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

Gosselink, Patil
Guijt, Irene
Thompson, John

Colombo, London 1995

INTERNATIONAL IRRIGATION MANAGEMENT INSTITUTE

IIED
INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

SUSTAINABLE AGRICULTURE PROGRAMME

LIVELIHOOD STRATEGIES AND PERFORMANCE INDICATORS: UNDERSTANDING IRRIGATION FROM WATER-USERS' PERSPECTIVES

Project Summary

A Collaborative Research Project of the
International Irrigation Management Institute, and
the International Institute for *Environment and Development*

This project aims to understand tlie changing nature and role of irrigation in local livelihood strategies in complex, risk-prone environments. Principally, it will assess and develop flexible livelihood indicators of irrigation performance from the water users' perspectives. Participatory Rural Appraisal will be adapted and employed as the primary methodology in this research, along with a short, focussed survey instrument.

The indicators and methodology will be applied in a range of irrigation systems in collaboration with research partners in Burkina Faso, Nepal, Pakistan and Sri Lanka. Finally, the broader policy implications of this research will be examined and practical recommendations on ways to enhance local livelihoods through improved irrigation performance and water management will be presented.

The principal objective of this research is to develop a clear understanding of the role that irrigation plays in supporting local livelihood strategies, in order to improve irrigation performance and enhance livelihoods.

In order to achieve this, the research project will work in a range of socioeconomic and agroecological environments to:

- identify and apply livelihood indicators for monitoring and evaluating irrigation performance over time;
- adapt and test a participatory research methodology for exploring livelihoods issues and irrigation performance;
- analyze the commensurability and comparability of farmers' indicators with those of system managers;
- assess linkages between irrigation management performance and broader socioeconomic agroecological trends and changes;
- examine the implications for policy makers and irrigation managers, and provide practical policy recommendations on ways to enhance local livelihoods through improved irrigation performance.

This project is designed to provide insights into new approaches to irrigation management research and to a more holistic approach to irrigation management.

The expected outputs of the project will be:

- identify and analyze different sets of water users' indicators of irrigation performance, to understand how they complement and conflict with those of system managers;

- field-test and refine a participatory research methodology for exploring water users' perspectives towards irrigation management and system performance;

- strengthen the capacity of partner organizations, including local water users' groups, to conduct their own participatory research and carry out regular monitoring of their irrigation systems using the livelihood indicators (through training in participatory research and comparative analysis, preparation of research documentation, involvement in the comparative analysis of findings in the four countries);

- generate practical policy recommendations on ways to enhance local livelihoods through improved irrigation performance;

- publish a series of policy documents and case studies based on empirical research which are targeted at different audiences;

- produce summary reports in the appropriate local languages to he presented and distributed to the participating farmers' organizations and other interested local groups.

The proposed project will require 3 years and will be implemented in four phases. This three years of effort will require approximately US$ 1.7 million for both institutes and their collaborators.

LIVELIHOOD STRATEGIES AND PERFORMANCE INDICATORS: UNDERSTANDING IRRIGATION FROM A WATER-USER'S PERSPECTIVE

A Collaborative Research Project of the International Irrigation Management Institute, and the International Institute for Environment and Development

I. Introduction: Background and Rationale

Many recent studies concerned with irrigation management and perforinance evaluation of irrigation systems take the physical infrastructure of the system as the starting point. Managers and farmers are expected to adapt their behavior to the technical requirements of the systems. As a consequence, most studies take water users' behavior into account only in so far as it deviates from their anticipated behavior (i.e. that behavior deemed necessary for realizing the full teclinical potential of the irrigation system).

Water users are increasingly allowed or even ordered to participate in management tasks, but the underlying assumption that they are interested in participating is hardly ever verified, nor are the reasons for their interest (or lack of interest) well understood. To this end, it is crucial to understand what role irrigation plays in terms of securing and sustaining users' livelihoods' and in what way irrigation fits into their broader livelihood strategies.

Many of the current irrigation management studies do recognize differences among water users based on their geographic location and function within the irrigation system. However, further distinctions are usually ignored, as are the present and potential conflicts arising from them. These distinctions include differences within households, based on gender and age, as well as those,related to social class, caste, ethnicity and so on. Social and political divisions and alliances will affect the willingness and ability of water users to engage in collective actions related to irrigation systems.

It is argued that a better understanding of water users' priorities, incentives, needs and constraints in their livelihoods will enhance the search for ways to improve the performance irrigation systems by i) ascertaining how the performance of irrigation systems relate to broader livelihood objectives; and ii) determining more realistic social, economic, environmental and technical levels of irrigation performance.

Water users' perspectives start with the recognition that conventional irrigation performance goals are often rigid, static and narrowly defined, as they are usually established by systems designers and managers without a clear understanding of the

---

[1] **A** livelihood comprises people, their capabilities and their assets (tangible: stores and resources; intangible: claims **and** access) and activities required for a means of living (Chambers and Conway, 1992).

complex and diverse livelihood strategies and requirements of local people. Smallholder farm family members are not simply irrigators, but also wage laborers, market traders, craftspeople, village inhabitants and so on. They are social actors who possess varying degrees of control over productive resources and have differential access to information and power from which decisions are made, alliances are formed and exclusions effected (Thompson and Scoones, 1994). The degree of local people's willingness to invest in irrigation will depend on how it is perceived to enhance or diminish their lives. This, in turn, will he determined by a socially-defined set of options open to different individuals. Taking this livelihoods perspective, it is clear that broader, more flexible and dynamic performance goals will have to be defined that incorporate the broader socioeconomic and agroecological needs and priorities of farmers, the ultimate users..

II. Performance Assessment of Irrigation

Recently, several conceptual frameworks and methodologies have been developed for performance assessment of irrigation systems (Bos et al., 1994; IIMI, 1994; Murray-Rust and Snellen, 1993; and Small and Svendsen, 1992).

According Bos et al. (1994233) a framework is required 'that enables a manager to effectively use the data collected as part of the routine task of operating and maintaining irrigation systems'. Thus, their classification of performance indicators should assist and guide managers in assessing irrigation performance. These indicators are: water supply performance; agricultural performance and economic, social and environment performance.

