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PARTICIPATORY RURAL APPRAISAL FOR IRRIGATION MANAGEMENT RESEARCH

Lessons from IIMI's Experience

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IIMI

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Foreword

RESEARCH METHODOLOGIES ARE important instruments in the "toolkit" of research institutes such as the International Irrigation Management Institute (IIMI). In fact, research on research methodologies is an essential part of IIMI's generic research program, as it is recognized that irrigation management research is conducted in a difficult environment where off-the-shelf methods and procedures may not be automatically appropriate or cost-effective.

Ideally, IIMI's research should be interdisciplinary, collaborative, field-based and client- and action-oriented. Within this model, IIMI has been employing different research methodologies which reflect the numerous disciplines of the staff members of the institute (e.g., participant observation, process documentation, direct measurements, questionnaires, literature reviews, interviews with key informants, action research, etc.). IIMI publications on research approaches, tools and techniques are, however, relatively scarce.

Recently, new research approaches and techniques have been developed for application and fine-tuning in irrigation management research, e.g., Geographic Information Systems and Remote Sensing for assessing irrigation system performance, or participatory approaches that involve water users and use visualization techniques.

Although there are numerous other participatory methodologies, this paper focuses solely on Participatory Rural Appraisal (PRA). It attempts to review the pros and cons of PRA in the context of irrigation management research, and discuss the potential for institutionalization of PRA at IIMI. Closely related to the use of PRA (or any other participatory methodology) is the issue of the involvement of water users in the design, implementation and evaluation of research activities, which is also discussed.

As such, the present Working Paper should be interpreted as an avenue to stimulate the debate at IIMI on research methodologies in general, and participatory methodologies in particular, whether or not one concurs with the conclusions of the paper on the required involvement of water users at different stages of the research process.

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Executive Summary

THE INCREASING INTERNATIONAL awareness about the strengths of participatory approaches and methods for research and development has led international development banks, NGOs, donors and research and training institutes to adopt Participatory Rural Appraisal (PRA) and other participatory approaches to implement new projects and programs. At IIMI, PRA approaches and methods have also been incorporated in a number of research activities.

The present Working Paper explores the opportunities of PRA in irrigation management research through an analysis of selected case studies in which IIMI attempted to practice the PRA approach. Recent experiences have shed light on the potential and down-sides of the approach, and in what ways it could be applied for an irrigation management research strategy which strengthens water users' input into irrigation management research.

The paper starts with the presentation of a simplified framework for irrigation management research based on the identification of actors, functions and processes required for irrigation management, along with their links with the enabling environment and their impact on agricultural production and rural development. This framework is subsequently used for an analysis of irrigation management research, and it focuses on the shifts in emphasis on the actors, functions and processes herein, and the importance attached to the enabling environment. It shows that water users have become very important to research as a unit of analysis to measure the impact of irrigation management and as increasingly important partners in the management of irrigation systems. Despite their recognized importance, the water users' role has remained a passive one in irrigation management research.

The following section describes PRA as one of the most important participatory research and development approaches to increase farmers' input into the research processes. PRA enables local people to participate in joint-analysis leading to actions plans. As such, PRA has been developed as a reaction to the alleged shortcomings of conventional ways of working with local people and conducting development-related research. While there are many other participatory approaches, their underlying principles are common and contribute to a process of empowerment and enhance the quality and validity of the information.

PRA has been used in different types of processes and sectors, and shows a broad repertoire of methods for group and team dynamics, sampling methods, interview and dialogue, and visualization and diagraming methods. Literature on the constraints to the use of PRA in practical, cultural, institutional and conceptual terminology is relatively scarce, but critiques of PRA question the cultural appropriateness of the methodology and the creation of expectations (typically aid). In research terms, the level of rigor has received criticism that may be related to the absence of proper evaluation of the methodology itself.

A literature review of the use of participatory methodologies in irrigation does not reveal many examples with clearly documented PRA experiences. PRA has been used in participatory appraisal of irrigation systems, participatory implementation of watershed management programs, participatory implementation of the design of irrigation systems, and in participatory monitoring and evaluation of programs. Four examples of the application of PRA in irrigation management research (Nepal, Sri Lanka, Pakistan, and Kenya, the latter being a non-IIMI example) are discussed to illustrate how the PRA approach works out in practice. These cases show that the conditions required for a proper PRA are not always met, that team composition is an important variable for the outcome of the participatory research, that biases and rigidity still persist, and that facilitators play a leading role in some of the

activities. An important conclusion is that the adoption of the PRA approach at the outset of research does not necessarily lead to interactive participation.

The paper ends with an attempt to assess the advantages and disadvantages of PRA on the basis of the three selected (IIMI) case studies. Two generic issues on the application of the approach by irrigation researchers are investigated: first, how does PRA relate to more formal approaches in irrigation management research? second, how can insights derived at the watercourse level impact on system level management and provide a broader view of the whole system? The paper stresses the importance of the complementarity between methods and approaches, and challenges researchers working in the field of irrigation management to identify appropriate sets of methodologies for research on the actors, functions and processes in irrigation management.

