bangladesh	122,949
FORD	Bridging Support, Nepal	161,019
FORD	BUET Performance Workshop, Bangladesh	25,015
FORD	Locally Managed Irrigation Systems	10,090
FORD	IIMI Mission to Egypt	17,689
FORD	India	44,725
FORD	IIMI Mission to Nigeria	50,000
FORD	Professional Development	569
FORD	Rio de Janeiro - ICID Workshop	30,000
FORD	Study of ADBN's Irrigation Program	50,870
FORD	Sudan	225,289
FORD	Third Int'l Conference on Water Law and Administration	756
FRANCE	Model Applications at Kirindi Oya	24,217
FRANCE	Support for Morocco and West Africa	256,482
FRANCE	Trust Fund for Staff Secondment	66,959
DRC	Irrigation Management Needs Assessment	2,175
FAD/BMZ	Assistance to Farmer-Managed Irrigation	243,324
FPRI/FORD	Assessing Irrigation Performance	43,250
JAPAN	Crop Diversification Network	5,852
ICA	Irrigation Investment Trends	10,305
NETHERLANDS	ICID - Performance Assessment Diagnosis	48,092
NETHERLANDS	Waterlogging and Salinity Project, Pakistan	410,047
ROCKEFELLER	IIMI/IRRI Project	339,394
UNDP	Workshop at Chiang Mai	13,537
USAID	Accelerated Agric. Production Proj., Philippines	307,618
USAID	India	97,953
USAID	ISM-Sri Lanka	187,656
USAID	ISPAN	214,124
USAID	Institutional Development Support - IIMI Pakistan	599,251
USAID	Irrigation Management Policy Support Activity (IMPSA)	155,731
WORLD BANK	Senior Water Management Adviser - SGB	85,653
TOTAL		4,329,833

Source: 1990 Report of the Auditors.

Consolidated Statement of Financial Position (Balance Sheet)
as of 31 December 1990

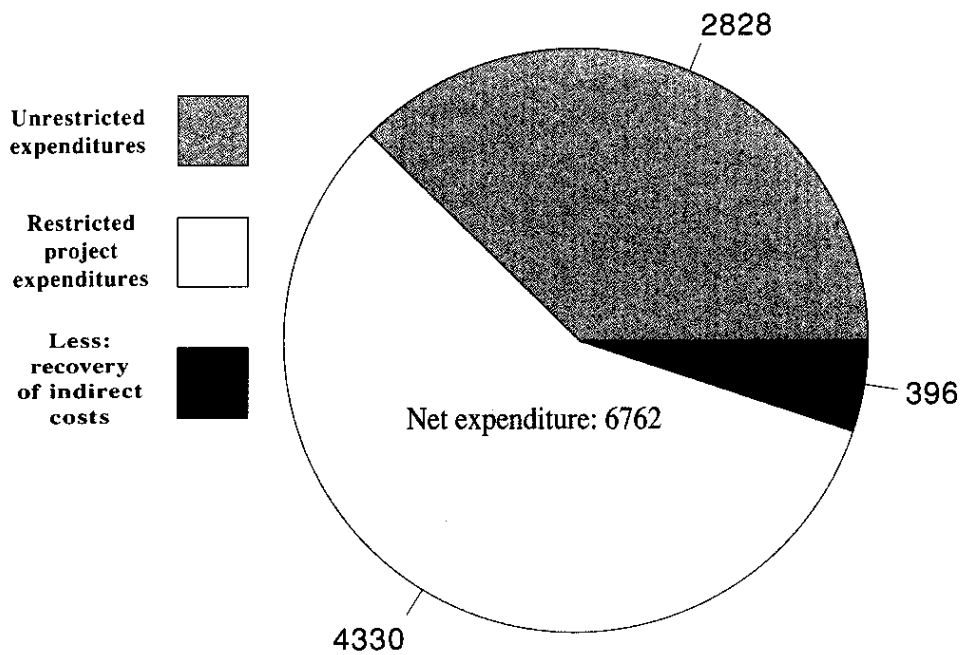
IIMI's consolidated balance sheet as of 31 December 1990 reflects the fact that during the year 1990, the accounting policy relating to the recognition of inventories was changed. The policy adopted in the previous years was to charge the cost of consumable stores purchased to the Statement of Activity in the year of purchase. The value of any inventory in hand at the year end was therefore not reflected in the balance sheet.

The policy was changed in 1990 to recognize the inventories at the lower of the cost and net realizable value in the balance sheet.

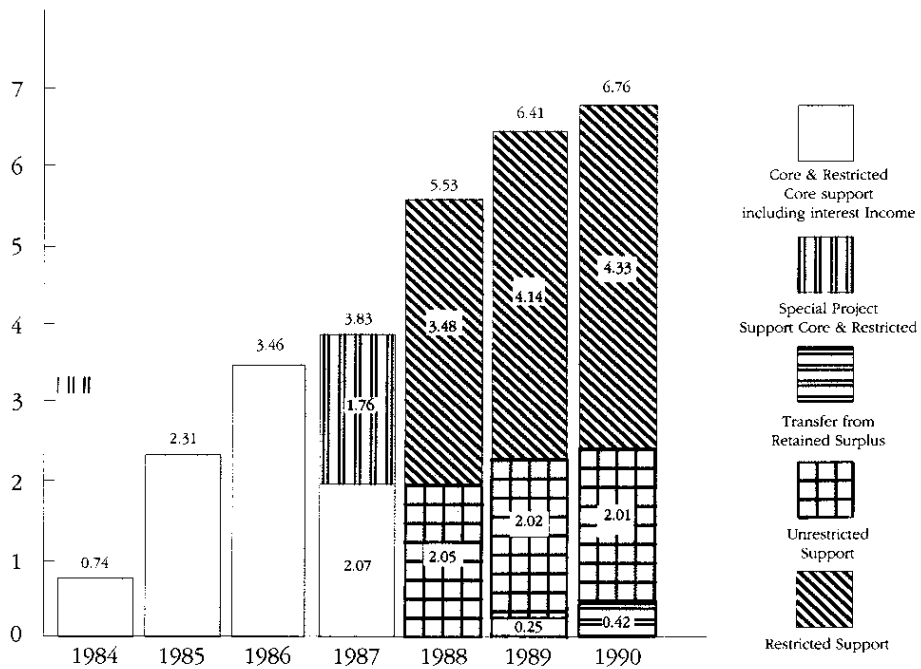
	1990 US \$	1989 US \$
CURRENT ASSETS		
Cash and Short Term Deposits	1,165,692	1,000,789
Receivables	1,165,112	1,498,028
Inventories	78,222	-
Deposits and Pre-Payments	281,626	550,725
Total Current Assets	2,690,652	3,049,542
PROPERTY, PLANT AND EQUIPMENT	2,321,160	2,037,413
TOTAL ASSETS	<u>5,011,812</u>	<u>5,086,955</u>
CURRENT LIABILITIES		
Funds Applicable to Succeeding Years	1,428,783	1,310,923
Other Payables and Accruals	400,392	458,094
Total Current Liabilities	1,829,175	1,769,017
FUND BALANCES		
Funds representing investment in Property, Plant and Equipment	2,321,160	2,037,413
Reserves	448,095	448,095
Retained Operating Surplus	413,382	832,430
Total Fund Balances	3,182,637	3,317,938
TOTAL CURRENT LIABILITIES AND FUND BALANCES	<u>5,011,812</u>	<u>5,086,955</u>

Source : 1990 Audited Accounts.

