

FMIS RESEARCH: A REFLECTION ON IWMI's 25 YEARS IN NEPAL

DHRUBA PANT

Head, IWMI-Nepal

d.pant@cgiar.org

Fifth International Seminar on Dynamics of Farmer Managed Irrigation Systems: Socio-institutional, economic and technical Context organized by Farmer Managed Irrigation System Trust. March 25-26, 2010, Kathmandu, Nepal

ABSTRACT

International Water Management Institute, the then International Irrigation Management Institute (IWMI) began its activities in Nepal since 1986 with a Memorandum of Understanding with His Majesty's Government of Nepal, now the Government of Nepal. The primary objectives were to strengthen the research capability of Water and Energy Commission Secretariat, promote collaborative research in Farmer Managed Irrigation Systems (FMIS), Irrigation Management Transfer (IMT) and Agency Managed Irrigation Systems (AMIS). Pioneering researches in FMIS and AMIS were carried out in Nepal by IWMI and it laid impact on participatory irrigation management through understanding the role of water users association for effective management of irrigation system. The researches in Nepal was also important for its contribution to the water sector management in the developing country through the promotion of science based studies and action research. The main areas of contribution of IWMI research were in policy formulation, methodology development and Institutional Strengthening and Capacity Building for irrigation research. Therefore, this paper will try to look into the FMIS, AMIS and other researches that IWMI has undertaken, their importance for water management in Nepal and the lessons learnt is expected to be of interest to policy makers, planners, researchers and the scientific community.

1. INTRODUCTION

His Majesty's Government of Nepal (HMG/N), now Government of Nepal (GON) established Water and Energy Commission Secretariat (WECS) in 1981 with a mandate of providing policy advice to the government on water and energy development. In 1985 Ford Foundation (FF) provided grant assistance to WECS for the establishment of planning and research unit in WECS. It also allocated fund for research to International Irrigation Management Institute (IIMI), now International Water Management Institute (IWMI) to provide technical support to WECS. In January 1986 WECS and IIMI signed a Memorandum of Understanding (MOU) with objectives (Pradhan, forthcoming) to:

- Promote and strengthen irrigation research capability in Nepal.
- Undertake research activities in FMIS in Nepal

IWMI has the mandate to work in cooperation with scientific departments, government agencies, NGOs and universities of Nepal in accordance with the strategies, policies and priorities of both GON and IWMI. In 1989 IWMI signed a MOU with Department of Irrigation (DOI), with an objective "to strengthen the efficient and effective utilization of the already developed irrigation and water resources potential in Nepal" (MOU 1994). The IWMI activity in Nepal is directed by the Consultative Committee, chaired by the Director General (DG), DOI.

IWMI's research activities in Nepal till 2000s focused on:

- Farmer Managed Irrigation System (FMIS)
- Irrigation Management Transfer

1. FARMER MANAGED IRRIGATION SYSTEM (FMIS)

The first collaborative research (1986-1989) was jointly carried out by WECS and IIMI in Indrawati River Basin in the east of Kathmandu Valley. IIMI provided technical inputs to enable WECS to make decisions on action research in which the manpower from the WECS participated. The objective of action research project was to examine ways to assist FMIS by testing lower-cost techniques and technologies and maximizing the participation and resource mobilization of the beneficiaries (Yoder and Upadhyaya 1987). Likewise, the irrigation resource inventory survey was carried out to enable rational planning and development activities through informed decision making to support FMIS (IIMI 1994). It enabled the development of both 'physical' and 'social' capital of the irrigation system and prepared for government support to the FMIS in Nepal, which until then were not receiving any kind of government support. The main activities carried out under this research was rapid assessment of the FMIS to provide agency support, resource survey on availability of water and potential for expansion, and farmer to farmer training (Rao and Abewickrema 1992), physical structure improvement and promotion of participatory irrigation management (PIM) in FMIS (Pradhan, forthcoming). IWMI was also involved in the evaluation of the process and performance of FMIS financed by Agriculture Development Bank (ADB/N) through a package of technical know-how, finance and institutional arrangement for the development of irrigation systems for small farmers. During this time a major

reorganisation of the irrigation sector was taking place in Nepal with the merger of Farm Irrigation Water Utilisation Division (FIWUD) of Department of Agriculture (DOA) and small irrigation of less than 50 ha of the then Ministry of Panchayat and Local Development to Department of Irrigation.