At IIMI, PRA can play an important role in adaptive (context-specific) research, but it could also contribute to the identification of new research issues based on interactions with water users for strategic research. It is emphasized that water users should come in at an early stage of the research cycle, in which they could take on some of the research functions and responsibilities, and have a voice in the definition of IIMI's research agenda. Potential changes required to institutionalize the involvement of water users (and other stakeholders) in the research process (such as modification in the process of research design, new definition of clients, new professional attitudes and values, and increased accountability to the end users of irrigation systems) are recommended.

Introduction

THE GENERIC RESEARCH program of the International Irrigation Management Institute (IIMI) entails evaluating and comparing the findings and results emerging from field research across countries and regions, yielding results with multi-country applicability. An important element of this program is **undertaking research on research methodologies** in the special context that irrigation management provides, i.e., a socio-politically complex topic in an area of unreliable or nonexistent data (IIMI 1992a).

Notwithstanding this generic aim of IIMI, there are only very few research papers on data collection methodologies for irrigation management research published by IIMI (for examples, see Chambers and Carruthers 1985 and 1986; Merrey 1994 and Sakthivadivel and Merrey 1992). In a different field, for example, the recent effort of the International Food Policy Research Institute (IFPRI), a sister institute of the Consultative Group for International Agricultural Research (CGIAR), is to be recognized and congratulated for the publication of the book titled *Data Needs for Food Policy in Developing Countries* (von Braun and Puetz 1993).

IIMI's Performance Assessment Program[1] has included part of the generic research elements into its objectives with the identification of the most appropriate methodologies and data collection methods for assessing irrigation system performance. To do so, different data collection methods are designed and field-tested, and then compared in terms of quality of the information collected, the accuracy of data, the convenience of the data-collection process, costs and skill requirements of each method, etc. However, although the methodological concern has been explicitly specified in the research agenda of IIMI's Performance Assessment Program, very little has been written yet on data-collection methods and the program activities to date have concentrated more (at least until recently) on the development of a logical framework for the analysis of irrigation system performance and the calculation of performance indicators.

The present paper focuses on one appraisal methodology: **Participatory Rural Appraisal (PRA),** and on its use for **Irrigation Management Research (IMR).** As will be discussed in the following sections, to link these two topics requires two initial clarifications. The first clarification relates to the identification of the boundaries of irrigation management research (what do we call irrigation management?). The second clarification focuses on the definition of PRA and its specificities versus other types of participatory approaches and techniques that have been developed and implemented in development and research activities for the last 20 years. A very specific portion only of the long list of participatory approaches similar to PRA that have been used in the field of irrigation management will be discussed in the present paper.

The attempt to describe the principles of the PRA approach and the implementation of PRA activities, and to evaluate the potential use of this method for irrigation management research in the present paper can be seen as a follow-up to the earlier papers on Rapid Rural Appraisal (RRA) for irrigation management research written by Potten (1985), Chambers and Carruthers (1985 and 1986) and Groenfeldt (1989). However, the emphasis on the methodology itself is

[1]The Performance Assessment Program of IIMI focuses on the introduction of performance assessment methodologies to define, monitor and evaluate improved operational procedures for existing irrigation systems. More specific objectives of this Program are provided under *Performance Indicators from Water Users' Perspective in Pakistan* (p. 37).

greater here, as the paper provides a clear description of the PRA approach and tools, and illustrates some of the basics of PRA with selected case studies. In fact, the paper has mainly been written for researchers, potential implementors of PRA and managers of PRA activities involved in irrigation management research.

The first and second parts of the paper focus on the two primary elements included in the paper's title: **(i) Irrigation Management Research**, and **(ii) Participatory Rural Appraisal.** The section on Irrigation Management Research attempts to address the issue of the boundaries (rather than the definition) of what is named irrigation management research. The relatively recent history of irrigation management research is described, and complemented by current and future research issues in irrigation management as seen by the research and donor community. In itself, this summary remains incomplete as it does not include the views of the various stakeholders of irrigation systems (one of the points stressed by the present paper). In fact, so far, stakeholders have not been formally involved in the identification of research topics and/or the evaluation of research findings.

In order to increase the (indispensable?) involvement of end users in irrigation management research, participatory methods are required (not for the sake of participation in itself but to ensure a higher effectiveness of this research and to increase the chances of acceptance of innovations and ultimately their sustainability). The main approach developed during the past 10 years, **PRA**, seems to offer a great potential for increasing stakeholders' involvement in the design of the research agenda for irrigation management research. Thus, the core ideas of PRA will be presented and discussed, and tools and techniques of potential use for irrigation management research will be described.

The link between the first two parts of the paper is made in the third section that describes past (and current) experiences in the use of PRA for irrigation management research, based on a review of literature and a review of IIMI's experiences in this arena. The concluding part of the paper analyzes the potential for further utilization and development of PRA for major areas of research in irrigation management, and also explores the potential for PRA at different stages of the research process, including the institutional context required for the implementation of PRA.