1990 Net Expenditures



Net Income, 1984 - 90



ANNEX 1
RESTRICTED PROJECTS 1990

PROJECT	DONOR	PLEDGED AMOUNT *	DURATION	CUMULATIVE EXPENDITURE TO 31/12/1989 US\$	EXPENDITURE 1990 US\$
		US\$			
SRI LANKA TA	ASIAN DEVELOP- MENT BANK	350,000	28 months	277,385	72,615
To identify means of increasing the use of existing land, water and infrastructure resources through improvements in the processes of design, rehabilitation, systems management, and operation and maintenance with particular attention to crop diversification.					
WORKSHOP ON RESOURCE MOBILIZATION FOR SUSTAINABLE IRRIGATION	ASIAN DEVELOP- MENT BANK	50,000	1 year	3,014	46,986
To support, at the request of the Government of Sri Lanka, a national workshop to build on the consensus reached so far on a participatory management policy, and to examine the implementation strategies for resource mobilization to improve irrigation-system performance through participatory management with farmers.					
IIMI PROGRAM IN AFRICA	AFRICAN DEVELOPMENT BANK	425,000	2 years	108,978	202,976
Support for IIMI research programs in West Africa, Morocco, and Sudan.					
IIMI EXTERNAL REVIEW	CIDA	Canadian \$ 30,000)	6 months)		
Partial support to meet expenditure in connection with the External Review of IIMI.))		
))		
))		
))		
	FRANCE	F.Francis) 100,000)	6 months)	43,420	87,331
))		
	ROCKEFELLER FOUNDATION	25,000)	6 months)		
))		
	FORD FOUNDATION New York	29,052)	6 months)		
))		
	ODA	St.Pounds) 10,000)	6 months)		
))		
))		
	USAID Washington	20,000)	6 months)		
))		

RABAT FMIS WORKSHOP	CCCE	F.C.F.A. 4,470,150)	6 months	-	18,000
To discuss alternative strategies for developing and improving farmer-managed irrigation systems by sharing experiences across countries in Asia, and North and West Africa.					
	FORD FOUNDATION Dakar	39,000)	6 months	-	39,000
RABAT FMIS WORKSHOP	IDRC	Canadian \$ 3,413	6 months	-	2,962
Define strategies for developing and improving farmer-managed irrigation systems and exchange experiences in North and West Africa.					
IMI POLICYMAKER'S WORKSHOP	GTZ	12,000	5 days		9,372
To conduct a workshop for Southeast Asian Irrigation Policymakers on New Trends in Irrigation Management					
BANGLADESH	FORD FOUNDATION Dhaka	450,000	3 years	202,120	122,949
To strengthen the capacity of relevant institutions and personnel in Bangladesh to manage irrigation systems and irrigation development.					
BRIDGING SUPPORT FOR NEPAL	FORD FOUNDATION New York	176,000	1 year	14,981	161,019
To support a program to strengthen the capacity of Nepal's principal irrigation agency to plan, manage, and utilize irrigation management research, particularly research related to government assistance to small-scale and farmer-managed irrigation systems.					
WATER PERFORMANCE WORKSHOP, BANGLADESH	FORD FOUNDATION Dhaka	32,000	6 months	-	25,015
Focused at performance evaluation of flood control, irrigation, and Bangladesh drainage projects in Bangladesh as part of the Bangladesh University of Engineering Technology and Bangladesh Water Development Board pilot program to improve management.					
LOCALLY MANAGED IRRIGATION SYSTEMS	FORD FOUNDATION New York	35,000	14 months	-	10,090
To prepare publications based on a review of literature and experience related to Farmer-Managed Irrigation Systems					

Annex I (continued)

IIMI MISSION TO EGYPT	FORD FOUNDATION Cairo	30,000	1 year	-	17,689
Exploratory mission to assess possibility of establishing of a collaborative research and development program in Egypt.					
INDIA	FORD FOUNDATION Delhi	200,000	2 years	84,609	44,725
To explore and initiate collaborative projects between IIMI and Indian institutions through research, professional development, and information exchange. This work is designed to strengthen the capacity of Indian institutions to contribute to the improvement of irrigation systems.					
IIMI MISSION TO NIGERIA	FORD FOUNDATION Nigeria	50,000	1 year	-	50,000
To provide technical advice on the Farmer-Managed Irrigation Project with Ahmadu Bello University and evaluate possibilities for long-term, collaborative activities in Nigeria.					
PROFESSIONAL DEVELOPMENT	FORD FOUNDATION New York	46,300	3 years	44,635	569
To support post-doctoral research on irrigation-related settlement planning, and pre-doctoral research to develop a model that would simulate the functioning of a small tank irrigation system.					
RIO DE JANEIRO - ICID WORKSHOP	FORD FOUNDATION New York	30,000	1 year	-	30,000
To provide partial support for holding the special IIMI session at the 1990 ICID Congress with a view to initiating collaborative research and training programs with Latin American institutions.					
STUDY OF ADBN'S IRRIGATION PROGRAM	FORD FOUNDATION Delhi	75,000	1 year	-	50,870
Support for a study of the irrigation program of the Agricultural Development Bank of Nepal.					
SUDAN	FORD FOUNDATION Cairo	495,000	2 years	356,293	225,289
Partial support to establish an irrigation management program in Sudan.					
THIRD INTERNATIONAL CONFERENCE ON WATER LAW AND ADMINISTRATION	FORD FOUNDATION Delhi	6,646	1 year	5,890	756
Grant to support airfares, accommodation, registration, and other costs of four participants presenting papers at the above conference.					
MODEL APPLICATIONS AT KIRINDI OYA	FRANCE	114,000	3 years	92,319	24,217
To support research on main canal operations using a mathematical model produced on microcomputer.					

SUPPORT FOR MOROCCO AND WEST AFRICA	FRANCE	FFrancis 1,600,000	2 years	42,351	256,482
Support for activities undertaken in Morocco and West Africa.					
TRUST FUND FOR STAFF SECONDMENT	FRANCE	105,000	2 years	160,515	66,959
Government of France - trust fund for staff secondment.					
IRRIGATION MANAGEMENT INFORMATION NEEDS ASSESSMENT	IDRC	Canadian \$ 196,370	15 months	-	2,175
To assist irrigation managers in developing countries to identify their internal and external information needs.					
ASSISTANCE TO FARMER-MANAGED IRRIGATION SYSTEMS	BMZ IFAD	DM940,000) US\$120,000)	3 years	375,862	243,324
To support a research program on assistance to farmer-managed irrigation systems, including maintaining a research network and newsletter.					
ASSESSING IRRIGATION PERFORMANCE	IFPRI/FORD	88,000	18 months	44,750	43,250
To undertake a joint research project on assessing irrigation-system performance.					
CROP DIVERSIFICATION NETWORK	JAPAN	20,000	1 year	14,148	5,852
Support for studies in irrigation management - crop diversification.					
IRRIGATION INVESTMENT TRENDS	JICA	10,305	1 year	9,370	10,305
Research on alternative investment opportunities in Sri Lanka					
IND - PERFORMANCE ASSESSMENT DIAGNOSIS	NETHERLANDS	DFL 287,458	5 months	-	48,092
To undertake a joint project with the International Institute for Land Reclamation and Improvement and International Institute for Hydraulic and Environmental Engineering, on relationships between irrigation design and management and resulting effects on performance of irrigation systems.					
WATERLOGGING AND SALINITY PROJECT, PAKISTAN	NETHERLANDS	DFL 4,009,000	5 years	215,852	410,047
Support to IIMI Pakistan to implement, in collaboration with national agencies, a program of applied research on waterlogging and salinity. Research will focus on irrigation strategies designed to prevent waterlogging and salinity.					