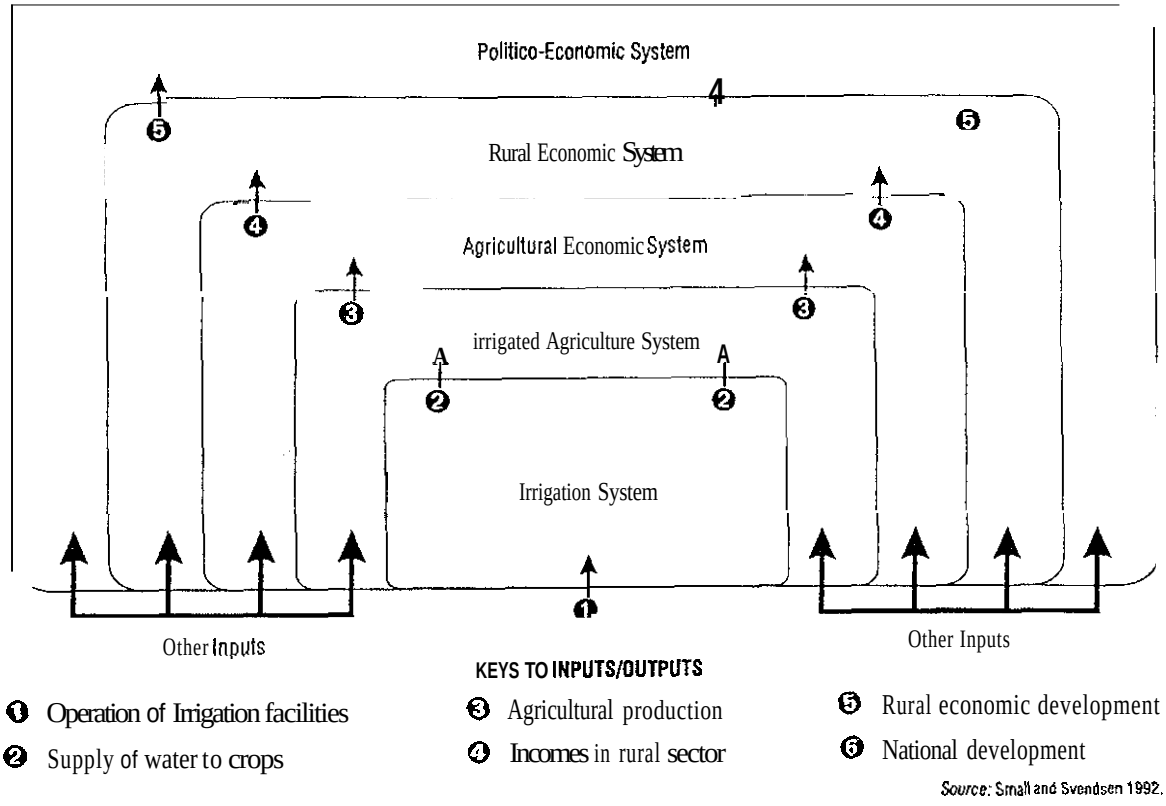
Small and Svendsen (1992) conceptualize irrigation (goals) within the context of a nested means-end framework, wherein irrigation systems form components of broader agricultural, economic and social systems (see fig **1** and 2 below). Their types of performance measures include process measures (internal to the irrigation system), output measures and impact measures (impact of output on the wider environment).

Murray-Rust and Snellen (1993) discuss performance in business and organizational terms and mainly address managerial issues at system level to improve irrigation performance. Their distinction of three different levels of organization (irrigation sector, agency level and irrigation system) parallels the nested hierarchy of Small and Svendsen (see below).

IIMI's Performance Program has (1994) defined the objectives and standards of irrigation performance form three discrete perspectives in order to interpret gaps in irrigation

system performance. These three[2] client groups with interest in irrigation system performance according to IIMI are i) policy-makers), irrigation managers and iii) farmers. For each of this clientele, objectives and indicator have been set and parameters involved in the measurement of each indicator have been specified.

Figure 1. *Inputs and Outputs: Irrigation in the context of nested systems*



Source: Small and Svendsen 1992.

[2] While not identified by IIMI, donors could be considered as a separate category with an indirect, though potentially strong influence on irrigation performance. Political priorities in all countries are often oriented to the short term. Donor funds allow politicians to start up projects that have high viability and prestige in the short run, despite reduced opportunities in the short, medium and long term (Nijman, 1992).

Figure 2. Irrigation purposes as nested means and end

LEVEL	MEANS	END
Proximate	Operation of irrigation facilities	Supplying water to crops
Intermediate 1	Supplying water to crops	Sustained increase in agricultural productivity
Intermediate 2	Sustained increase in agricultural productivity	Increased incomes in rural sector
Intermediate 3	Increased incomes in rural Sector	Rural economic development
Ultimate	Rural economic development	(1) Improved livelihoods of rural people (2) Sustained socioeconomic development for entire economy

Source: Small and Svendsen. 1992

This study will complement and extend the other frameworks of irrigation performance that have been developed recently (e.g., Bos et al., 1994; IIMI, 1994; Murray-Rust and Snellen, 1993; and Small and Svendsen, 1992). The fundamental difference between this investigation and those studies lies in the primary focus of the analysis. While those studies concentrate on systems and systems managers, this study will explore irrigation performance from the perspectives of the water users. **As** a result, it will begin with the assumption that farmers' understanding and indicators[3] of irrigation performance do not necessarily coincide, and may sometimes conflict, with those of system managers and policy makers. If true, this supposition would have direct implications for irrigation management, demanding a thorough analysis of the perceptions and actions of *all* stakeholders involved in a system in order to help reconcile contentious issues and accommodate different priorities. Moreover, it would highlight the need for the development of more participatory monitoring and evaluation procedures on which management decisions are made.

Unlike previous frameworks, this study will view broader agroecological and socioeconomic systems and structures in which local people strive to sustain their livelihoods (through agroindustry and trade, off-farm employment, etc) as having as much influence on the performance of irrigation systems and their managers as the

[3] **As** described here, ***indicators*** **refer** to the criteria individuals and groups use for assessing changes in and making decisions about specific actions and strategies. They are related to, but distinct from *norms*, which reflect valuations that individuals and groups place on actions or strategies in and **of** themselves. In this study, norms of behavior will be examined along with indicators, especially as they relate to the way irrigation management alternatives are perceived and weighed by the various actors.

performance of the systems and managers have on them. From this vantage point, the wider, dynamic social (e.g., structural adjustment, land reform policies, market liberalization, etc) and physical (e.g., droughts, crop pests and diseases, etc) 'landscapes' in which irrigation systems are situated take on new significance, as they create the often rapidly changing conditions and constraints under which all actors must operate (Guijt and Thompson, 1994).

If a framework for irrigation performance assessment is to have any impact and be applied, then it must be feasible for both water users and system managers to understand and implement it. Developing a framework with the involvement of both water users and system managers will go far in ensuring that the outcome meets the feasibility criteria.

III. Short Project Description

The working title of the proposed project will be Irrigation and Livelihoods. For the initial selection of countries and potential research sites, the main criteria which has been applied is that the research should reflect the different *couleurs* locales (wider than production systems only) in which irrigation takes place. The assumption is that the distinct role of irrigated agriculture and how it fits into people's livelihoods forms an important variable for the performance of irrigated agriculture. In addition, practical criteria such as the availability of data on system level, the presence of already established contacts with local organizations and local staff exposed to and experienced with the principles, tools and techniques of participatory research (see VII, Methodology) are considered to be crucial for the successful implementation of the research.