Irrigation Management Research

BACKGROUND

IN THE MAJORITY of developing countries (especially in Asia), the required increases in agricultural production and productivity have been obtained in the past by the development of irrigation accompanied by the Green Revolution. With the best sites for new irrigation schemes already in use, leading to increasing investment costs for new irrigation infrastructure, with the recognized inadequacy of water deliveries of most of the irrigation schemes compared to design or requirements, and with the environmental degradation (waterlogging, salinity) that have accompanied the poor performance of irrigation systems, the improvement of the management of the current systems appears as the option with the highest payoff. In fact, the benefits that may be expected from improved irrigation management are seen as extremely high as the current levels of performance are substantially below their potential and far from their original design figures (Clarke 1993; Rosegrant and Svendsen 1993; Yudelman 1993; Gerards 1995).

Research in the domain of irrigation management is a rather recent phenomenon, and has probably arisen as an answer to the increasing demand for an integrated approach of the management of irrigation systems. This demand has mainly been led by the donor community, but it has also been driven by governments whose objectives are to increase the financial and economic returns of existing and new investments in the irrigation sector, to reach higher levels of self-sufficiency in the production of staple (irrigated) crops, and to reduce the budgetary burden imposed by most of the current irrigation schemes. One of the most positive aspects of irrigation management research has been to put different disciplines together leading towards a more holistic analysis of irrigation systems.

Rather surprisingly, irrigation management is not a clearly defined and confined subject as shown by the comparison between research papers that have analyzed the complexity of this topic and have described the history of irrigation management research (see, for example, Rao and Wickham 1986; Johnson 1989; Hoogendam and Slabbers 1992; Levine 1992 and 1993). Moreover, the focus of the different actors involved in research has evolved other time. The recent changes in the mandate of IIMI, from irrigation system management to irrigated agriculture and even watershed management (Wijayaratna 1995), comprise one of the examples that stresses the dynamic nature of the research process and research agenda and the evolving priorities as identified by researchers and other actors involved in the research process.

Changes in the research agenda occur because great success or failure of research programs follows changing financial, institutional and human constraints, and the agenda is also influenced by the requirements or policy objectives of the institutions financing irrigation management research. As contended by Chambers (1988:65), research agenda and research projects are generally developed by researchers in their content, *following the latest fashion and priorities of funding agencies*. This statement may be too strong as sometimes the format only of a project (and not its content) is modified to satisfy the requirements of the donors. Various environment-related projects provide such examples of repackaging of research ideas and activities for a better fit with donors' priorities. The inclusion of gender issues may be another area of such concern.

A FRAMEWORK FOR IRRIGATION MANAGEMENT [2]

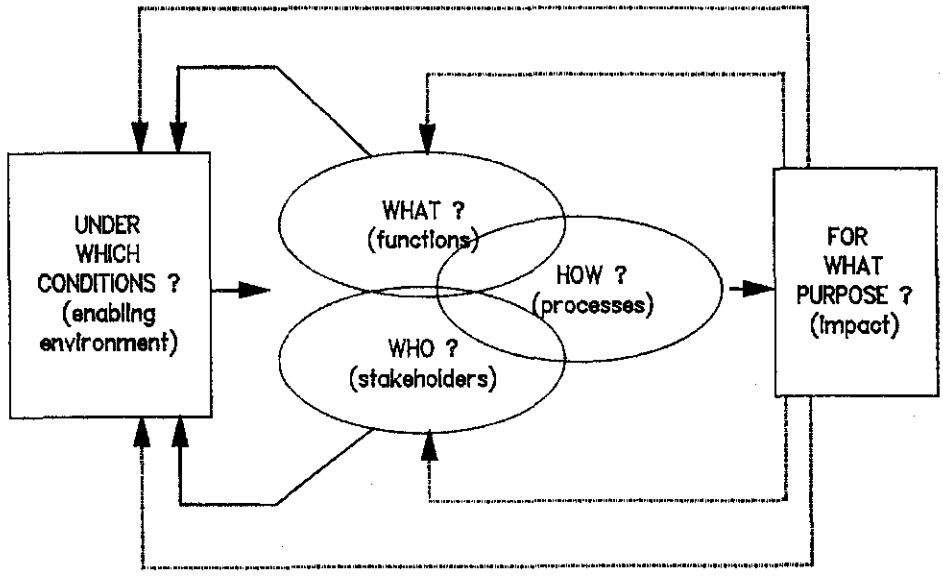
To ease the discussion on the use of PRA for irrigation management research, a simplified structure of irrigation management research is proposed and presented in Figure 1, based on three basic questions (focused on different axes of the irrigation management matrix), and on two major links. The three questions are:

Who? This relates to the different **actors or stakeholders** (from the individual to government agencies, via community groups and lobbies), their objectives and internal constraints and their position within the general network of actors.