Annex I (continued)

IIMI/IRRI PROJECT	ROCKEFELLER FOUNDATION	1,200,000	3 years	787,236	339,394
To conduct collaborative research with IRRI on the problems of water management in irrigation systems devoted to rice-based farming systems in the Philippines, Indonesia, and Bangladesh.					
WORKSHOP AT CHIANG MAI	UNDP	39,000	4 days	25,463	13,537
To create awareness in the importance of irrigation-system design for farmer-managed irrigation systems. Identify shortcomings of present design methods and procedures for operation and maintenance. Exchange information on design ideas and experiences, and recommend new design ideas and strategies.					
ACCELERATED AGRICULTURAL PRODUCTION PROJECT, PHILIPPINES	USAID Philippines	890,070	35 months	274,926	307,618
Program to support the irrigation objectives of the USAID supported AAPP in the Philippines.					
INDIA	USAID India	500,000	18 months	40,310	97,953
To explore and initiate collaborative projects between IIMI and Indian institutions through research, professional development, and information exchange. This work is designed to strengthen the capacity of Indian institutions to contribute to the improvement of irrigation systems.					
IRRIGATION SYSTEMS MANAGEMENT (ISM) - SRI LANKA	USAID Sri Lanka	579,950	35 months	129,458	187,656
To assist USAID's Irrigation System Management project through the development and implementation of research on key irrigation management questions, and to strengthen Sri Lankan national capacity for irrigation management research. This work will build on IIMI's collaborative relationships with Sri Lankan irrigation related research institutions and agencies.					
IRRIGATION SUPPORT PROJECT FOR ASIA AND THE NEAR EAST (ISPAN)	USAID Asia and Near East Bureau	570,000	3 years	205,328	214,124
To increase IIMI's capacity to develop more effective training and professional development programs.					
INSTITUTIONAL DEVELOPMENT SUPPORT - IIMI PAKISTAN	USAID Pakistan	2,000,000	2 years	1,212,909	599,251
To support IIMI Pakistan's efforts to strengthen Pakistan's national capacity to improve the performance of irrigation systems through management innovations.					

IRRIGATION MANAGEMENT POLICY SUPPORT ACTIVITY (IMPSA)	USAID Sri Lanka	232,743	21 months	-	155,731
Project aimed at supporting the policy initiatives of the government of Sri Lanka in the irrigation sector.					
SENIOR WATER MANAGEMENT ADVISOR - SUDAN GEZIRA BOARD	WORLD BANK	Sud.Pounds 567,400 & US\$395,500	2 years	-	85,653
Support for the appointment of a senior water management adviser to the Sudan Gezira Board under a World Bank-assisted rehabilitation project.					
					<hr/>
					4,329,833
					<hr/>

In US dollars unless otherwise stated.

ANNEX II

1990 PUBLICATIONS

GENERAL PUBLICATIONS:

International Irrigation Management Institute. The strategy of the International Irrigation Management Institute. Colombo, Sri Lanka: The Institute. 56p. (January). ISBN 92-9090-104-7.

International Irrigation Management Institute. Annual Report 1989. Colombo, Sri Lanka. The Institute. 48p. (September). ISBN 92-9090-127-6.

International Irrigation Management Institute. Proposed program & budget for 1991. Colombo, Sri Lanka: The Institute. 124p. (October).

International Irrigation Management Institute. Senior staff profiles. Colombo, Sri Lanka: The Institute. 20p. (October).

SERIALS:

International Irrigation Management Institute. A selected bibliography on irrigation management. Documents entered in the irrigation management information network (IMIN) database. Vol. 2, No. 2. 1988. Colombo, Sri Lanka: The Institute. 96p. (March). ISSN 1015-168.

International Irrigation Management Institute. A selected bibliography on irrigation management. Documents entered in the irrigation management information network (IMIN) database. Vol. 3, No. 1. 1989. Colombo, Sri Lanka: The Institute. 140p. (March). ISSN 1015-168.

PERIODICALS:

International Irrigation Management Institute. IIMI Review. Vol. 4. No. 1. Colombo, Sri Lanka: The Institute. 24p. (March). ISSN 1012 831X.

International Irrigation Management Institute. IIMI Review Vol.4. No.2. Colombo, Sri Lanka: The Institute. 24p. (December). ISSN 1012 831X.

NEWSLETTERS:

International Irrigation Management Institute. Farmer-managed irrigation systems newsletter. No. 7. Colombo, Sri Lanka: The Institute. 24p. (August). ISSN 1012 988X.

International Irrigation Management Institute. Irrigation management for crop diversification research network, newsletter Vol. 1. No. 1. Colombo, Sri Lanka: The Institute. 20p. (August). ISSN 1016 7927

TECHNICAL PAPERS AND MONOGRAPHS:

International Irrigation Management Institute. Irrigation management in Latin America. Present situation, problem areas and areas of potential improvement. Colombo, Sri Lanka: The Institute. 108. (English). (April). ISBN 92-9090-124-1.

Institut International de Management de L'Irrigation. Gestion de L'irrigation en Amerique Latine. Situation actuelle, problématique et possibilités d'amélioration. Colombo, Sri Lanka: The Institute. 116p. (French). (April). ISBN 92-9090-125-X.

Instituto Internacional del Manejo de la Irrigacion. El Manejo de la Irrigacion en America Latina. Situación actual, areas problemáticas areas y potenciales de mejoramiento. Colombo, Sri Lanka: The Institute. 120p. (Spanish). (April). ISBN 92-9090-126-8.

International Irrigation Management Institute. Resource mobilization for sustainable management. Proceedings of a workshop on major irrigation schemes in Sri Lanka held at Kandy, Sri Lanka. 22-24 February. Colombo, Sri Lanka: The Institute. 240p. (October). ISBN 92-9090-133-0.

Manor, S.; Patamatankul, S. and Olin, M. Role of social organizers in assisting farmer-managed irrigation systems (Khon Kaen, May 1989). Colombo, Sri Lanka: The Institute. 156p. (November). ISBN 92-9090-128-4.

Yoder, R. and Thurston, J. Design issues in farmer-managed irrigation systems: Proceedings of an International Workshop. Colombo, Sri Lanka: The Institute. 332p. (November). ISBN 92-9090-110-1.

COUNTRY PAPERS:

Sri Lanka

Jungeling, I. Improving management of small-scale irrigation systems: A possible field of assistance for nongovernment organizations? Experiences from Hambantota District, Sri Lanka. Colombo, Sri Lanka: International Irrigation Management Institute. 80p. (Sri Lanka - Country paper No. 5). (June). ISBN 92-9090-122-5.