On the basis of these criteria, countries should be selected from two continents, Africa (South of Sahara) and Asia (S./S.E Asia) where the role of irrigation and irrigated agriculture in the farming systems and its potential contribution to sustaining livelihoods is contrasting. The following four countries are proposed for site selection. In Africa: Burkina Faso and in Asia: Nepal, Pakistan and Sri Lanka, where a diverse range of irrigation systems (from large to small, from farmer managed to agency managed, etc.) can be found. IIMI has country programs (field operations) and long-standing research and institutional strengthening programs in all countries. IIED has developed important partnerships with key local institutions in these countries as well.

Site selection of irrigation systems in these four countries should subsequently be based on criteria such as farmer managed or agency managed, minor or major (based on the area served by the systems), and potentials for improving livelihoods. Each system has its own technical and socio-economic limitations and potentials for farmers in terms of livelihoods. The greatest potential for poverty alleviation are alleged to be through small scale schemes (Chambers et al.; 1989, Lowdermilk; 1990, World Bank, 1991; IFAD, 1992) with their higher control over the water supply situation. The potential benefits of

improved performance of canal irrigation systems are high, as Chambers put it (1988:1): 'the improvement of the anti-poverty performance of canal irrigation systems is now one the great practical and intellectual challenges facing humankind'.

The collaborating agencies of this joint research will be the International Institute for Environment and Development (IIED), London, UK, and the International Irrigation Management Institute (IIMI-HQ), Colombo, Sri Lanka. Other partners will be national collaborators (staff of government agencies, such as Irrigation Departments), IIMI Country Programs, local research organizations, and NGOs. The envisaged project duration is three years (1996-1998) and its estimated cost is US$ 1.7 million (see budget below).

IV. International Advisory Committee

In order to be able to execute a project that challenges conventional thinking on irrigation performance and local livelihood strategies, a small International Advisory Committee (IAC) will be established. The role of the committee will be to provide advice on project planning and implementation. The **IAC** will consult with the IIMI-IIED researchers and the senior Research Officers from the four country programs on three occasions at the IIMI headquarters. It will offer advice on the research design and the methodology during Phase I. At the beginning of Phase III, the group will meet for a mid-term appraisal of the work to date and recommend any necessary changes to the research schedule or methodology. Finally, the Steering Committee members will take part in the policy review meeting at IIMI planned for the end of Phase IV.

Committee members will be drawn from a diverse range of backgrounds, but will be expected to have specialized knowledge on one of four areas: (i) irrigation performance research; (ii) farmer participatory research; (iii) participatory monitoring and evaluation; or (iv) water users' groups and community-based organizations.

The aim is to have two specialists from the South and two from the North, and a balance of women and men. A short list of potential committee members is now being drawn up.

V. Objectives of Project .

At IIMI, this project will have its intellectual home in a program concerned with assessing and improving the performance of irrigated agriculture. IIMI's Performance Program is designed to improve procedures and practices in the assessment of the performance of irrigation systems at all levels. Therefore, a better understanding of irrigation from water users' perspectives and as well the complexities of rural livelihood

strategies, will be complementary to studies of the more technical determinants of performance.

At IIED, this research will be situated within the Livelihoods and Landscapes research project of the Sustainable Agriculture Programme. This project endeavors to understand the changing nature and role of irrigation in local livelihood strategies in complex, diverse and risk-prone environments (Guijt and Thompson, 1994).

The IIMI-IIED collaboration aims to apprehend, analyze and apply farmers' indicators of irrigation performance in Burkina Faso, Nepal, Pakistan and Sri Lanka, and the actions and impacts resulting from them. Related to this will be an examination of the indicators and actions of the policy-makers and systems managers, and a comparison of their perceived indicators against the assumed standards (as outlined in IIMI's Performance Program reports and various project documents).

An important aspect of this study is its longitudinal orientation. Rather taking a conventional 'snap-shot' approach to the study of the irrigation systems, where research is conducted during a single point in time, this research will be carried out over a three-year period. This will not only allow the interdisciplinary research teams (including IIMI and IIED staff, Research Officers and Research Assistants from the partner organizations, as well as local farmers) to assess livelihood indicators of irrigation performance, but also incorporate and evaluate the use and impact of those indicators on the systems.

The principal objective of this research is to develop a clear understanding of the role that irrigation plays in supporting local livelihood strategies, in order to improve irrigation performance and enhance livelihoods.

In order to achieve this, the research project will work in a range of socioeconomic and agroecological environments to:

- identify and apply livelihood indicators for monitoring and evaluating irrigation performance over time;
- adapt and test a participatory research methodology for exploring livelihood issues and irrigation performance;
- analyze the commensurability and comparability of farmers' indicators with those of system managers;
- assess linkages between irrigation management performance and broader socioeconomic and agroecological trends and changes;

- examine the implications for policy makers and irrigation managers, and provide practical policy recommendations on ways to enhance local livelihoods through improved irrigation performance.

Given these objectives and issues, the principal research questions are:

- How is the performance of irrigation systems affected by local people's livelihood strategies and how are their livelihood strategies affected by irrigation performance?

- What are the indicators by which farmers assess irrigation performance and how do they select which are most important?

- How and to what degree do farmers' indicators influence their attitudes and behavior towards the use and management of irrigation and systems and services?

- To what degree are farmers' indicators commensurable and comparable with those of system managers?

- Are farmers interested and capable of taking part in a participatory monitoring and evaluating system using these livelihood indicators, and what impacts would the implementation of such a system have on irrigation performance?

- Is it possible to distinguish between different types of indicators? That is, are there basic indicators (i.e. those that fit all irrigation systems and remain more or less constant) and circumstantial indicators (i.e. those particular to specific systems and/or which change over time)? If so, is it possible to design systems to deal with basic indicators while retaining enough flexibility to respond to changes in circumstantial indicators?

VI. Scope of the Project - Components

This current research will explore the ways how farmers perceive and apply their own livelihood indicators in a process to improve the performance of their irrigation system. In an analysis of irrigation and livelihoods (Chambers, 1988:7) 'irrigation is assessed in terms of adequate and secure livelihoods it generates and sustains, putting anti-poverty effects, and people, before production *per* se'. Important elements of livelihood gains from irrigation are for instance raised employment or security against impoverishment.

This means that if we apply livelihood-thinking to irrigation (management) a whole new domain if inquiry will have to be developed. **A** process to come to new and adapted indicators of irrigation performance will have to be developed. Examples of these 'reworked' performance indicators are presented in Annex I. It is argued that normal performance indicators bypass aspects *of* livelihoods such as gender, environment and

health. Therefore, these aspects will be incorporated as important components within this study.

Irrigation, Gender and the Analysis of Difference

Evidence suggests that even if water users' perspectives are taken into account in irrigation management, the water users' groups will usually be thought of as consisting either largely or entirely of men (Zwarteveen, 1993). The technically-oriented assumptions of irrigation engineers and systems managers make gender invisible, when it is clear that irrigated agriculture is not the exclusive domain of men. Since it cannot be assumed that female water users have identical needs, problems, constraints and perspectives to their male counterparts, it is essential to make gender as a central component in this study.