One study on FMIS focusing on public-private partnership and equity issue was carried out by IWMI in Aandhikhola Irrigation and hydel project. The study looked at the processes by which the land redistribution to the landless and marginal farmers was made and whether it was 'pro poor' and have addressed social equity as envisaged or not. The study observed that the land and water distribution to the poor was a positive step towards achieving social equity however, the benefit to the poor could have been enhanced had it been effectively implemented. The lack of representation of the poor in the planning and decision making committees for land and water distribution was identified as the main reason for this situation (Jacobin et. al 2002).

2. IRRIGATION MANAGEMENT TRANSFER

Banganga Irrigation System

In 1992, the GON engaged in the management transfer programs of agency managed irrigation systems as per Nepal's Irrigation Policy by introducing joint management by DOI and farmers. With funding from United States Agency for International Development (USAID) performance improvement through participatory irrigation management was introduced in Banganga Irrigation System (BIS) of 6000 ha in Western Nepal. The focus of IWMI activities were on improvement in water distribution and organising irrigation users' organisation for operation and maintenance at tertiary canal and field channels. Farmers were encouraged to form Water Users' Group (WUAs) and were also encouraged to collect fee for Operation and Maintenance (O&M). The major achievement of the project was to initiate dialogue between Department of Irrigation (DOI) and Farmer for management transfer and to form a task force to prepare national guidelines on policy for participatory irrigation (IIMI 1992). IIMI was organizing the WUA for Irrigation Management Transfer (IMT) in branch canals, which was encouraging but also there was a concern that the DOI might not be able to sustain this work, as it has to complete the organization of the WUA for the entire system.

West Gandak Irrigation System

IWMI carried out action research on the management transfer in this System as well, which has a command area of 8700 ha and is in western part of Nepal. The activities in West Gandak emphasised on Farmers to Farmers training from the users of well managed farmer managed irrigation system including to the project manager. It was organised to understand share system in allocation and distribution of water in farmer managed irrigation system which was later on introduced by them in their system and labor mobilization according to the shares (Mishra and Molden 1996). The management transfer study focused on assessment of agricultural productivity, documentation of management transfer outlining the processes followed on WUA formation, introduction of farmers training on development of rules and regulations for resource mobilization, record keeping and O&M. The study concluded that in general Agricultural productivity has increased (Samad et al. 1992; Mishra and Molden 1996) in Irrigation Management Transfer (IMT) sites due to rehabilitation and improved management brought about by IMT but it was difficult to attribute all these gains to IMT as other factors such as climatic variations may have also been involved.

Another important observation made by the farmers' representative was on the farmers' resource mobilization, which was encouraging compared to earlier situation, in which resource contribution was not tied to service delivery (Yadav, 1998). In one of the transferred irrigation system majority of the farmers claimed that management has improved and felt easier to get assistance of the Water Users' Association (WUAs) in transferred units as compared to getting the assistance from the agency in non-transferred units (Samad et al 1999). An interesting observation the Irrigation Service Fee (ISF) study (Sijapati and Prasad 1998) made was the lack of legal back up for collection and spending of the resources by farmers, which was identified as a major constraint. Also the study found that the collection was far below the required amount for operation and maintenance, although the government contribution in maintenance has decreased. The study concluded that this could affect the sustainability of the agricultural production in the long run due to under investment. The lesson learnt from the IMTP study, which is still valid suggests that there is a need to identify alternative mode of IMTP keeping in view of the failure to achieve desired result in the past, especially in case of Irrigation Service Fee collection (ISF) and operation and maintenance of the system.

Banganga and West Gandak were the two irrigation systems where IWMI was involved intensively in documenting management transfer processes in partnership with Research and Technology Development Branch (RTDB) of DOI. The documentation on rehabilitation process, institutional development process and post transfer support was carried out in collaboration with Institute of Agriculture and Animal Science (IAAS), Rampur Campus through their students for three years and documented in great detail among others: WUA meetings, elections, decision making patterns and organization of canal maintenance (Shukla et al 1999). The study pointed out the high degree of local party politics involved during the election process of Water Users' Association (WUA) and irrigation management transfer. This was especially the case where there was absence of strong leadership in the community. This had adverse effects on the smooth functioning of the WUA and later on it was found that in one scheme the WUA almost became defunct, because of political intolerance among functionaries and representatives in the WUA.