Abeyratne, S. Rehabilitation of small-scale irrigation systems in Sri Lanka: State policy and practice in two systems. Colombo, Sri Lanka: International Irrigation Management Institute. 72p. (Sri Lanka - Country paper No. 6). (August). ISBN 92-9090-123-3.

Nepal

Pradhan, P. Patterns of irrigation organization: A comparative study of 21 farmer-managed irrigation systems. Colombo, Sri Lanka: International Irrigation Management Institute. 140p. (Country paper - Nepal No.1). (January). ISBN 92-9090-109-8.

Pradhan, P. Increasing agricultural production in Nepal: Role of low-cost irrigation development through farmer participation. Colombo, Sri Lanka: International Irrigation Management Institute. 76p. (Country paper - Nepal No. 2). (January). ISBN 92-9090-142-X.

WORKING PAPERS:

De Jong, I.H. Fair and unfair: A study into the Bethma system in two Sri Lankan village irrigation systems. Colombo, Sri Lanka. International Irrigation Management Institute. 36p. (Working paper No. 15). (February).

Ekanayake, R. Navaratne W, Groenfeldt, D. A rapid-assessment survey of the irrigation component of the Anuradhapura dry-zone agriculture project (ADZAP). Colombo, Sri Lanka: International Irrigation Management Institute. 52p. (Working paper No. 16). (July). ISBN 92-9090-120-9.

Ekanayake, R. Groenfeldt, D. Organizational aspects of improved irrigation management: An experiment in Dewahuwa tank, Sri Lanka. Colombo, Sri Lanka: International Irrigation Management Institute. 44p. (Working paper No. 17). (July). ISBN 92-9090-129-2.

Dayaratne, M. and Wickramasinghe, G. The role of non-government organizations in the improvement of minor irrigation systems in Sri Lanka. Proceedings of a workshop held at Digana Village, Kandy, Sri Lanka. Colombo, Sri Lanka: International Irrigation Management Institute. 64p. (Working paper No. 18). (July). ISBN 92-9090-130-3.

Moragoda, R. and Groenfeldt, D. Organizational aspects of improved irrigation management: Kalankuttiya block, Mahaweli system H, Sri Lanka: Colombo, Sri Lanka: International Irrigation Management Institute. 36p. (Working paper No. 19). (July). ISBN 92-9090-131-4.

Vimaladharma, K. A selected bibliography on small-scale irrigation systems in Sri Lanka. Colombo, Sri Lanka: The Institute. 36p. (August). ISBN 92-9090-132-2.

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International Irrigation Management Institute. Final report. Study on irrigation management for diversified crops (TA No. 859 Philippines). Philippines: The Institute. 372p. (January).

The International Irrigation Management Institute. Final report on the technical assistant study (TA 846 SRI) irrigation management and crop diversification (Sri Lanka). Vol. I - Synthesis of findings and recommendations: Kirindi Oya and Uda Walawe Project. Colombo, Sri Lanka: The Institute. 72p. (June).

The International Irrigation Management Institute. Final report on the technical assistant study (TA 846 SRI) irrigation management and crop diversification (Sri Lanka). Vol. II - Kirindi Oya Project. Colombo, Sri Lanka: The Institute. 268p. (June).

The International Irrigation Management Institute. Final report on the technical assistant study (TA 846 SRI) irrigation management and crop diversification (Sri Lanka). Vol. III - Uda Walawe Project. Colombo, Sri Lanka: The Institute. 258p. (June).

International Irrigation Management Institute. Final report (draft) on the training needs assessment at Department of Irrigation and Drainage in Malaysia. Colombo, Sri Lanka. The Institute. 294p. (August).

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ODI/IIMI. Irrigation Management Network Newsletter. (ODI/IIMI Irrigation Management Network Paper 90/1a). 28p. (April 1990).

Tiffen, M. Variability in water supply, incomes and fees: Illustrations of vicious circles from Sudan and Zimbabwe (ODI/IIMI Irrigation Network Paper (90/1b). 28p. (April 1990).

Jaujay, J. The operation and maintenance of a pilot rehabilitated zone in the office du Niger, Mali (ODI/IIMI Irrigation Management Network Paper (90/1C) 20p. (April 1990).

Makhadho, J.M. The design of Farmer Managed Irrigation Systems: Experiences in Zimbabwe (ODI/IIMI Irrigation Management Network paper (90/1d) 20p. (April 1990).

Small, L. Irrigation Service Fees in Asia (ODI/IIMI Irrigation Management Network paper 90/1e) 20p. (April 1990).

Speelman, J.J. Designs for sustainable Farmer-Managed Irrigation Schemes in sub-Saharan Africa (ODI/IIMI Irrigation Irrigation Management Network paper 90/if) 20p. (April 1990).

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Smout, I. Farmer participation in planning, implementation and operation of small scale irrigation projects. (ODI/IIMI Irrigation Management Network paper 90/2b) 32p. (July 1990).

Millican, J. Reading, writing and cultivating: The role of literacy in irrigation (ODI/IIMI Irrigation Management Network paper 90/2c) 20p. (July 1990).

The FAO Investment Center. Estimating the economic profitability of irrigation: The case of Brazil (ODI/IIMI Irrigation Management Network paper 90/2d) 32p. (July 1990).

Palinasami, K. Tank Irrigation in South India: What next? (ODI/IIMI Irrigation Management Network paper 90/2e) 16p. (July 1990).

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Abernethy, C.L. Indicators and criteria of the performance of irrigation systems. Paper presented at the FAO Regional Workshop on Improved Irrigation Systems Performance for Sustainable Agriculture, Bangkok, Thailand, 22-26 October 1990.

Abernethy, C.L. The use of river and reservoir sediment data for the study of regional soil erosion rates and trends. Paper presented at the International Symposium on Water Erosion, Sedimentation and Resource Conservation, Dehradun, 9-13 October 1990.

Cabluyan, D.M.; Valera, A.; Simbahan, G.; Elegado, A.; Francisco, A.; Pasqual, C. Simulation for optimum crop production in irrigation systems adopted diversified crops during the dry season. A paper presented during the Philippine Society for Agricultural Engineers - 40th Annual Convention, 25-28 April 1990 at Punta Villa Iloilo City.

Lenton, R. Development and implementation of innovation in Irrigation. Paper presented at the Conference on Appropriate Development for Survival: The Contribution of Technology, London, UK, 9-11 October 1990. The Institution of Civil Engineers, London.

Miranda, S.M. Management of irrigation for crop diversification. Paper presented at the Regional Workshop on Agricultural Diversification, Ciarua, Bogor, Indonesia, 20-22 March 1990.

Miranda, Senen M. Crop diversification in rice-based irrigation systems: A regional perspective. Paper presented at National Seminar on Crop Diversification for Non-Granary Irrigated Areas in Malaysia, Malacca Village Resort, Malacca, Malaysia, 27-29 August 1990.

Pradhan, P.; Yoder, R. Irrigation development: The management and use of irrigation in the mountains of Nepal. Kathmandu, Nepal: ICIMOD. (Mountain farming systems discussion paper series no.16).