In addition to gender dimensions, this study will examine the role of other social characteristics, including age and social status, play in shaping perceptions and actions related to irrigation performance. This socially differentiated view is essential for understanding differential access and control of resources, and the influence and authority various groups and individuals have over decision making processes.

Irrigation and Health

The development of irrigated agriculture creates a range of social, economic and environmental changes which have a significant impact on health (and general well-being) of the communities involved. The health and well-being of water users will in turn have an impact on the overall performance of irrigation systems and will affect the long-term sustainability of those systems. The success of any irrigation system will depend in part on the ability of irrigation managers to address the health needs of the water users within it, while at the same time optimizing the systems' productivity. For this reason, the health dimensions of irrigation will be another important component of this research (Konradsen, 1994).

It is important that future research is based on the actual health problems encountered by farmers and other groups affected by the development of irrigation. Therefore, the initial phase of this project will have to make use of methodologies that can identify the real needs of the community, including a range of irrigation related health impacts, positive as well as negative. So far, most health and irrigation related research has been defined by outsiders only with a narrow disease specific focus (Tiffen, 1993).

Irrigation and Environment

Irrigation tries to reduce the risk and uncertainty for farmers caused by unreliable or insufficient precipitation. Yet, while deeply aware of the importance of that single aspect of biophysical change, many irrigation planners assume an otherwise static natural

environment in which local people reside. When agroecological conditions vary significantly from those identified in the project design phase, the irrigation system will not perform optimally.

A new body of ecological theory argues for a more sophisticated understanding of environmental change and local people's management of natural resources[4]. Recent research in range ecology and dryland agriculture indicates that farmers exploit a diverse range of 'micro-environments' or 'patches' with varying degrees of intensity at different times of the year and over extended periods in order to adjust to changing agroecological and socioeconomic conditions and sustain their livelihoods (Behnke *et al*, 1993; Scoones, 1994). Similar research has yet to be conducted in irrigated landscapes, however. Therefore, as a starting point, this study will adopt a non-equilibrium view of ecological change in order to derive a deeper understanding of local people's management and use of complex and diverse environments, both irrigated and non-irrigated.

VII. Methodology

For this study, the selection of an appropriate research methodology is of particular importance, as it will be used not only to identify key issues and indicators, but establish a more constructive dialogue among the main actors in the research sites. Moreover, because of the broad livelihood focus of this research, special attention will be given to irrigation and gender issues, and some of the key health and environmental issues related to irrigated agriculture.

The design for this project will be controlled comparative research in four irrigation systems in two regions. 'Intensive research' (Sayer, 1992) will be conducted which explores the processes in a relatively small number of cases with causal groups (rather than taxonomic groups). Causal explanations and the study of individual agents in their causal contexts will be pursued rather than descriptive representative generalizations and large scale (sample) surveys.

A research activity that attempts to address livelihood strategies and irrigation performance from water users' perspectives requires a powerful, 'bottom-up' methodology. Participatory Rural Appraisal (PRA) enables local people to share, enhance and analyze their knowledge of life and conditions (Chambers, 1992). To date, PRA has been developed and applied widely in the study of agroecosystems and wider rural development issues, and more recently, to the examination of 'sustainability indicators' for impact analysis (Thompson and Pretty, 1994). In this study, its usefulness

[4] From this viewpoint, landscapes are characterized by non-equilibrium dynamics, and intentional, unintentional and contingent human manipulations of resources.

for irrigation management research will be tested and evaluated on the basis of intensive fieldwork in selected irrigation sites on two continents.

In addition to the more ethnographic and interactive PRA exercises, the quantitative research methodologies will consist of semi-structures interviews and possibly small-scale surveys in the selected systems. The small-scale surveys will be developed and designed in a participatory manner (Shah, 1993).

VIII. Sequence of Fieldwork

The research, coordinated by local partner organizations and facilitated by joint teams from IIMI and IIED, will be carried out in four countries. It will take approximately three years in total, commencing in early 1996 and ending in late 1998. The project is divided into four phases: I - Research and Development; II - Identification and Classification of Indicators; III - Assessment of Irrigation Performance Using New Indicators; and IV - Impact Analysis and Policy Review. Each phase is outlined below:

Phase I - Research & Development (Year 1 - First Half)

1. Conduct a detailed bibliographic review of the irrigation and livelihood literature;

2. Prepare a series of briefing papers on themes central to this study, including irrigation performance appraisal, and irrigation, livelihoods and: (1) gender; (2) human health; and (3) environmental change;

3. Consult with collaborating partners to select appropriate field sites (one for each country) and agree terms and conditions of the research. Site selection will, to a certain extent, depend on the availability of existing data on technical performance (water delivery) of the systems, which will allow a discussion of the relationship between irrigation management and livelihoods in the systems;

4. Facilitate a methodology workshop for (sr) research officers of the collaborating partners at IIMI-HQ.

5. Establish an International Advisory Committee comprised of a small group of irrigation specialists and senior research officers from the collaborating organizations to offer advice on the research and the methodology at strategic junctures of the project.

Phase II - Identification & Classification of Indicators through Benchmark Studies (Year I - Second Half)

1. Facilitate methodology workshops for training collaborating research partners to employ Participatory Rural Appraisal for analyzing irrigation performance and livelihood strategies;

2. Identify and categorize the indicators of the various actor groups -- especially those of both women and men farmers -- into usable sets (operational definitions of terms will be agreed) - PRA Study No. 1 for each fieldsite;

3. Review and refine the formal monitoring system to incorporate some of the new indicators, if deemed appropriate by the key actors (see Figure 5);

4. Train farmers to use their own indicators to monitor and, if necessary, modify their systems.

Phase III - Assessment of Irrigation Performance Using New Indicators (Year 2)

1. Employ the benchmark livelihood indicators established during the Phase II to assess the performance of the irrigation system - PRA Study No. 2 for each fieldsite;

2. Analyze how and to what degree the actors' perceptions (based on their indicators) have influenced their actions towards the irrigation system;

3. Modify farmers' and the formal indicators and monitoring systems as necessary.

4. Mid-term review workshop

Phase IV - Impact Analysis and Policy Review (Year 3)

1. Employ the modified indicators to assess the impacts on the performance of the irrigation system - PRA Study No. 3 for each fieldsite;

2. Convene a workshop involving all the key actors to discuss the impacts and the use of farmers' indicators of irrigation performance at each site;

3. Hold a larger policy review workshop at IIMI-HQ to discuss the implications of the research.

4. Prepare a series of joint IIED-IIMI publications to disseminate the results of the research.

IX. Project Outputs

This project is designed to provide insights into new approaches to irrigation management research and to a more holistic approach to irrigation management. In practical terms, the project will:

- identify and analyze differentsets of water users' indicators of irrigation performance, to understand how they complement and conflict with those of system managers;
- field-test and refine a participatory research methodology for exploring water users' perspectives towards irrigation management and system performance;
- strengthen the capacity of partner organizations, including local water users' groups, to conduct their own participatory research and carry out regular monitoring of their irrigation systems using the livelihood indicators (through training in participatory research and comparative analysis, preparation of research documentation, involvement in the comparative analysis of findings in the four countries);
- generate practical policy recommendations on ways to enhance local livelihoods through improved irrigation performance;
- publish a series of policy documents and case studies based on empirical research which are targeted at different audiences.
- produce summary reports in the appropriate local languages to be presented and distributed to the participating farmers' organizations and other interested local groups.