What? This relates to the **functions** performed for irrigation management, i.e., acquisition, distribution, application and disposal of water.

How? This refers to **processes** such as planning, construction and rehabilitation, operation, maintenance and supply of support services.

Figure 1. A framework for irrigation management.



[2]The basic structure of this framework and the definition of the different categories included in the **what** and **how** questions are based on articles by Rao and Wickham (1986) and Small and Svendsen (1990).

The two major links refer to the **impact** of the so-called **enabling environment** (including social, economic, legal and physical aspects) on irrigation management; and the **impact of irrigation management** itself on agricultural production and productivity and their sustainability, and eventually on farm income and socioeconomic development of the area served by a given irrigation system. These major links are complemented by feedback loops stressing the fact that the impact of irrigation management may induce changes in the enabling environment, and also in the way the ***who/what/how*** trilogy interacts.

Some of the issues to be addressed for the application of the present (very simplified) framework are the source of irrigation water (groundwater versus surface water for example), the level of analysis and focus (whether at the level of the irrigation system, at the level of one distribution canal or at the level of the farm), the spatial diversity in terms of ***who*** does ***what*** and ***how***, and the temporal variability of the irrigation management processes. Moreover, social, economic and physical aspects are to be considered for the intersection between the different ***who***, ***what*** and ***how*** categories.

The junction between the ***who*** axis and the ***what*** axis (who does what?), for example, will address issues of responsibilities and accountability among the different actors, along with problems related to information and financial flows (support services). The link between actors and the enabling environment includes irrigation-sector policy, with the specification of the roles of different actors in the development and implementation of these policies.

Using this framework as a basis for analyzing irrigation management research (IMR), a look at the literature shows that research issues have changed over time (Fuchs Carsh et al. 1992; Hoogendam and Slabbers 1992; Levine 1992). While 30 years ago, irrigation was mainly a construction (a **how** question) and technical subject focused on main canals (acquisition and distribution categories of the **what** question) operated by large bureaucracies, it shifted to the management of the tertiary units in the sixties-seventies with the development of integrated technical, social and economic approaches and research programs. The eighties saw a shift to the main canal system again, but with a focus on operation and maintenance of large irrigation systems in the context of a complex social, economic and technical environment. Multidisciplinary approaches similar to the ones developed in the seventies for the tertiary-level research were applied for issues at higher levels of the irrigation system (Hoogendam and Slabbers 1992). However, and as a follow-up to the focus on tertiary units, the lower levels of irrigation systems were not abandoned, mainly because the increasing emphasis on farmers' role in irrigation management led by the relatively good performance of farmer-managed irrigation systems also became the object of comprehensive research program in the eighties. This was further reinforced by recent policies aimed at turning over large-scale publicly managed systems (or at least part of these systems) to the water users (or water user associations).

The shift in the emphasis of the ***who/what/how*** categories was also accompanied by an increasing importance of the enabling environment variables (and the recognition of the impact of macro-policies on irrigation system performance), and the concomitant recognition of the integration of the irrigation sector into the broader irrigated agriculture sector. IIMI itself has

been instrumental in recognizing this shift, as highlighted by the recent change in the Institute's mandate from irrigation system management to irrigated agriculture[3] (IIMI 1992b).

In terms of research emphasis, this shift leads to a greater need to fully understand technical, social and economic constraints at the farm and household level as other inputs may constrain irrigated agriculture and limit the scope for positive impacts (in terms of production, productivity, sustainability) of irrigation-management innovations. Thus, water users become central to the research agenda for two reasons: (i) as the appropriate unit of analysis to estimate the impact of water management on agricultural production, productivity and socioeconomic development (the final decision related to the allocation and use of irrigation water is taken by individual farmers within a given set of constraints which may be related to actions at higher levels of the irrigation system); and (ii) as increasingly important partners in the management of irrigation systems in the context of irrigation system turnover programs promoted by governments and funding agencies in a large number of countries.

IMR: FOR, BUT WITHOUT, WATER USERS?

However, even with water users at the core of IIMI's research agenda, the absence of water users and farmers in the identification of the research agenda is rather striking. In fact, water users appear only as the object of the research process and not as active participants in this process. The basic assumption is that researchers know what farmers need, which is their interpretation of the farmers' situation (Tripp 1992). In the basic research on agriculture, farming systems research provided the first attempt to shift from the "the researchers know" perspective (Thompson and Scoones 1994) towards a more user-oriented approach. However, this has not been directly transferred to IMR, partly due to weak links between farming system research and IMR (Merrey 1994).

From the donors' point of view, low-income water users whose livelihoods depend on irrigated agriculture should have the greatest benefits from research projects in irrigation management. However, no concerted attempts have been made to explore the major problems of these water users or to determine what their priorities would be in terms of improving the management of their irrigation system. Chambers (1988, 66) summarizes this opinion when discussing gaps in research:

> *Moreover, for gap and linkage subjects, these are often not clearly established methods of enquiry. How, for example, does one assess the knowledge and expectations of farmers regarding the water they will receive from the main system, and how this affects their behavior?*

[3]This shift may have been accelerated by the expansion of IIMI activities to more diverse environments and countries outside of the more traditional field of South Asian countries with their predominately large-scale publicly managed irrigation systems.