Pradhan, P. Contribution of irrigation systems in mountain agriculture. Paper presented at ICIMOD organized by the International Symposium on Strategies for Sustainable Mountain Agriculture, held in Kathmandu, Nepal, 10-14 September 1990.

Pradhan, P. Farmer-managed irrigation systems in Nepal. Paper presented at the first Annual Meeting of International Association for the Study of Common Property held at Duke University, USA, 27-30 September 1990.

- Rosegrant, M.W.; Svendsen, M. Irrigation investment for sustainable agricultural growth in Asia. In Technology policy for sustainable agricultural growth. New York, NY USA: IFPRI. pp. 19-20.
- Schulze, F.E. Institution and awareness building for drainage development. Paper presented at the ICID sponsored International Drainage Workshop, Cairo, Egypt, 23-24 February 1990.
- Svendsen, M.; Small, L.E. Farmer's perspective on irrigation performance. Irrigation and Drainage Systems. Volume 4, Number 4: 385-402.
- Svendsen, M.; Small, L. Assessing irrigation system performance. ODU Bulletin, April 1990, No.18:4-6.
- Svendsen, M.; Changming, L. Innovations in irrigation management and development in Hunan province. Irrigation and Drainage Systems. Volume 4, Number 3: 195-214.
- Svendsen, M. Sustainability in irrigated agriculture. Entwicklung landlicher raum, 3:12-15.
- Svendsen, M. Choosing a perspective for assessing irrigation system performance. FAO Regional Workshop on Improved Irrigation System Performance for Sustainable Agriculture. Bangkok, Thailand, 22-26 October 1990.
- Uphoff, N.; Wickramasinghe, M.I.; Wijayarathne, C.M. "Optimum" participation in water management: Issues and evidence from Sri Lanka. Human Organization, 49(1): 26-40.
- Valera, A.; Panabokke, C. Irrigation management issues affecting clayey soil management for non-rice production in rice-based systems. Paper presented at the IBSRAM workshop on Management of Lowland Clayey Soils for Upland Crops after Rice in Asia, Khon Kaen, Thailand, 19-24 March 1990.
- Vander Velde, E.J. Performance assessment in a large irrigation system in Pakistan: Opportunities for improvement at the distributary level. Paper presented at the Regional Workshop on Improved Irrigation System Performance for Sustainable Agriculture, Bangkok, Thailand, 22-26 October 1990.
- Vermillion, D.L. Potential Farmer Contributions to the Design Process: Indications from Indonesia. Irrigation and Drainage Systems. Volume 4, Number 2: 133-150.
- Vermillion, D.L.; Johnson, S.H. III. Turnover and Irrigation Service Fees. Indonesia's New Policies to Achieve Economically Sustainable Irrigation. Volume 4, Number 3: 231-247.
- Yoder, R. Farmer-managed irrigation systems: How sustainable are they? Paper presented at the first international meeting of the International Association for the Study of Common Property, 29 September 1990.

ANNEX III
1990 SPECIAL AWARDS, FELLOWSHIPS & SCHOLARSHIPS

NAME	DATES	CASE STUDY	LOCATION
Special Awardee			
Mr. Leonardo S. Gonzales	October 1990 December 1990	Turning over of a pump irrigation system and its acceptance by a Farmer Irrigators' Association in the Philippines.	The Philippines
Ph.D. Research Fellowships			
Mohammed Nawaz Bhutta	April 1987 February 1990	Effect of Varying Discharges on the Equity of Water Distribution in Irrigation Systems.	Pakistan
Master's Degree Scholarships			
M. Saeed	December 1989 April 1990	Effect of soil salinity on moisture deficit and yield of irrigated wheat.	Pakistan
Paul Heinsbroek	April 1990 October 1990	Water balance in water-course command area of Pir Mahal Distributary.	Pakistan
Niels Blaauw	April 1990 October 1990	Salt balance in water-course command area of Pir Mahal Distributary.	Pakistan
John Jacobs	October 1990 April 1991	Effects of main canal operation on water supplies to distributaries.	Pakistan
Emco Schoonderwaldt	October 1990 April	Effects of main canal operation on water supplies to distributaries.	Pakistan

**ANNEX IV
AGREEMENTS SIGNED IN 1990**

Organization

Purpose

Burkina Faso

Protocol with the Ministry of Water.

Implementation of a Research Development Project on Irrigation Management Issues in Systems Under Small Dams.

Germany

Deutsche Stiftung fur Internationale Entwicklung (DSE)

To design and conduct collaborative dialogue and training programs in irrigation management.

Pakistan

Agricultural and Research Division, the Province of Punjab.

Provision to the Institute the site for IIMI Pakistan Headquarters building in Lahore.

Sudan

Rehabilitation Project Management Unit
- Sudan Gezira Board.

Appointment of IIMI Irrigation Specialist to serve as the Senior Water Management Advisor to the the Sudadan Gezira Board.

USA

Winrock International Institute
for Agricultural Development.

Collaboration in the overall area of the assessment of performance of irrigation systems.

ANNEX V
1990 WORKSHOPS AND CONFERENCES

1. Workshops and conferences organized by IIMI

Title	Date	Location
Irrigation Research Methodologies.	25-26 January	Los Banos, Laguna, Philippines.
Research Planning Workshop to discuss the India Program Preliminary Research Proposal.	12-13 February	Colombo, Sri Lanka.
Consultative Workshop on Performance Evaluation.	14-16 February	Pangbourne, U.K.
Workshop on Resource Mobilization for Sustainable Management of Major Irrigation Schemes - Sri Lanka.	23-25 February	Kandy, Sri Lanka.
Workshop on Study of Water Delivery Systems by Lanka Hydraulics Institute.	8 March	Polonnaruwa, Sri Lanka.
Workshop to discuss detailed Research proposals held at the Institute of Rural Management.	24-25 April	Gujarat, India.
Irrigation Management in Latin America, special IIMI session at 14th Congress of the International Commission on Irrigation and Drainage (ICID)	4 May	Rio de Janeiro, Brazil.
International Workshop on Strategies for Developing and Improving Farmer-Managed Irrigation Systems: Experiences in North and West Africa.	15-19 May	Rabat, Morocco.
Workshop on Institutional Strengthening under Irrigation Systems Management (ISM) project.	15 June	Colombo, Sri Lanka.
National Workshop on the Indonesia Component of the International Irrigation Management Institute (IIMI)/International Rice Research Institute (IRRI) Collaborative project.	12-13 June	Yogyakarta, Indonesia.

Annex V (continued)

Bangladesh University of Engineering and Technology (BUET)/Bangladesh Water Development Board (BWDB) Workshop Evaluation of Flood Control Drainage Irrigation (FCDI) Projects: Issues for Action Research.	14-25 August	Dhaka, Bangladesh.
National Workshop on Irrigation Management for Rice-Based Farming Systems.	10-11 September	Los Banos, Philippines.
Regional Research Workshops in three Accelerated Agricultural Production Project (AAPP) regions to discuss initial findings and action plans.	12 October	Cagayan de Oro City, Philippines.
	31 October	Oloilo City, Philippines.
	24-25 October	Pili Camarines Sur, Philippines.
Irrigation Management Training Needs in Bangladesh.	29 October.	Dhaka, Bangladesh.
Intercountry Workshop on Irrigation Management for Rice-Based Farming Systems.	12-14 November	Colombo, Sri Lanka.
Deutsche Stiftung fur Internationale Entwicklung (DSE)/International Irrigation Management Institute (IIMI) Workshop for South East Asian Irrigation Policymakers on New Trends in Irrigation Management.	15-18 November	Colombo, Sri Lanka.
Planning Workshop - Accelerated Agriculture Production Project (AAPP) Irrigation Research.	19-21 November	Diliman, Q.C., Philippines.
Joint Seminar of the Sri Lanka Irrigation Department and International Irrigation Management Institute (IIMI).	10 December	Colombo, Sri Lanka.
First Annual Workshop of the Irrigation Management for Crop Diversification (IMCD) Research Network.	10-14 December	Manila, Philippines.
Research Network on Irrigation Management for Rice-Based Farming Systems.	10-14 December	Quezon City, Philippines.