X. BUDGET

The proposed project will require 3 years, in which Phase I and II will be implemented in the first year (1996). This three years of effort will require approximately US$ 1.7 million (including contingency and inflations provisions) for both institutes and their collaborators. Project leaders will be Paul Gosselink (IIMI-HQ) and John Thompson (IIED). IIMI will be the lead institution.

There will be a 'division of labor' between IIMI and IIED in terms of supervision for the fieldwork activities in the respective countries. It is proposed that IIMI will take the lead in Pakistan and Sri Lanka and IIED in Nepal and Burkina Faso. IIMI's country operations will provide support in all countries. The methodology Phase I workshop and the Policy Review workshop (Phase IV) will be organized jointly by IIMI and IIED and will be held at IIMI's headquarters in Colombo.

BUDGET FOR IIMI - IIED COLLABORATION (US$)

	YEAR 1			YEAR 2			YEAR 3			TOTAL		
ITEM	IIMI	IIED	TOTAL	IIMI	IIED	TOTAL	IIMI	IIED	TOTAL	IIMI	IIED	TOTAL
A. Salaries and Benefits												
1. International	68,750	87,120	155,870	68,750	87,120	155,870	68,750	87,120	155,870	206,250	261,360	467,610
2. National	32,300	32,300	64,600	32,300	32,300	64,600	32,300	32,300	64,600	96,900	96,900	193,800
3. Consultants	16,400	-	16,400	16,400	-	16,400	16,400	-	16,400	49,200	0	49,200
B. Travel												
1. International	35,280	43,680	78,960	35,280	43,680	78,960	35,280	43,680	43,680	105,840	131,040	236,880
2. National	19,093	18,260	37,353	19,093	18,260	37,353	19,093	18,260	37,353	57,279	54,780	112,059
C. Supplies & Services	7,500	7,500	15,000	6,500	6,500	13,000	6,500	6,500	13,000	20,500	20,500	41,000
D. Workshops	33,500	12,500	46,000	14,500	10,500	25,000	29,500	10,500	40,000	77,500	33,500	111,000
E. Publications	4,000	4,000	8,000	1,000	1,000	2,000	7,500	7,500	15,000	12,500	12,500	25,000
F. Sub Total	216,823	205,360	422,183	193,823	199,360	393,183	215,323	205,860	385,903	625,969	610,580	1,236,549
G. Indirect Costs	69,383	37,837	107,220	62,023	35,917	97,940	68,903	37,997	106,900	200,310	111,750	312,060
H. Sub Total	286,206	243,197	529,403	255,846	235,277	491,123	284,226	243,857	528,083	826,279	722,330	1,548,609
I. Equipment	12,000	12,000	24,000	-		0	-		0	12,000	12,000	24,000
J. Sub Total	298,206	255,197	553,403	255,846	235,277	491,123	284,226	243,857	528,083	838,279	734,330	1,572,609
K. Contingency	11,928	10,208	22,136	12,792	11,764	24,556	14,211	12,193	26,404	38,932	34,165	73,096
L. Inflation	-	-	0	12,792	11,764	24,556	14,211	12,193	26,404	27,004	23,957	50,960
GRAND TOTAL	310,135	265,405	575,539	281,431	258,804	540,235	312,649	268,242	580,891	904,215	792,452	1,696,666

NOTES TO BUDGET

A1 International Staff Costs

IIMI Research Fellows:

Irrigation and Performance 6 months/yr:	6.0 Q $ 6,250 * 3 yrs	$ 112,500
Irrigation and Gender 2 months/yr:	2.0 @ $ 6,250 * 3 yrs	$ 37,500
Irrigation and Health 2 months/yr:	2.0 @ $ 6,250 * 3 yrs	$ 37,500
Sr IIMI Irrigation Specialist 0.5 month/yr	0.5 Q $12,500 * 3 yrs	$ 18,750
TOTAL IIMI Staff for three years:		$ 206,250

Monthly rate of Salary and Bcncfits:

IIMI Research Fellow	Q $ 6,250/month
IIMI Senior Staff	Q $ 12,500/month

IIED Research Fellows:

Irrigation and Livelihoods 4 months/yr:	4.0 Q $ 9,130 * 3 yrs	$ 109,560
Irrigation and Gender 2.5 months/yr:	2.5 Q $ 9,130 * 3 yrs	$ 68,476
irrigation and Environment 2.5 months/yr:	2.5 @ $ 9,130 * 3 yrs	$ 68,476
Sr IIED Irrigation Specialist:	0.5 Q $ 9,900 * 3 yrs	$ 14,850
TOTAL IIED Staff for three years:		$ 261,362

Monthly rate of Salary and Benefits:

IIED Research Fellow	Q $ 9,130/month (incl. indirect costs)
IIED Senior Staff	@ $ 9,900/month (incl. indirect costs)

TOTAL IIMI and **IIED** Staff Salaries and Benefits		$ 467,612

A2 National Staff Costs

Senior Research Officers, 4 nos, 12 months/yr	4 @ $ 7,440 * 3 yrs	$ 89,280
Research Officers, 4 nos, 10 months/yr	4 @ $4,750 * 3 yrs	$ 57,000
Research Assistants, 8 nos, 6 months/yr	8 Q $ 1,980 * 3 yrs	$ 47,520

To be recruited by both IIMI and IIED at the following rates:

Senior Research Officers	Q $ 620/month
Research Officers	@ $ 475/month
Research Assistants	Q $ 330/month

IIMI share: $ 96,900; IIED share: $ 96,900

TOTAL National Staff Salaries and Benefits	$ **193,800**

A3 International and National Consulfants

Four internationally recruited members of the International Advisory Committee (IAC) at 8 days/yr/advisor: 3 days preparation/review of documents, 2 days travel and **3** days at the workshop in Colombo. To be recruited by IIMI.

Honorarium of max $ 200/day: **4** @ $200 * 8 * **3** yrs $ **19,200**

Nationally recruited consultant to assist with planning workshops, evaluating the results and other supporting activities. *To* be recruited by IIMI.

1 @ $ 10,000 * **3** yrs $ 30,000

TOTAL Consultants $ 49,200

B1 International Travel

a. *Visit to sites*

Each field site will be visited twice per year, 3 weeks per visit and two researchers, pairing IIED with IIMI researchers. This means incurring costs for **4** trips per site per year, with Sri Lanka as the exception as IIMI staff are already on location. Only IIED would need to travel to Sri Lanka. The table below summarizes the field visits; 1/1 means 1 IIED researcher and 1 IIMI researcher.