More generally, the lack of participation of stakeholders in the research process has also been very recently acknowledged by the consortium providing financial support to the CGIAR as testified by the Lucerne *Declaration and Action Program (renewal of the CGIAR)* output of the CGIAR ministerial-level meeting in February 1995 (CGIAR 1995). One of the recommendations related to the CGIAR research agenda urges the CGIAR to:

> ***Work in closer partnership and collaboration with*** *public and private research organizations in the South, including* ***farmer groups****, universities, NGOs, and international institutions* ***to design and conduct research programs****.*

As IIMI has moved from irrigation system management to irrigated agriculture with more impact analysis at the farm/household level, this recommendation would naturally apply to the Institute even more now than in the past.

The Performance Assessment Program of IIMI offers an appropriate example of how water users have been left out of the definition of the research agenda. Here, the point made is not to advocate a greater involvement of end users in the analysis of information and calculation of performance indicators, but to recognize the importance of incorporating their objectives and expectations, that have presently been defined for them but without them. The analysis of the performance of an irrigation system as described by the Performance Program documents (IIMI 1994b) stresses differences between policymakers, irrigation system managers and water users, but it does not make the appropriate steps to investigate objectives and performance-related issues from the water users' perspectives.

Another striking example is the push towards turnover or water users' participation in the management of irrigation systems mentioned in the introductory section. Although one may have very good reasons to believe that turnover or increased participation of water users in the management of their systems would increase the productivity and sustainability of these systems, it is never clear whether the proposed option is seen as the best option by the water users themselves; and their role in the identification of research issues under this program is negligible.

In sum, the present paper advocates an increasing involvement of stakeholders, especially water users, in the research process. Assessing the match between IMR and the perspectives of the end users and stakeholders is perceived as the minimum step required to increase IMR effectiveness and the potential for positive changes in irrigation management (with eventual impact on the sustainability of irrigated agriculture itself).[4]

However, to what extent water users should participate in the research process or research cycle, may depend on the type of research, the capability of the team of researchers, the type of farmers, the social environment, etc. This will be further discussed in the *Discussion and Conclusion* part of the present paper. What is clear is that the change in focus and perspective

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[4]Stakeholders other than water users are, and have been, involved in the identification of research issues and the implementation of specific research activities at IIMI up to a certain extent. For example, meetings involving representatives of national agricultural and irrigation ministries had been organized for the preparation of IIMI's Strategy. Consultative Committees are set up in countries where IIMI has ongoing research programs (Kijne 1995). However, the effectiveness of these committees and their role in the definition of the research agenda is not clear.

(i.e., to include the perspectives of the end users themselves), will require different approaches, techniques and behavioral attitudes of researchers.[5]

The following sections of the paper focus on the most commonly used method to increase farmers' input into the research process, to diversify research issues and to reduce the rigidity imposed by researchers themselves: i.e., PRA. The basics of the approach are described in some detail, and tools and techniques for addressing specific issues related to farmers' participatory research are described and discussed.

[5]As the role of stakeholders will be modified with their increasing involvement in irrigation management research, attitude changes may also be required for the end users/stakeholders themselves.

Participatory Rural Appraisal

A TYPOLOGY OF PARTICIPATION

IIMI's CONCERN ABOUT the concepts of "participation" and "participatory" is not a novelty in the development and research community. These notions already appeared in the development jargon as early as the 1950s (Rahnema 1992), and have since been present in the discussions on development. Recently, participation has been broadly defined as "a process by which people, especially disadvantaged people, influence decisions that affect them" (World Bank 1992).

The objectives of participation have gradually shifted over the years, and it is now a universal and accepted concept for policymakers, donors, banks, NGOs and development and research institutes as evidenced by the status of the participatory concept in organizations such as the World Bank. With a myriad of reasons for its widespread popularity, the inclusion of this slogan is to serve the objectives of empowerment, developing beneficiary capacity, effectiveness and efficiency of the activities, and cost sharing (World Bank 1992).

The use of the word participation in project and research proposals has become exceedingly favored, without however providing a proper definition of what participation means in different contexts. The cosmetic employment of the concept and its fashionable overuse without leading to truly different ways of working with local people did however not go unnoticed (e.g., Cernea 1991; Chambers 1992; Cornwall et al. 1994).