Rehabilitation processes indicated that the strategies, scope of work, cost sharing and implementation of rehabilitation vary greatly from project to project and also leadership, high interference of local politics and personal gains while awarding contracts in rehabilitation works influenced the outcome. For example, management turnover of West-Gandak, Khageri and Panchakanya were initiated at the same time. Khageri and Panchakanya with a command area of 3900 and 600 ha in the central part of the country followed the same elaborate procedures based on the assumptions mentioned above. Still, results measured in terms of farmer satisfaction and WUA effectiveness was very different (ibid 1999). Thus it was evident that strong leadership was important than the rehabilitation process and creating an environment for the emergence of strong leadership was challenging for the success of rehabilitation. The differences in the success of IMT also could be attributed to the size of the irrigation schemes.

The study on institutional development processes (S. Upadhyaya 1999) observed that WUAs effectiveness in carrying out irrigation management tasks varied across the irrigation systems which pointed to the scope of improvement in areas of operations and maintenance, ISF collection, empowerment, and governance. But it concluded that the functional status of WUAs is reasonable to good in systems where institutional development processes preceded the management transfer compared to the systems where rehabilitation and institutional development were taken together. The research study also identified areas for post transfer support by analyzing the performance of various WUA which has just begun to manage irrigation systems. The study made two important policy recommendations:

- The agency should identify specific and measurable indicator of IMT to enable its evaluation later on, which was not very clear when it was implemented.
- Government should provide adequate resource and WUA also should strive to collect fee from farmers for strengthening the institutional capability of the WUAs.

The research on IMT in Nepal was also part of IWMI's on-going program to assess the impacts of IMT in various countries of the world at that time. A comparative analysis of management transfer in six countries including Nepal (Frederiksen, and Vissia 1998) indicated that comprehensive legislative provisions need to be enacted before service transfer. Also the study emphasised the role of local beneficiaries and local entities beside the central government especially for O and M, as only the government can play the role of regulator for providing water services. The comparative study was valuable in providing policy recommendation on the roles that entities could play at various levels-from Central to the local level and also suggested guidelines for management transfer. The comparative study suggested various aspects for consideration in management transfer such as drainage, water right and future availability of water for irrigation and other uses (ibid).

IWMI's assessment of IMTP in Nepal concluded that government expenditure on IMTP reduced its budget for O&M. However, in West Gandak Irrigation System irrigation cash cost to the farmer was found to be higher in the tertiary transferred to the farmers than that of not transferred. But water allocation and distribution was much fairer in IMT schemes compared to before (Samad 2002). In case of ground water the pumping charges in IMT schemes were higher than that of Non-IMT schemes.

IWMI researches on the gender aspect of irrigation were pioneering at that time when gender role in irrigation management was not explored and well understood. An important study on gender role in irrigation management was carried out in West Gandak Irrigation System wherein the researchers found that there was a need to increase women role in decision making (van etten et al 1999). The action research also took steps in encouraging women participation at different levels of the WUA and has increased the number of women in sub-committees of the

WUA. Also it was observed that women irrigators although significant in number have to compete for irrigating their field with men and they were placed in a disadvantage position (van koppen et al 2001). The study suggested for capacity building of the women and increasing their role in decision making through their representation in the Water Users' Association (WUA)

IWMI's work from 2000-2010 focused on:

Water Management in River Basins

The river basin studies were carried out in Indrawati and East Rapti. The studies focused on generating key information and recommendations for integrated water resource development and management strategies that combine the objectives of productivity, equity and resource conservation, as the government was in the process of preparing Water Resources Strategy. Later on the study in Begnas Basin looked at processes of building institution for the implementation of Water Resources Strategy (2002) and National Water Plan (2005)

Small holder Irrigation

The study focused on scope and implication of drip irrigation and multiple use schemes in poverty alleviation. These technologies were found to be useful for the small holders to help them for domestic and productive activities in areas where there is water scarcity.