Year	Trip #	BF	Npl	Pak	SL
1	1st	1/1	1/1	1/1	1/0
	2nd	1/1	1/1	1/1	1/0
2	1st	1/1	1/1	1/1	1/0
	2nd	1/1	1/1	1/1	1/0
3	1st	1/1	1/1	1/1	1/0
	2nd	1/1	1/1	1/1	1/0
TOTAL		6/6	6/6	6/6	6/0

Total: **24** JIED + **18** IIMI tickets **42 @ $ 1,500** $ 63,000

Per Diems: per researcher **21** days/trip @ $ 60 per day * **48** trips $ 60,480

b. *International Advisory Committee*

4 IACs * 3 workshop trips **8** $ 1,500 $ 18,000
Per diems: **4** IACs * **3** days/workshop * **3** yrs @ $75 $ 2,700
Stay at hotel in CMB at concessionary rates through IIMI's services

c. *IIED trips to Methodology Workshops at IIMI-HQ*

3 researchers * 3 workshops Q 5 1,500	5 13,500
Per diems: 3 researchers * 24 days (14 + 5 + 5) Q 5 75	$ 5,400

d. *Sr ROs and ROs to Methodology Workshops at IIMI-HQ*

3 Sr ROs * 3 workshops @ 5 1,500	5 13,500
3 ROs * 3 workshops @ 5 1,500	$ 13,500
Per diems: 4 Sr ROs * 24 days (14 + 5 + 5) @ $ 75	$ 7,200
Per diems: 4 ROs * 24 days Q 5 75	5 7,200

e. *Farmers Representatives to Methodology Workshops at IIMI-HQ*

IIMI and IIED intend to invite local representatives for the methodology, mid-term review and policy review workshops. These farmers will attend the meetings, discuss and present their experiences and will comment on our research procedures and the relevance of our findings. It is suggested to invite 2 farmers from each host country, per workshop.

6 local representatives Q $ 1,500 * 3 workshops	$ 27,000
Per diem: 8 (incl. SL) representatives * 3 days @ $ 75 * 3 workshops	$ 5,400

IIMI share: 5 105,840; IIED share: 5 131,010

TOTAL International Travel	$ ***236,880***

B2 National Travel

National travel includes estimated cost for vehicle rentals (four-wheel drive) for IIMI-IIED facilitators, drivers, O&M for motorcycles of field staff, in-country per diems.

Per diem research officers estimated at 5 10 per actual day spent in the field (incl. accommodation). Total number of months of local staff 408 * 22 days * 75% spent in the field * 5 10.	$ 67,320
Fuel for 8 motorcycles:	$ 8,000
O&M of 8 motorcycles (spare parts, maintenance)	$ 4,000
Vehicle hire 4 sites * 21 days per visit * 12 visits @ $ 30/day	5 30,240
National travel Sri Lanka (airport, preparation workshops)	5 2,500

IIMI share: 5 57,280; IIED share: 54,780

TOTAL National Travel	$ 112,060

C Supplies and Services

Includes fax, phone and e-mail cost associated with the project as well as officesupplies and secretarial support. Document acquisition for both institutes (to the tune of $2,000) has been incorporated in year 1. IIMI share: $ 20,500; IIED share: $ 20,500

Year 1: IIED and IIMI	2 @ $ 7,500	$ 15,000
Year 2/3: IIED and IIMI	2 @ $6,500 * 2	$ 26,000
TOTAL Supplies and Services		$ 41,000

D Workshops

IIMI and IIED will organize workshops at the research sites and at IIMI-HQ.

Yr 1: Methodology Workshop/IIMI	1 @ $ 20,000	$ 20,000
Yr 1: Methodology Workshops/Sites (2 by IIMI, 2 by IIED)	4 @ $ 6,000	$ 24,000
Yr 2: Indicator Workshops/Sites (2 by IIMI, 2 by IIED)	4 Q $ 5,000	$ 20,000
Yr 2: Mid-term Review (end yr 2)	1 Q $ 3,000	$ 3,000
Yr 3: Review Workshops/Sites (2 by IIMI, 2 by IIED)	4 Q $ 5,000	$ 20,000
Yr 3: Policy Review/IIMI-HQ	1 @ $18,000	$ 18,000
Training material and teaching aids at 4 sites * 3 workshops @ $ 250		$ 3,000
Translation at IIMI-HQ Workshops		$ 3,000

IIMI share: $ 77,500; IIED share: 33,500

TOTAL Workshops $ 111,000

E Publications

Includes the costs of printing, translating and disseminating reports and research **results:** workshop proceedings, site papers, methodology and working/discussion/position papers. Working/position/discussion papers will mainly bc produced in year 1 and 2, final reports in ycar 3.

IIMI and IIED.

Yr 1: $ 4,000/institute
Yr 2: $ 1,000/institute
Yr 3: $ 7,500/institute

IIMI share: $ 12,500; IIED share: $ 12,500
TOTAL Publications $ 25,000

G Indirect Costs

IIMI's current Board approved indirect cost recovery rate is *32%* on all direct costs. IIED's standard rate has been included **in** the international staff costs and amount to 32% on all other direct costs.

I Equipment

IIMI and IIED **expect** to purchase the following equipment in Year 1. IIMI share: $ 12,000; IIED share: 12,000

Computer hardware and software lor each of the four sites. This will cover a computer, printer, surge protector, software and supplies	4 @ $ 3,500	$ 14,000
Motorcycles 2/fieldsite	8 @ $ 1,250	$ 10,000
TOTAL Equipment		$ 24,000