Accelerated Agricultural Production Project - Irrigation Program (AAPP-IP) Implementation Conference.	17-19 December	Quezon City, Philippines.
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2. **Selected workshops and conferences at which IIMI was represented**

Regional Expert Consultation on Impact of Small-Scale Irrigation on Rural Poor and its Prospects in Asia, Kathmandu, Nepal, 18-21 January.

* Center for Integrated Rural Development for Asia and the Pacific. (CIRDAP).

Design for Sustainable Farmer-Managed Irrigation Schemes in Sub-Saharan Africa, Wageningen, The Netherlands, 5-8 February.

* Wageningen Agricultural University, The Netherlands.

International Drainage Workshop, Cairo, Egypt, 23-24 February.

* International Commission on Irrigation and Drainage (ICID).

IBSRAM Workshop on Management of Lowland Clayey Soils for Upland Crops after Rice in Asia, Khon Kaen, Thailand, 19-24 March.

* International Board of Soil Resources and Management (IBSRAM).

Agricultural Diversification Seminar, Bogor, Indonesia, 21-22 March.

* Agency for Agricultural Research and Development (AARD), Indonesia.

14th Congress of the International Commission on Irrigation and Drainage (ICID), Rio de Janeiro, Brazil, 30 April-4 May.

* International Commission on Irrigation and Drainage (ICID)/IIMI.

Farmer Participation in Irrigation Development and Management: Problems and Prospects, Zaria, Nigeria, 7-8 May.

* Institute of Agricultural Research, Ahmedo Bello University, Zaria, Nigeria

DSE-Workshop on "Management of Irrigation Projects" - 19 April -15 May, Feldfing, West Germany.

* Deutsche Stiftung fur Internationale Entwicklung (DSE).

Crop Diversification in Non-Granary Irrigated Areas of Malaysia, Malaysia, 27-29 August.

* Department of Irrigation & Drainage, Malaysia.

International Union of Conservation of Nature and Natural Resources (IUCN) Workshop on Sustainable Development of Freshwaters - 30 August-Sept 02, Linkoping, Sweden.

* International Union of Conservation of Nature and Natural Resources.

10th Annual General Meeting of the Panel of Experts for Environmental Management (PEEM) at FAO, Rome, Italy, 3-9 September.

* Panel of Experts for Environmental Management (PEEM)

International Symposium on Strategies for Sustainable Mountain Agriculture, Kathmandu, Nepal, 10-14 September.

* International Centre for Integrated Mountain Development (ICIMOD).
Kathmandu, Nepal.

International Conference on "Designing Sustainability of the Commons," North Carolina, USA, 27-30 September.

* International Association for the Study of Common Property, Duke University, North Carolina.

First Irrigation Management Policy Advisory Committee (IMPAC) Policy Workshop. Irrigation Management Policy Support Activity, Hikkaduwa, Sri Lanka, 5-7 October.

- * Irrigation Management Policy Support Activity (IMPSA) Secretariat, Colombo.

Seminar on Water Resources Development and its Management in Arid Areas, Quetta, Pakistan, 6-9 October.

- * Pakistan Council of Research in Water Resources.

Regional Workshop on Improved Irrigation System Performance for Sustainable Agriculture, Bangkok, Thailand, 22-26 October.

- * Food and Agricultural Organization (FAO) of the United Nations, Rome.

Food and Agricultural Organization (FAO) Research Workshop on Improved Irrigation System Performance for Sustainable Agriculture, Bangkok, Thailand, 26-27 October.

- * Food and Agricultural Organization (FAO) of the United Nations, Rome.

Appropriate Development for Survival - the contribution of Technology, 9 -11 October, London, UK.

- * Institution of Civil Engineers, UK.

Consultative Group on International Agricultural Research (CGIAR) International Centers Week Meetings - 29 October-2 November, Washington DC, USA.

- * Consultative Group on International Agricultural Research (CGIAR).

Groundwater Resource Management, Bangkok, Thailand, 5-7 November.

- * International Water Resources Association (IWRA)/Centre de Formation Internationale a la Gestion des Ressources en Eau (CEFIGRE)/Asian Institute of Technology (AIT).

Irrigation System Management Research Symposium, Islamabad, Pakistan, 15-17 November.

- * Government of Pakistan and United States Agency for International Development (USAID)

- * Organising Institution.

ANNEX VI
IIMI's Professional/Management Staff
(As of 31 December 1990)

OFFICE OF THE DIRECTOR GENERAL

Roberto Lenton (Argentina)
 Director General

Wendy Daudrumez
 Special Assistant to the
 Director General

PROGRAMS DIVISION

Charles Abernethy (U. K.)
 Director, Programs

Zenete M. P. da S. Franca (Brazil)
 Training Specialist

Khin Maung Kyi (Burma)*
 Senior Management Specialist

Shaul Manor (Israel)
 Senior Irrigation Specialist

Senen Miranda (Philippines)
 Senior Irrigation Specialist

Hammond Murray-Rust (UK)
 Senior Irrigation Specialist

Alfredo Valera (Philippines)
 Irrigation Specialist

Douglas Vermillion (USA)
 Irrigation Specialist

E. Nijman (The Netherlands)
 Associate Expert

Wilmy Sally
 Irrigation Management and
 Engineering Specialist

Kuruppuarachchi
 Research Associate

A. Karunasena
 Research Associate

Amarasekera
 Research Associate

FIELD OPERATIONS DIVISION

anda Abeywickrema (Sri Lanka)
 Director, Field Operations

W. F. Ratnayake
 Assistant to the Director,
 Field Operations

Bangladesh

Donald E. Parker (USA)
 Head, Bangladesh Field Operations

A. Rahaman
 Administrative Officer

M.H.K. Choudhury
 Field Officer

M. Islam
 Field Officer

M.D.R. Karim
 Field Officer

M.D.H. Ali
 Field Officer

S. Islam
 Field Officer

A. Sarwar
 Field Officer

S.N. Roy
 Field Officer

S. Shadi
 Field Officer

N. Hoque
 Field Officer

Md. M. Pathan
 Field Officer

M.A. Hakim
 Research Fellow (Seconded)