Ground water Management

The research carried out were to understand socio-ecological status of Groundwater, energy use in Groundwater, Exploring Community Management of Electricity in Groundwater and Strengthening capability of mid and senior level managers through training and research. The research help understand the ground water use condition in Nepal and exploring the possibility for increased use of it. The research and training program was helpful in strengthening the capability of government officials.

Gender and Irrigation

IWMI researches on the gender aspect of irrigation were pioneering in understanding the women's role in irrigation management through their increased role in decision making, which was accepted in the government policy.

3. IMPACT of IWMI's WORK in NEPAL

An assessment of IIMI program in Nepal from 1986-1992 (Rao and Abeywickrema 1992) identified three major areas of contributions and they are.

- Policy Contribution to System Turnover and Participatory Management
- Efforts at Institution Building and Management Development
- Strengthening National capacity for irrigation research

A review of the IWMI's work shows that some of the projects were successful in contributing to the policy reforms; however, some of the recommendations did not have desired level of impact at the policy level, as these were not mandatory for the agencies to implement. Nevertheless, given the thrust of the study projects, each of the projects had major impact in one of the following areas.

- Policy contributions
- Methodology development and its application
- Institutional Strengthening and Capacity Building

Policy contributions

The studies on Farmer Managed Irrigation System had influenced policy making by highlighting the contribution of FMIS in food production and important role of water users association for effective management of Irrigation System, which led to the introduction of participatory approach of management in Agency Managed Irrigation

Systems. The study on FMIS and IMTP had focused on helping agencies in the formulation, amendment and implementation of the policies, rules and regulations. The contributions from these studies were largely dependent on the government policies at that time and up take of the study findings by the government. The earlier studies in Nepal were effective in influencing the policy changes but due to lack of follow-up support they were not very successful at implementation.

IWMI's involvement in the beginning helped understand the dynamics of Farmer Managed Irrigation Systems (FMIS) and created awareness on its importance among the government and donor officials. At that time a major policy reform - from project approach to sector approach - in irrigation and assistance to FMIS was being discussed. IWMI's collaborative research with the national partners made policy contributions on developing mechanisms for assistance to farmer-managed irrigation systems; helped develop participatory approach in irrigation management and O&M improvement in public sector irrigation systems in Nepal. During the period the study on the large scale FMIS in Western Nepal did contribute to make the policy makers aware of the dynamics of functioning of such schemes (Pradhan, forthcoming).

The policy contribution was also made by being member in the Task Force on invitation from the government for the preparation of 7th Five Year Plan of Nepal. Likewise, IWMI was requested for its input on the draft Irrigation Regulation 2056 (2000) of Nepal in which suggestions were provided by a group of IWMI researchers. Research findings, suggestions and recommendations from IMTP study were reflected in the Irrigation Regulation 2056 (2000) in following areas (Pradhan, forthcoming):

- Government's facilitating and supporting role for capacity building and strengthening of WUAs, fixing of irrigation service fee, its collection, investment and joint performance monitoring for operation and Maintenance (O and M) after management transfer.
- Government's regulatory role for water quality control, environmental protection and security of water rights.

Irrigation Service Fee (ISF) study by IWMI on government policies, institutions and irrigation financing modalities with focus on the farmers' ability to borne the irrigation financing vis-à-vis the cost of production and the market price of the output (Small et al 1986 and 1989; Martin et al 1989, Prashad et al 1998) were important to prepare guidelines and policies relating to cost recovery mechanisms by the government. The impact however, is not visible due to government's inability to enforce it through appropriate policy interventions with adequate legal provisions because of lack of political commitment.