Approximately 30 methodologies including abbreviations are nowadays *en vogue* which reflects the faddism and potential rhetoric of the participatory movement. Some of the more well-known participatory approaches to agricultural research are Farmer Participatory Research (FPR - Farrington and Martin 1988), Participatory Action Research (PAR - Whyte 1991) and Participatory Analysis and Learning Methods (PALM - MYRADA 1990-). While one method may be more participatory than the other, they all manifest in one way or another the innovations and new directions in agricultural research and, as observed by Cornwall et al. (1994) *the challenge is to draw away from this array of innovation to create new syntheses.*

The intensity of how people participate in programs and projects has been described by Farrington and Martin (1988) and Biggs (1989). More recently, Pretty (1994, adapted from Adnan et al. 1992) has shown that participation ranges from passive participation, participation in information-giving and participation by consultation to participation for material incentives, functional participation, interactive participation and self-mobilization (Table 1). Passive participation means that people participate by being told what is going to happen or has already happened, while interactive participation means that people participate in joint-analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. Self-mobilization means that people participate by taking initiatives independent of external institutions to change systems. The participatory methodology, PRA, is alleged to liaise with local people in an intensive manner, where participation is interactive leading to self-mobilization if looked at in the context of the classification developed by Pretty and presented in Table 1.

Table 1. A typology of participation: How people participate in development programs and projects.

Typology	Components of Each Type
Passive Participation	People participate by being told what is going to happen or has already happened. It is a unilateral announcement by an administration or project management without any listening to people's responses. The information being shared belongs only to external professionals.
Participation in Information Giving	People participate by answering questions posed by extractive researchers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research are neither shared nor checked for accuracy.
Participation by Consultation	People participate by being consulted, and external agents listen to views. These external agents define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision making, and professionals are under no obligation to accept people's views.
Participation for Material Incentives	People participate by providing resources, for example labor, in return for food, cash or other material incentives. Much on-farm research falls in this category, as farmers provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
Functional Participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organizations. Such involvement does not tend to be at the early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependant on external initiators and facilitators, but may become self-dependant.
Interactive Participation	People participate in joint-analysis, which leads to action plans and the formation of new local institutions or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and makes use of systematic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices.
Self-Mobilization	People participate by taking initiatives independent of external institutions to change systems. Such self-initiated mobilization and collective action may or may not challenge existing inequitable distribution of wealth and power.

Source: Pretty 1994, adapted from Adnan et al. 1992.

In this paper the term Participatory Rural **Appraisal** will be used mainly for the range of activities from the identification of a project (or a specific research issue) to the project's appraisal (or definition of a work plan for implementation of research activities) as presented in Table 2. Thus, appraisal is synonymous with diagnostic analysis or diagnosis and prescription (Chambers and Carruthers 1985). The appraisal phase in itself does not include the subsequent phase of action (research), which will be based on the participatory appraisals

but which will not be necessarily participatory. In practice, however (and also in most of the written material summarizing and analyzing PRA experiences), it is very difficult to separate the action phase from the purely appraisal phase as both become closely interrelated in the case of participatory approaches integrated in development activities.

Table 2. Appraisal: Overlaps of word meanings.

SEQUENCE		
Project identification -------> Detailed design -------> Project appraisal		A C T I O N
Investigation	Analysis	
Diagnosis	Prescription	
Diagnostic analysis		
Appraisal		

Source: Chambers and Carruthers 1985.

In the next sections, PRA will be described with its main menu, and practical examples will be presented. This chapter ends with a critique of PRA from the literature.

WHY PRA?

Rapid Rural Appraisal as a predecessor to Participatory Rural Appraisal emerged and developed in the 1970s as a reaction to the alleged shortcomings of conventional ways of working with local people and conducting development-related research (McCracken et al. 1988). The weaknesses of the conventional approaches (e.g., rural development tourism, survey slavery, rural poverty unobserved) have been well documented by Chambers (1983). This gave rise to the maturation of a methodology which perceived the knowledge and views of villagers as basic determinants of the development path to be followed. In agricultural research, PRA attempts to challenge the assumptions of conventional ways of perceiving farmers, where knowledge is the exclusive area of the researcher and where the farmer is a passive recipient of information (Pretty and Chambers 1994).

This indicates that a combination of push and pull factors was involved in the spread of PRA. A significant pull factor in this process was the recognition that local people appear to have a greater capacity to analyze their own situations and conditions than the professionals normally imagined. Another pull factor is the cost-effectiveness of the approach and timely delivery of information which appeals to development workers and researchers. Thus, PRA is

supposed to have characteristics which should be able to overcome the weaknesses of more conventional approaches. According to Chambers (1992) these features are the following:

* A reversal of learning, to learn from rural people;

* Learning rapidly and progressively with flexible use of methods, improvisation and cross-checking;

* Offsetting biases, especially those of rural development tourism (spatial, project, person, dry season, diplomatic and professional);

* Optimizing trade-offs between quantity, relevance, accuracy and timeliness;

* Triangulation, using a range of methods, types of information, investigators and/or disciplines to cross-check information;

* Seeking diversity.

Through working with local people on this basis, the process of interactive participation leads to the strengthening of the capacities of local people (Richards 1994): notably it (i) enables local people to collect information, to assess its relevance, to cross-check its validity and document and present the findings; ii) enhances capabilities to prepare project proposals (planning, management); and iii) improves local skills for dealing with potential conflicts between different interest groups.