Morocco

Jean Verdier (France)
 Head, Morocco Field Operations

Nepal

Robert Yoder (USA)*
 Head, Nepal Field Operations

Prachanda Pradhan
 Head, Nepal Field Operations

K. C. Durga
 Agricultural/Social Scientist

S. R. Shrestha
 Administrative Officer

U. Rayamajhi
 Administrative Officer

Philippines

C.M. Wijayaratna (Sri Lanka)
 Head, Philippines Field Operations

D. Cablayan
 Research Associate

E.M. Pintor
 Research Associate

G. Simbahan
 Admin/Research Assistant

A. Francisco
 Research Assistant

J.A. Elegado
 Research Assistant

A. Valdevilla
 Research Assistant

Sri Lanka

Douglas J. Merrey (USA)
 Head, Sri Lanka Field Operations

R. Sakthivadivel (India)
 Senior Irrigation Specialist

Masao Kikuchi (Japan)
 Irrigation Specialist

H. M. Hemakumara
 Research Officer

P. B. Aluwihare
 Research Officer

K. A. Hemakeerthi
 Research Officer

W. J. J. Upasena
 Research Officer

Mr. K. Jinapala
 Research Officer

P. G. Somaratne
 Research Officer

E. Ratnasiri
 Research Officer

B. R. Ariyaratne
 Research Officer

Annex VI (continued)

L. R. Perera
Research Officer

M. H. S. Dayaratne
Research Officer

C. Withana
Research Officer

Sudan

M. Siddique Shafique (Pakistan)
Head, Sudan Field Operations

K. A. Haq
Irrigation Specialist

Abdel Bagi
M. S. Student

West Africa (Ouagadougou, Burkina Faso)

Jean-Claude Legoupil (France)
Regional Representative

Andre-Marie Pouya
Information and Communication Service

PAKISTAN DIVISION

F. E. Schulze (The Netherlands)
Director

D. Jayatissa Bandaragoda (Sri Lanka)
Senior Management Specialist

Jacob Willem Kijne (The Netherlands)
Senior Irrigation Specialist

Edward Vander Velde (USA)
Irrigation Specialist

H. Anwar
General Manager Administration

M. Badruddin
Senior Principal Irrigation Engineer

G. R. Firdausi
Senior Principal Irrigation Engineer

M. A. Bhatti
Principal Irrigation Engineer

Z. Habib
Systems Analyst

R. M. Afaq
Irrigation Engineer

A. S. A. Khan
Accountant

F. H. Sendhu
Senior Field Research Hydrologist

S. U. Rehman
Senior Field Research Economist

M. Anees
Senior Field Research Hydrologist

M. Saleem
Field Research Social Scientist

T. Shahzad
Field Research Engineer

K. A. Babar
Field Research Engineer

W. U. Zaman
Field Research Engineer

A. S. Safdar
Field Research Engineer

H. Khan
Field Research Engineer

A. S. Qureshi
Field Research Engineer

A. Ahmed
Field Research Engineer

N. Hasan
Field Station Manager

INFORMATION OFFICE

Francis O'Kelly (Ireland)
Head, Information

V. Somasundaram
Administrative Officer

I. R. de Silva
Documentalist

N. U. Yapa
Head, Librarian

S. Sri-Nammuni**
Assistant Librarian

K. Nimal A. Fernando
Chief Production Editor

Kingsley Kurukulasuriya
Editor

A. C. M. Sufian
Production Manager

D. Van Eyck
Distribution Manager

I. Weerasinghe
Assistant Documentalist

PROJECT DEVELOPMENT OFFICE

Marian Fuchs-Carsch (USA)
Project Development officer

FINANCE AND ADMINISTRATION DIVISION

Daniel C. Goodman, Jr. (USA)
Director, Finance and Administration

Laksiri Abeysekera
Controller

Fred Abeysekera
Personnel Manager

A.D.S. Weerasekera*
Budget Officer

U. Wettasinghe**
Budget Officer

D. Samaraweera
Manager, Administrative services

K. S. C. Perera
Maintenance Engineer

G. Halvitige
Senior Accountant

Mohan Abayasekara
Travel and Conference Coordinator

Shanthi Weerasekera
Manager, Office Support Systems

T. K. O. Bahar
Personnel Officer

P. S. B. Ekanayake
Assistant Accountant

*Departed IIMI during 1990

**Arrived during 1990

ANNEX VII
1990 CONSULTANTS

NAME	COUNTRY IN WHICH THE CONSULTANCY WAS CONDUCTED	MISSION
PROGRAMS DIVISION		
Mr. Adriza	Sri Lanka	To perform statistical analysis of irrigation performance data collected by Prof. Kyi and his collaborators.
Dr. Richard Carter	U.K.	To review the literature on "Management of Irrigation Support Services to Farmers."
Prof. Drs. A. A. Kampfraath	Malaysia	To review Management issues related to curriculum development for training at DID in Malaysia with IIMI's Training Specialist.
Dr. Judith Kuiper	Thailand	To assist in the study of the rehabilitation process of the People's Irrigation Project (PIP) in northern Thailand.
Dr. P. S. Rao	Bangladesh	To participate in the IIMI workshop on Irrigation System Management Training Strategy for senior managers of irrigation agencies in Bangladesh.
Mrs. R. Sooriyaarachchi	Sri Lanka	To design the data entry structure, write statistical programs, instruct and supervise data entry and data analysis.
Prof. C. R. Shanmugam and Dr. P. K. Ayyasamy	India	To review the literature on "Management of Irrigation Support Services to Farmers."
Dr. K. Sanmuganathan	U.K.	To review papers presented at IIMI's Performance Symposium (Internal Program Review Nov. '89).

NAME	COUNTRY IN WHICH THE CONSULTANCY WAS CONDUCTED	MISSION
FIELD OPERATIONS DIVISION		
Dr. John Sutter	Nigeria/Senegal	To review papers on developments concerning the ABU/IIMI collaborative Farmer-Managed Irrigation Systems (FMIS) Project in Nigeria.
Dr. Terrence Abeysekera	Sri Lanka	To carry out a systematic review of the relevant published and unpublished documents available on Sri Lankan rehabilitation experiences and to analyze, systematize and report on the findings.
Mr. Nihal Fernando	Sri Lanka	To collect field information and carry out analysis required to answer queries raised in the draft Final Report ADB TA 846 SRI project by the Asian Development Bank and other agencies.
Mr. G. N. Kathpalia	India	To liaise with the chairperson of the India-IIMI Co-ordinating Committee, Ms. Radha Singh, the Ministry of Water Resources, WAPCOS and the Central Water Commission (IRMIO) and expedite implementation of the decision taken at the Third Co-ordinating Committee meeting with regard to sending approval letters for mode of payment to the collaborating institutions.
Dr. C. R. Panabokke	Sri Lanka	To plan and coordinate meetings, and prepare minutes of consultative committee meetings and contribute to the Project on Irrigation Management and Crop Diversification (ADB-SLTA).
Dr. S. P. F. Senaratne	Sri Lanka	To prepare a draft proposal for IIMI's participation in the National Irrigation Rehabilitation Projects (NIRP).