Some of the policy recommendations on IMT were to make the main committee more responsible for the management of irrigation system, sufficient mobilization of the cash and labour resources for O&M and enforcing the rules (Mishra and Molden 1996). The policy impact of these recommendations is however mixed as all these have not been implemented by the government. For example government policies on users' role on asset management (ibid) is still not clear, which was one of the recommendations of the study, as it was important to delineate the roles and responsibilities of users and the agency. A policy level workshop on Management Transfer (Pant et al 1992) was organized to look at the impact of the IMT project. There was some skepticism with respect to the sustaining of the irrigation system after the withdrawal of the DOI financial support and inadequate capacity of WUA to raise the resources. The workshop also identified issues central to the participatory management as follows: (ibid)

- Farmers' unawareness of policies, laws on water resources and water rights are not explicitly recognized by DOI.
- Involvement of farmers and NARES in research and data collection.
- Farmers' participation in planning and construction also and not only after the construction.

The gender study in this project contributed to policy by which certain percentage of women users' representation in the WUA was made mandatory in the irrigation policy. This has helped increase women's role in decision making of both FMIS and AMIS. This was a major policy reform which is being practised till now.

The IMTP project helped establish IWMI Nepal Consultative Committee, chaired by Director General, Department of Irrigation (DOI) with representation from an interdisciplinary group of people from various governmental and

non-governmental organizations and universities. Later on this committee became permanent and meets regularly to guide the IWMI-Nepal work.

Methodology development and its application

The first project –action research on FMIS was the first of its kind in water sector in Nepal which laid emphasis on developing and testing low-cost processes, procedures, methods, and technology for greater utilization of human and physical resources (Yoder and Upadhyaya 1987).Therefore, the methodology developed in this project was of great importance for water sector in Nepal. The methodology development and its application in following three areas (Pradhan, forthcoming) from this project was important contribution to water sector studies.

- Checklist development for Rapid Appraisal of Irrigation
- The basis of cost calculation for administrative cost and rehabilitation cost
- Initiation of process documentation research

The Checklist of Rapid Appraisal for pre-feasibility study of irrigation system was adopted by two donor agencies - Dutch Development Agency (SNV) and International Labour Organisation (ILO) in their Irrigation Project in Mechi and Dhaulagiri Zone respectively. IWMI's work during this period also included studies for the donors which enabled them to look for alternative strategy for rehabilitation of farmer managed system. One such study was the Rapid Appraisal of Farmer Managed Irrigation System in Kailali district for World Bank (Pradhan, forthcoming).

The development and application of PRA tools (Gosselink, and Strosser, 1995), based on the study by IWMI in which selected farmer managed irrigation systems in three districts of Nepal was also included, for clear understanding of role of irrigation on local livelihood strategies by taking into account of gender and other social characteristics, to analyse relation between the irrigation performance and livelihood from farmers' perspectives was important methodological contribution for the study of irrigation systems.

Some other methodological contribution in the study of the irrigation systems were the development of methods for the inventory of FMIS outlining the steps from selection of sites to data collection and analysis by involving farmers (Yoder, Robert 1992; IIMI 1994) and emphasis on farmers' participation and learning from them was an important activity. The representative of farmers group from the successful irrigation organization presented the papers in the workshop attended also by the policy makers (Pradhan et al 1992). The purpose was to facilitate interaction between the farmers and the agency officials and to strengthen NGOs capability to enable them to participate in interventions according to the needs of the agency and project consultant.

IWMI was also asked for the process documentation of the implementation of the Rajapur Irrigation project in west Nepal and this was also the first of its kind of study. The study has influenced in the design of the project in relation to water right, type of organisation and resource mobilization based on the discussion with the farmers (Pradhan, upcoming). IWMI applied the methodology of process documentation research also in IMTP by conducting an extensive documentation of the management transfer of irrigation system with focus on technical and socio-institutional aspects. The documentation was important in providing insights into the strength and weaknesses of the processes of management transfer and in suggesting the corrective measures required in future management transfer. Beside, the data gathered during the processes documentation served as bench mark for future comparisons.

IWMI's work provided a basis for the development of Nepal Irrigation Data Base by Indiana University in collaboration with Institute of Agriculture and Animal Science (Pradhan, forthcoming). Seminar on field to farmer organised by IWMI/IAAS (Pradhan 1994) helped look into the issues of different methods of data collection and IWMI encouraged collaboration with academics both within and outside Nepal had positive impact in enriching the knowledge base on farmer managed irrigation systems.