DEFINITION AND PRINCIPLES OF PRA[6]

PRA has been described as *a growing family of approaches and methods to enable local people to share, enhance and analyze their knowledge of life and conditions, to plan and act* (Chambers 1994a). The variety of participatory labels given to other members of this growing family is enormous, but they all share common principles. These are as follows (Guijt and Thompson 1994):

* ***A Defined Methodology and Systematic Learning Process.*** The focus is on cumulative learning by all the participants and, given the nature of these approaches as systems of inquiry, their use has to be participatory.

* ***Multiple Perspectives.*** A central objective is to seek diversity, rather than characterize complexity in terms of average values. The assumption is that different individuals and

[6]See also Scoones (1995) for a more detailed analysis of these principles and of their potential misuse.

groups make different evaluations of situations, which lead to different actions. All views of activity or purpose are heavy with interpretation, bias and prejudice, and this implies that there are multiple possible descriptions of any real-world activity.

* ***Group Inquiry Process.*** All involve the recognition that the complexity of the world will only be revealed through group inquiry. This implies three possible mixes of people, namely of disciplines, of sectors, and of outsiders (professionals) and insiders (local people).

* ***Context-Specific.*** The approaches are flexible enough to be adapted to suit each new set of conditions and actors, and so there are multiple variants.

* ***Facilitating Experts.*** The methodology is concerned with the transformation of existing activities to try to bring about changes which people in the situation regard as improvements. The role of the "expert" is best thought of as helping people in their situation to carry out their own study and so achieve something.

* ***Leading to Sustained Action.*** The inquiry process leads to debate about change, and debate changes the perceptions of the actors and their readiness to contemplate action. Action is agreed, and implementable changes will therefore represent an accommodation between the different conflicting views. The debate and/or analysis both define changes which would bring about improvement and seek to motivate people to take action to implement the defined changes.

These common principles of PRA are the basics of a well-defined and practical set of tools and techniques (see under *Practical Applications and Methods of PRA* [p.14]) which—if applied skillfully—contribute to the process of empowerment and enhance the quality and validity of the information. The participatory innovations have helped discover the hidden capacities of villagers to map, diagram, score and rank and that relaxed rapport which is crucial to facilitating participation (Chambers 1994b). Likewise, it was discovered that participatory diagramming and visual sharing are powerful and popular and that sequences of participatory methods create a flexible learning process which is open-ended and adaptable.

Accepting the PRA principles guides development workers and researchers into different behaviors and attitudes in their interactions with local people. A practical working principle of PRA therefore is accepting a different role[7] as facilitator where "they do it" (Chambers 1992). So, the role of villagers is to explore, analyze and experiment by themselves, while the researchers do not interfere and "hand over the stick." In addition, standards of self-critical awareness and responsibility where the behavior of the facilitators is continuously reviewed by other members of the team and sharing of information are leading principles in working with

[7]Changes in attitudes have been established through facilitators D.I.Y. (Do-It-Yourself), where the villagers are the teachers and the outsiders are the students (Chambers 1994c).

PRA. PRA has developed practical aids to assist facilitators in correcting the behavior of colleagues, such as team contracts and "shoulder tapping" (Shah 1991).

PRACTICAL APPLICATIONS AND METHODS OF PRA

The principles, tools and techniques of PRA have been applied in a broad field of subjects. Through training and field experiences in various workshops all over the world, these methods became accessible to a large number of interested development workers and researchers. Many of the field experiences have been carefully documented in PRA training reports in the English language (e.g., Girara and Abela 1991; Guijt and Pretty 1992; Tamil Nadu Agricultural University and IIED 1992; IIED and ActionAid 1992; IIED and MYRDA 1991; Theis and Grady 1991; Thompson and Nott 1992; IIMI 1995a) and in French (Gueye 1993abc and 1994). Handbooks and training manuals have been produced as field guides intended to assist those involved in all forms of participatory inquiry (World Resources Institute 1990; Pretty et al. 1995; Kamara and Denkabe 1993). Very recently the World Bank (Narayan and Srinivasan 1994) has developed a "participatory development tool kit" which contains training material for agencies and communities. Srinivasan (1993) has produced a manual and video package for training of trainers in participatory techniques. In addition, participatory approaches to monitoring and (self-)evaluation of programs have been developed (Aubel 1993; Aaker and Shumaker 1994; Narayan 1993; Rugh 1986). PRA has not only been used in developing countries, but in western contexts as well (Webber and Ison 1995; Scheuermeier and Ison 1992; Kievelitz and Forster 1991; Dunn 1993).

According to Chambers (1994a) the applications of PRA can be found in four types of processes and in four major sectors. The most important types of processes are:

* Participatory appraisal and planning;
* Participatory implementation, monitoring and evaluation of programs;
* Topic investigations; and
* Training and orientation for outsiders and villagers.

The four sectors in which PRA has been applied are:

* Natural resources management (which includes watershed management and soil and water conservation);
* Agriculture (including irrigation);

* Poverty and social programs; and

* Health and food security.