NAME	COUNTRY IN WHICH THE CONSULTANCY WAS CONDUCTED	MISSION
Prof. Milton Barnett	Philippines	To participate in the planning workshop of the research component of the Accelerated Agricultural Production Project (AAPP) on 19, 20 and 21 November 1990.
PAKISTAN DIVISION		
Dr. W. Siderius	Pakistan	To make an inventory of aerial photographs available on the survey of Pakistan, specifying the dates the photos were taken, their types and goals and restrictions/regulations with respect to their use.
INFORMATION OFFICE		
Mr. John Colmey	Sri Lanka	To provide editorial support to the Information Office; in particular edit the IIMI Review.
Mr. Matthew Driskill	Sri Lanka	To provide general communications support to the Information Office.
Mr. Robert Lamb	Sri Lanka	To prepare the 1990 Annual Report and other public information material.
DIRECTOR GENERAL'S OFFICE/FINANCE AND ADMINISTRATION		
Ms. Marie-Pierre Rousseau Fernando	Sri Lanka	To provide interpretation from English to French during IIMI's Board Meeting from January 31 to 4 February 1990.
Prof. Gilbert Levine	U.S.A./Sri Lanka	To assist in the process to select a Director for Research and provide assistance in further defining the criteria for the designation of IIMI's internationally recruited staff as senior specialist.

NAME	COUNTRY IN WHICH THE CONSULTANCY WAS CONDUCTED	MISSION
Mrs. Renuka O'Kelly-Jeyaraj	Sri Lanka	To arrange and coordinate a press conference given by IIMI Board members and executive staff to selected representatives of the domestic and foreign press in Sri Lanka and to update the media list.
Mr. J. Stephen Parker	Sri Lanka	To create a job description for the post of Technical Information Specialist.
Mr. Raj Bhatia	Sri Lanka	To assist in the designing and implementation of a computerized accounting and budgeting system for IIMI's headquarters and field offices.
Dr. William Gormbley	U.S.A.	To prepare terms and conditions of employment for a junior category of internationally recruited staff.
Mr. Alex Gunasekera	Sri Lanka	To make modifications in the existing Final Assets Program to record the value of the assets in the currency in which it was purchased.
Mr. Steve Lee	Sri Lanka	To provide E-mail enhancements for easy use, e-mail improvements to reduce cost, and modem connections (E-mail) to field operations offices; discuss and evaluate installation of a local area network and requirements.

ANNEX VIII
1990 COLLABORATIVE RESEARCH CONTRACTS

Contract Title	Research Institute
1. The Operation and Management of PIO's in the Bicol Region.	Camarines Sur State Agricultural College Camarines Sur, The Philippines.
2. Assessment of the effectiveness of NIA's Training Program in Region V.	Ateneo de Naga University. Naga City, The Philippines.
3. NIA Provincial Irrigation Offices Services to CIS in Western Visayas.	University of the Philippines in the Visayas, Iloilo City The Philippines
4. Attitudinal Concomitant to Payment of Irrigation Service Fees.	Central Mindanao University Bukidnon, The Philippines.
5. Impact Assessment of Training Program Conducted by NIA in Region X.	Central Mindanao University. Bukidnon, The Philippines.
6. Water Measurement & Farm Productivity Study in the National Irrigation Systems (NIS) in the Bicol Region.	Bicol University (Development Foundation), Legaspi City, The Philippines.
7. Water Measurement Study for Communal and National Irrigation Systems in West Visayas.	West Visayas State University, Iloilo City, The Philippines.
Water Measurement Study for Communal Irrigation Systems in the Bicol Region.	Camarines Sur State Agricultural College, Camarines Sur, The Philippines.
8. Irrigation Water Management Evaluation of NIS and CIS in Region X. Research Institution	Central Mindanao University Bukidnon, The Philippines.

ANNEX IX IIMI ADDRESSES

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LIST OF ACRONYMS

AAPP	Accelerated Agricultural Production Project (The Philippines)
AAPP-IP	Accelerated Agricultural Production Project - Irrigation Program (The Philippines)
AARD	Agency for Agricultural Research and Development (Indonesia)
ABU/IIMI	Ahmedo Bello University/International Irrigation Management Institute
ADB	Asian Development Bank
ADB-SLTA	Asian Development Bank - Sri Lanka Technical Assistance
ADB-TA 846 SRI	Asian Development Bank - Technical Assistance, Sri Lanka
ADBN	Agricultural Development Bank of Nepal
AFDB	African Development Bank
AIT	Asian Institute of Technology (Bangkok, Thailand)
BADC	Bangladesh Agricultural Development Corporation
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit (Germany)
BRRI	Bangladesh Rice Research Institute
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CCCE	Caisse Centrale de Corporation Economique
CEFIGRE	Centre de Formation Internationale a la Gestion des Ressources en Eau (France)
CEMAGREF	Centre National du Machinisme Agricole du Genie Rural des Eaux et des Forets (France)
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
CIS	Communal Irrigation Systems (The Philippines)
IRDAP	Centre on Integrated Rural Development for Asia and the Pacific
COMA	Canal Operations Management Assessment
DI	Drainage and Irrigation Department (Malaysia)
DOI	Department of Irrigation (Nepal)
DRIP	Drainage Research Institute of Pakistan
DRMS	Development Research and Management Services
DSE	Deutsche Stiftung für Internationale Entwicklung (Germany)
ENGREF	Ecole Nationale du Genie Rural des Eaux et des Forets (France)
FAO	Food and Agriculture Organization of the United Nations
FCDI	Flood Control Drainage and Irrigation
FMS	Farmer-Managed Irrigation Systems
GTZ	Gesellschaft für Technische Zusammenarbeit (GTZ), GMBH (Germany)
ICID	International Commission on Irrigation and Drainage
IAS	Irrigators' Associations
ISRAM	International Board for Soil Research and Management
IMOD	International Centre for Integrated Mountain Development
IRRC	International Development Research Centre (Canada)
IFAD	International Fund for Agricultural Development
IMCD	Irrigation Management for Crop Diversification
IFPRI	International Food Policy Research Institute
IIN	Irrigation Management Information Network
IPSA	Irrigation Management Policy Support Activity (Sri Lanka)
IPAC	Irrigation Management Policy Advisory Committee (Sri Lanka)
IRI	Irrigation Research Institute (Pakistan)
IRMO	Irrigation Research and Management Improvement Organization (India)
IRRI	International Rice Research Institute
ISIM	Irrigation Systems Management
ISPA	Irrigation Support Project for Asia and the Near East
IASRI	International Waterlogging and Salinity Research Institute
IWA	International Water Resources Association
IUCN	International Union for Conservation of Nature and Natural Resources

JICA	Japan International Cooperation Agency
KADA	Kemubu Agricultural Development Authority (Malaysia)
MARA	Ministere de l'Agriculture et de la Reforme Agraire
NIA	National Irrigation Administration (The Philippines)
NIRP	National Irrigation Rehabilitation Projects
NIS	National Irrigation Systems
NGO	NonGovernmental Organization
ODA	Overseas Development Administration (U.K.)
ODI	Overseas Development Institute, (U.K.)
PCARRD	Philippines Council for Agriculture, Forestry and Natural Resources Research and Development
PEEM	Panel of Experts on Environmental Management and Vector Control
PIO	Provincial Irrigation Offices
PIP	People's Irrigation Project (Thailand)
SGB	Sudan Gezira Board
TEAMS	Technology Evaluation and Management Services (Pvt) Ltd. (Sri Lanka)
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
WAPCOS	Water and Power Consultancy Services Ltd. (New Delhi, India)
WECS	Water and Energy Commission Secretariat (Nepal)