Institutional Strengthening and Capacity Building

One of the objectives of the IWMI program in Nepal was to strengthen the research capability of the Nepali researchers. IWMI research in Nepal was carried out by the IWMI researchers, local researchers, WECS and DOI engineers, University teachers and students with inputs from the IWMI researchers. Their involvement on IWMI research

works was a form of on-the-job training due to knowledge sharing between the local and international researchers. This has helped in local capacity building in following way:

- Enhancing knowledge base.
- Developing research skills.
- Exposure to various research tools and methodologies used by IWMI especially in cross-country studies.
- Familiarization with cross-cutting issues.
- Contacts with IWMI's national and international staffs.
- Better access to IWMI's research findings and publications.
- Paper presentation and participation in national, regional and international workshops.

Given IWMI's mandate to strengthen the national capacity by working with the national institutes, it interacted frequently with officials and academics who were involved or interested in water sector in Nepal, although it was working mainly with DOI and WECS. IWMI provided opportunity for exposure visit locally to Government officials and other researchers in order to enable them to understand ground situation of water management based on the reality of the field. Under various projects, the government officials also received training and participation in international workshops/seminar, which was helpful in strengthening their knowledge and skills.

Strengthening of WECS capability through FMIS studies and through collaborative research work was an important contribution on human resource development (Rao and Abeywickrema 1992). Part of the research grant under IMTP study was allocated to DOI and Institute of Agriculture and Animal Science (IAAS) under the Tribhuvan University and WECS for their capacity building activities. Some of the important work for institutional strengthening of DOI was as follows:

- Input to DOI in establishing a monitoring and evaluation system based on three performance data sets: agricultural performance, operational performance, and maintenance performance.
- Increased awareness about the need for post transfer supports in management transferred systems has led to inclusion of more articulated post transfer support extending arrangements in IMT agreements between the WUAs and the agency.

Students from Tribhuvan University and university outside Nepal were supported in conducting research for their Masters Thesis which helped in building local capability as well. Likewise, the opportunities to IWMI staff from other countries to be involved in the research works in Nepal have enhanced their knowledge base on various aspects, helped develop international contacts, fostered their research capacities and contributed toward understanding cross-country scenarios and views on IWMI's interest areas.

4. Conclusions

IWMI's collaboration with government agency and other institutions helped design research based policy reform in water management sector in Nepal. The development of the mechanisms for assistance to farmer-managed irrigation systems and introduction of participatory approach in irrigation management were the major policy contributions in earlier research which made the policy makers aware of need for improvement in public sector irrigation systems in Nepal. The most visible policy change was the initiation of management transfer processes in agency managed irrigation system. The formation of Water Users' Association, introduction of irrigation service fee and trainings on various aspects of irrigation management helped strengthen their role in operation and maintenance of irrigation systems. The collaborative research led to the recognition of the women's role in decision making of both FMIS and AMIS by ensuring their representation in the WUA. This was a major policy reform in irrigation management.

IWMI's collaborative research with various partners was helpful in developing methodologies for PRA tools, intervention criteria for supporting FMIS, users' participation in research and processes documentation research provides guidelines for future research on FMIS and AMIS. As all the collaborative researches were conducted with local partners, the institutional strengthening and capacity building of the participating agency has been an integral part of the research undertaking. Development of research skills, institutionalizing research activity in government agencies and learning from the research across and between the regions has enhanced the knowledge base of the both national and international researchers.