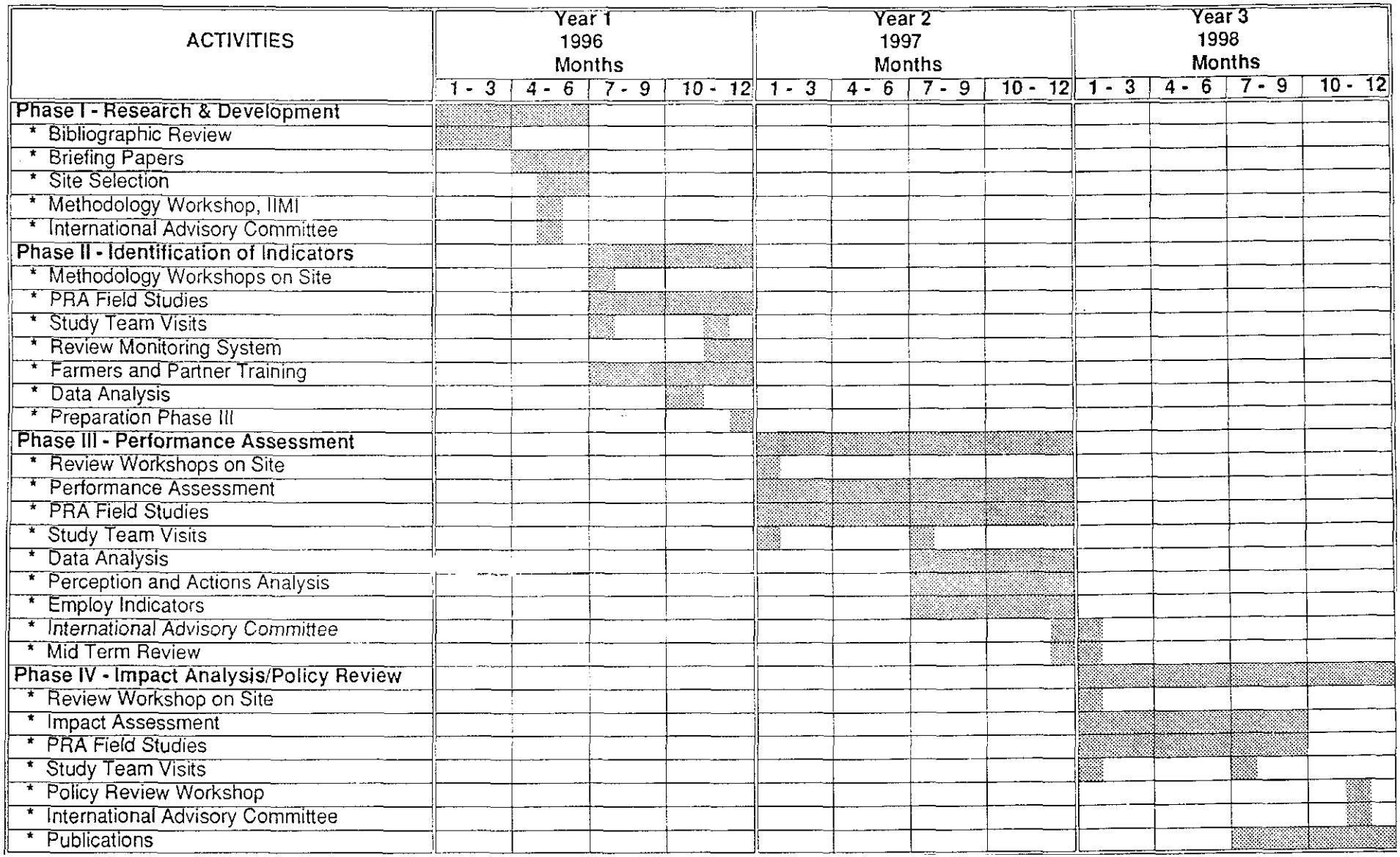
K **Contingency**

Contingency at **4%** in Year 1 **and** 5 in Years 2 and

L Inflation

Inflation at 5% in Year *2* and 3

IMPLEMENTATION PLAN FOR LIVELIHOOD STRATEGIES AND PERFORMANCE INDICATORS



APPENDIX I. INDICATORS' DEVELOPMENT: AN ADAPTIVE PROCEDURE

It is expected that the study will contribute to incorporating significant, but presently neglected standards for the measurement of irrigation performance. Some aspects which might have been disregarded are illustrated in Figure 3 below. Figure 4 suggests how farmers' perception could be included in the development of irrigation performance indicators.

Figure 3.** Parameters/Indicators of **Irrigation Objectives and Factors bypassed

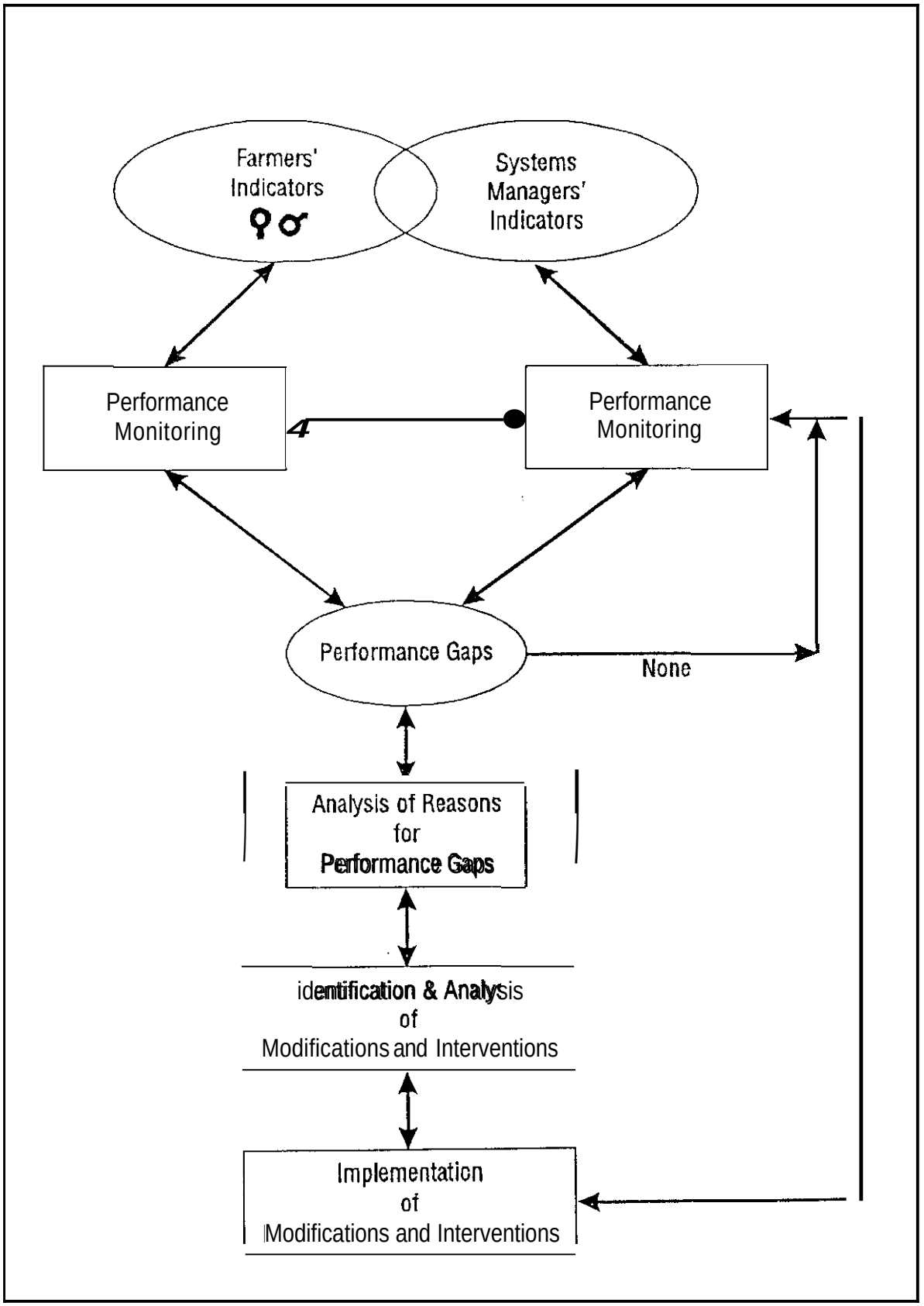
Performance Indicator	Parameters	Aspects bypassed
All indicators	Miscellaneous	■ No differentiation according to gender
Farmers' Profitability	Net value of additional output/water/ha/labor	■ Ignores totality of the operation of the system directed to satisfaction of multiple objectives rather than one criterion. ■ Disregards hetcrogcncity of labor. ■ Short and longer-term stability. ■ Effects on health and nutrition. ■ Minimization of **cash** cost/risk/water requirements.
Maximization of Productivity	Gross value of output/water/ha/labor	
Maximization of irrigated area	Net Gross Irrigated Area	■ Ignores more and better livelihoods with more food and income commanded by the farmers