References

- Frederiksen, H.D and R.J.Vissia 1998. Considerations in formulating the transfer of services in the water sector. Colombo, Sri Lanka: IWMI
- Gosselink, P.; Guijt, I.; Thompson, J. 1995. Livelihood strategies and performance indicators: Understanding irrigation from water-users' perspectives: A Collaborative Research Project of the International Irrigation Management Institute, and the International Institute for Environment and Development. Colombo, Sri Lanka; London, UK: IIMI; IIED.
- Gosselink, P.; Strosser, P. 1995. Participation in irrigation management research: IIMI's application of PRA. In Shivakoti, G.; Varughese, G.; Ostrom, E.; Shukla, A.; Thapa, G. (Eds.) People and participation in sustainable development: Understanding the dynamics of natural resource systems - Proceedings of an international conference, 17-21 March 1996, Institute of Agriculture and Animal Science, Tribhuvan University, Rampur, Chitwan, Nepal.
- IIMI 1992. Final report submitted to the Department of Irrigation and USAID Mission to Nepal, Agricultural and Rural Development Office. Vol 1-Increasing water user participation in irrigation management. Phase 1-Field testing alternative approaches, Main report;Vol.II-Institutional Development;Vol III-Main canal management in Banganga Irrigation Systems;Vol IV-Administrative Linkages analysis of Banganga irrigation system, Kapilbastu District, Nepal. Kathmandu Nepal:IIMI 4 vols.
- IIMI 1994. Comparison of support services for farmer managed irrigation systems in Sri Lanka and Nepal. Report submitted to IFAD and BMZ in October 1994. Program on Farmer Managed Irrigation Systems and Support Services. Phas II Vol. 2- Final Report. IWMI PO Box 2075, Colombo, Sri Lanka
- IIMI 1994. Irrigation Resource Inventory: A Methodology and Decision Support Tool for Assisting Farmer-Managed Irrigation Systems. Program on Farmer-Managed Irrigation Systems and Support Services, Phase II, Vol. 3- Final Report. IWMI PO Box 2075, Colombo, Sri Lanka
- IWMI. 2000. Evaluation of Management Transfer Performance and Process, Nepal, Project Completion Report (September 1996 – April 2000), Colombo, Sri Lanka
- Jacobijn van Etten; Koppen, Barbara van and Pun Shuku 2002. Do Equal Land and Water Rights Benefit the Poor? Targeted Irrigation Development: The Case of the Andhi Khola Irrigation Scheme in Nepal. Working Paper no. 38. IWMI, Sri Lanka, Colombo.
- Martin, E.D.; P. Pradhan; M.S. Adriano 1989. Financing Irrigation Services in Nepal. In Small, L.E. et al, Financing Irrigation Services: A literature review and selected case studies from Asia. Colombo, Sri Lanka, IIMI
- Mishra, V. S.; Molden, D. J. 1996. Management turnover in the West Gandak Irrigation System, Nepal. Colombo, Sri Lanka
- Memorandum of Understanding 1994. Government of Nepal and International Water Management Institute.
- Neupane, I.; K. C. Prasad (Eds.) 1997. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 5-6 October 1997. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Pant, S. R.; Valera, A.; Pradhan, U. (Eds.) 1992. National Workshop on Participatory Management in Agency-managed Irrigation Systems in Nepal. Kathmandu, Nepal: Department of Irrigation: IIMI: Nepal Field Operations. Proceedings of the National Workshop on Participatory Management in Agency-managed Irrigation Systems in Nepal, Lazimpat, Kathmandu, Nepal.
- Parajuli, U.;K. C. Prasad (Eds.) 1999. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 11-12 October 1999. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Pradhan, P. (Forth coming). A Decade's of IIMI Activities in Nepal
- Pradhan, N. C. 1989. Gender participation in irrigation system activities in the hills of Nepal. In Proceedings of Second Annual Workshop on Women in Farming Systems
- Pradhan, U.; Valera, A.; Rana, S. 1992. Role of NGOs in irrigation development and management in Nepal: Proceedings of the National Workshop on the Role of NGOs in Irrigation Development and Management in Nepal, Nepal Administrative Staff College, Jawalakhel, Lalitpur, Nepal. Kathmandu, Nepal: IIMI Nepal; Udaya-Himalaya Network.
- Pradhan, U. 1994. Farmer to Farmer Training as a Way of Assistance to the Farmers on the Improvement of Irrigation Systems. In Sowerwine, J.; Shivakoti, G; Pradhan, U.;Shukla, A;Ostrom, E (Eds), From farmers' fields to data fields and back: A Synthesis of Participatory Information Systems for Irrigation and other Resources: Proceedings of an International Workshop held at the Institute of Agriculture and Animal Science Rampur, Nepal 21-26 March 1993. Colombo, Sri Lanka

- Prasad, K. C.; Sijapati S.; Pradhan, P.; Sharma, K. R.; Riddell, N. 1998. Irrigation service fees in Nepal: Evaluation of management transfer performance and process. Report of a joint study by the Department of Irrigation, Nepal, and IWMI.
- Rao, P. S.; Abeywickrema, N. 1992. Review of IIMI's experience in strengthening national capacity for irrigation management and research. Parts I and II. Colombo, Sri Lanka: IIMI.
- Samad, M.; C. Fraiture and K.C. Prasad 1992. Impact Assessment of Irrigation Management Transfer in Selected Irrigation Systems in Nepal in Parajuli, U.;K. C. Prasad (Eds.) 1999. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 11-12 October 1999. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Shukla, A.; J.P. Dutta, B. Devkota and K.c. Ghimire 1998. A paper based diagnosis of election of WUA functionaries in Nepal West Gandak Irrigation System in Sijapati. S; K. C. Prasad (Eds.) 1998. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 17-18 September 1998. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Sijapati, S and K.C. Prasad 1998. Conclusions and recommendations of ISF study in Sijapati. S; K. C. Prasad (Eds.) 1998. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 17-18 September 1998. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Sijapati, S; K. C. Prasad (Eds.) 1998. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 17-18 September 1998. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Smakhtin, V. Shilpakar, R. L. 2005. Planning for environmental water allocations: an example of hydrology-based assessment in the east Rapti River, Nepal. Colombo, Sri Lanka: International Water Management Institute (IWMI) v, 20p. (IWMI Research Report 89)
- Small, L. E.; Adriano, M. S.; Martin, E. D.; Bhatia, R.; Shim, Y. K.; Pradhan, P. 1989. Financing irrigation services: A literature review and selected case studies from Asia. Colombo, Sri Lanka: IIMI. ix, 286p.
- Van Etten, J. Prabina Bajracharya, Amita Tuladhar and Barbara van Koppen 1999. Participation of women in West Gandak Water Users' Association in Parajuli, U.;K. C. Prasad (Eds.) 1999. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 11-12 October 1999. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Van Koppen, Barbara; Van Etten, Jacobijn; Bajracharya, P.; Tuladhar, A. 2001. Women irrigators and leaders in the West Gandak Scheme, Nepal. Colombo, Sri Lanka: International Water Management Institute (IWMI) vii, 28p. (IWMI Working Paper 15).
- Yadav, S.D. 1998. Deliberation on West Gandak Irrigation System (in Nepali) in Sijapati. S; K. C. Prasad (Eds.) 1998. Workshop proceedings: Evaluation of Irrigation Management Transfer Process and Performance - Workshop held in Kathmandu, 17-18 September 1998. Proceedings of workshop jointly organized by Research and Technology Development Branch (RTDB) and IIMI.
- Yoder, R and S.B. Upadhyay 1987. Reconnaissance/Inventory Study Of Irrigation Systems in the Indrawati Basin of Nepal in *Irrigation Management in Nepal: Research Papers From a National Seminar*. National Seminar on Irrigation Management in Nepal: Research Results. Bharatpur, Nepal
- Yoder, R.; Pradhan, P.; Martin, E. 1988. Recommendation for consideration in the development of Nepal's Irrigation Master Plan. Part 1 - Management of irrigation systems for effective O & M and resource mobilization; Part 2 - Farmer managed irrigation systems. Digana Village, Sri Lanka: IIMI. i, 21p. (IIMI occasional paper)
- Yoder, Robert 1994. Data Management, Analysis and Report writing for a field based Resource Inventory Survey. In Fay M. Lauraya, C.M. Wijayaratra and Douglas. L. Vermillion (Eds.) *Information Support Systems for Farmer Managed Irrigation Systems*. Selected Proceedings of the Asian Regional Workshop on the Inventory of Farmer Managed Irrigation Systems and Management Information Systems held at Tagaytay city, the Philippines. IIMI, Colombo, Sri Lanka.
- Van Koppen, B. 2001 Gender in Integrated Water Management: An analysis of variation. *Natural Resources Forum*, 25:299-312.
- Zwarteveen, M. 1997. Free-riders or Victims: Women's Non-participation in Irrigation Management in Nepal's Chhatis Mauja Irrigation Scheme. *Journal of Applied Irrigation Science; Zeitschrift fur Bewässerungswirtschaft*, 32 (1):113-116