Figure 4. Difference in Indicators** between **Fanners and Irrigation** System **Managers

System Manager Indicator	Farmers' Indicator	Adapted Indicator Incorporating Farmers' Perspectives
Equity/ Adequacy	Farmers' conflicts over water	• Reduced number of conflicts among farmers and between farmers and agency. ■ Reduced number of unresolved conflicts or leading to escalation.
Maximization of productivity/ Profitability	More work/food/income Reduced migration	• increased amount and stability of days worked, wages and food grown by the farmers. ■ reduced migration to towns with low pay-off jcbs. ■ consumption activities with high income elasticities. ■ investments in consumer durables.

Source: IIMI, 1994; Shah, 1993; Cosselink, **1993;** Chambers, **1988**

APPENDIX II **Fig. 5. USE OF MULTIPLE CRITERIA FOR IRRIGATION PERFORMANCE AND FEEDBACK (after Lenton, 1983)**



References

Behnke, Roy, Ian Scoones and Carol Kerven, eds (1993) *Range Ecology at Disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannas.* London: Overseas Development Institute.

Bos, M G, D H Murray-Rust, D J Merrey, H G Johnson, and W B Snellen (104) *Methodologies for Assessing Performance of irrigation and Management.* In: Irrigation and Drainage Systems 7:231-261, 1994. Kluwer Academic Publishers.

Chambers, Robert, N.C. Saxena and Tushaar Shah (1989) To *the Hands of the* Poor. *Water and Trees.* Intermediate Technology Publications.

Chambers, Robert (1988) *Managing Canal Irrigation: Practical Analysis from South Asia.* Cambridge, UK: Cambridge University Press.

Chambers, Robert and Conway, Gordon R (1992) Sustainable Rural Livelihoods: Practical Concepts for the 21th Century. *IDS Discussion Paper* 296. Institute of Development Studies: Brighton, UK.

Chambers, Robert (1992) Rural Appraisal: Rapid, Relaxed and Participatory. *IDS Discussion Paper* 311 Brighton, UK: Institute of Development Studies.

Chambers, Robert (1995) Poverty and Livelihoods: Whose Reality Counts? *IDS Discussion Paper* **347** Brighton, UK: Institute of Development Studies.

Gosselink, Paul W J (1993) *Socio-Economic Impacts* of *Improved Irrigation Performance.* Research Proposal for IIMI's Performance Program. Colombo, Sri Lanka, July 1993.

Guijt, Irene and John Thompson **(1994)** Landscapes and Livelihoods: Towards an Understanding of the Environmental and Socioeconomic Dimensions of Small-Scale Irrigation. *Land Use Planning 11* (4):294-308.

IFAD *(1992) The State of World Rural Poverty. An inquiry into* Its *Causes and Consequences.* Idriss Jazairy, Alamgir Mohiuddin and Theresa Panuccio. Published for the International Fund for Agricultural Development by New York University Press.

IIMI (1994) *Performance Program Work Plan: 1994-1998.* Presented at the 20th Meeting of the Program Committee, 7-9 April, 1994, Colombo, Sri Lanka. Colombo:IIMI.

Konradsen, Flemming (1994) The Context for an IIMI Workplan for the Health and Irrigation Program. *Internal IIMI Discussion Paper.* Colombo: IIMI.

Kotagama, H B (1992) *irrigation Systems Management under Diversified Cropping* In *Sri Lanka: A Multiple Objective Economic Assessment of Performance of Main System* Water *Management.* Department of Agricultural Economics, Wye College, University of London, April 1992.

Lenton, Roberto (1983) *Management Tools for Improving Irrigation Performance.* Ford Foundation Delhi Discussion paper Series **No.5,** June 1983.

Lowdermilk, Max K (1990) *Irrigation water Control and Anarchy* In: Social, Economic and Institutional Issues in Third World Irrigation Management, pp 155-173. Edited by RK Sampath and Robert A Young. Studies in Water policy and Management, No 15, 1990. Westview Press.

Murray-Rust D and W Bart Snellen (1993) *Irrigation System Performance Assessment and Diagnosis.* Joint Publication of IIMI, ILRI and IHE. Colombo: IIMI.

Nijman, Charles (1992) *Irrigation Decision-Making Processes and Conditions.* A Case Study of Sri Lanka's Kirindi Oya Irrigation and Settlement Project. IIMI Country Paper - Sri Lanka - No. 9. Colombo:IIMI.

Sayer A (1992) *Method in Social Science. A Realist Approach,* 2nd Edition. London and New York: Routledge.

Scoones, Ian, ed (1994) *Living with Uncertainty: New Directions* in *Pastoral Development in Africa.* London: Intermediate Technology Publications.

Shah, Parmesh (1993) *Questionnaires: Participatory, Reliable and Interesting?* A note prepared for IIED/IDS workshop on 'Alternatives to Questionnaires Surveys' on 26 October 1993.

Small L E and Svendsen M (1992) *A Framework for Assessing Irrigation Performance.* Working Papers on Irrigation Performance 1. International Food Policy Research Institute, Washington, D.C.

Thompson, John and Jules N Pretty (1994) Sustainability Indicators and Soil Conservation: A Participatory Impact Study and Self-Evaluation of the Catchment Approach of the Ministry of Agriculture, Kenya. *Journal of Farming Systems Research-Extension* (under review).

Thompson, John and Ian Scoones (1994) Challenging the Populist Perspective: Rural People's Knowledge, Agricultural Research and Extension Practice. *Agriculture and Human Values* 11 (2-3): *58-76.*

Tiffen, Mary (1993) Guidelines for the Incorporation of Health Safeguards into Irrigation Projects through Intersectoral Cooperation. *Peem Guidelines Series* 1. Joint WHO/FAO/UNEP Panel of Experts on Environmental Management for Vector Control. World Health Organization: Geneva.

World Bank (1991) *India Sector Review* Vol II - Supplementary Analysis. July 3, 1001. Agricultural Operations Division, India Department, Asia Region.

Zwarteveen, Margreet (1993) Gender and Irrigation Management: Issues and Challenges. Paper presented at the **SIDA** Workshop on Gender and Water Resources Management: Lessons Learned and Strategies for the Future, Stockholm, **1-3** December, 1993

Zwarteveen, Margreet (1994) Gender Issues, Water Issues: A Gender Perspective to Irrigation Management. Colombo, Sri Lanka: International Irrigation Management Institute (IIMI Working Paper no. **32).**