The major innovators and users of PRA were NGOs and government field organizations (Chambers 1994a), operative in the fields of initiating, implementing and monitoring and evaluating development projects and programs. This may explain why the known applications of PRA in international agricultural research are relatively scarce. In fact, the international agricultural research centers have been criticized for *their lack of commitment to develop and disseminate methods for analysis conducted by farmers* on the one hand, and for *their gaps in approaches and methods to change the behavior, attitudes and beliefs of scientists* on the other (Pretty and Chambers 1994). It is argued that while many individual efforts have been made to integrate participatory methods into mainstream research, it is not the norm (see also Fujisaka 1994).

Table 3 shows the broad menu of PRA methods of group and team dynamics, sampling, interviewing and dialogue and visualization and diagramming. Visualization is considered as one of the principal innovations of the methodology (Chambers 1994b; Cornwall et al. 1994), where villagers and participants take over from the researchers and development workers who do not interfere with the villagers, observe from a distance or simply go away in order not to disturb the process.

PRA, however, should not be interpreted as a simple "tool box" which can be easily taken off the shelf and applied instantaneously. It entails a reversal of normal professional practices[8] (Chambers 1994b), where the organization of the activities and the use of tools may be of assistance, but not necessarily sufficient for working in an interactive manner with farmers. Going to the field and interacting with a handful of farmers is not equivalent to conducting a PRA (Drinkwater 1994). Or, as put by Gupta (quoted by Jiggins 1994):

> *... the methodologies cannot be expected to instil participatory values in the hands of individuals unable or unwilling to go through the necessary reversals...*

Appendix I provides a short description of the PRA tools. In Table 4 an overview is given of use of PRA methods for Farmer Participatory Research indicating possible applications of PRA methods in the context of IMR with and by water users. In addition, selected examples are given here as graphic presentations which portray some of the applications in the irrigation and nonirrigation fields. These examples are: participatory mapping, impact diagram, activity calendar, benefit analysis flow chart, and a monitoring tool.

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[8]Chambers (1994b) refers to four clusters of reversal: i) from outsiders' to insiders' perspectives (reversals of **frames**); ii) from individual to group, from verbal to visual, from measuring to comparing (reversals of **modes**); iii) from reserve to rapport, from frustration to fun (reversals of **relations**); and iv) from extracting information to convening, facilitating and initiating a process of empowering (reversals of **power**).

Table 3. PRA and its methods.

Group and Team Dynamics Methods	*Sampling Methods*	*Interviewing and Dialogue*	*Visualization and Diagramming Methods*
■ Team contracts ■ Team reviews and discussions ■ Interview guides and checklists ■ Rapid report writing ■ Energizers (motivators) ■ Work sharing (taking part in local activities) ■ Villagers and shared presentations ■ Process notes and personal diaries	■ Transect walks ■ Wealth ranking and well-being ranking ■ Social maps ■ Interview maps	■ Semi-structured interviewing ■ Direct observation ■ Focus groups ■ Key informants ■ Ethnohistories and biographies ■ Oral histories ■ Local histories, portraits and case studies ■ Transects and group walks ■ Traditional practices and beliefs	■ Participatory mapping and modeling ■ Social maps and wealth ranking ■ Aerial photograph analyses ■ Mobility maps ■ Seasonal calendars ■ Daily routines and activity profiles ■ Historical profiles ■ Trend analysis and time lines ■ Matrix scoring ■ Preference or pair-wise ranking ■ Venn Diagrams ■ Network diagrams ■ System diagrams ■ Flow diagrams ■ Pie Diagrams

Sources: Pretty 1994; Thompson and Pretty 1995.

Table 4. Applications of PRA methods for farmer participatory research.

Methods	Applications
Social maps	■ Location of changes and adoption of new technologies ■ Household listings for stratification and sampling ■ Inventory of vital social resources, local groups, etc. ■ Spread of technologies in neighboring communities
Farm sketches and resource maps: before and after	■ Inventory of vital natural resources, infrastructure, etc. ■ Changes in productivity of fields, intensity of resource use, resource degradation, etc. ■ Changes in rates of adoption, adaptation and rejection of agricultural technologies or practices
Transects	■ Field observations of natural resources, topography, land use patterns, farming practices, indigenous technologies, etc.
Mobility maps and network diagrams	■ Migration patterns ■ Labor opportunities before and after impact ■ Key individuals (e.g., suppliers of information, advice, technologies, services, etc.) and their locations
Trend analysis Time lines Crop biographies	■ Major trends and key events in the lives of local people ■ Influence of external interventions and agencies on community ■ History of introduction of major crop varieties
Seasonal calendars	■ Timing and amount of labor demand ■ Seasonal patterns of production and consumption, income and expenditure, debt and credit, employment ■ Seasonal patterns of rainfall, pests and diseases, etc.
Daily activity profiles	■ Daily work patterns and responsibilities of women and men

(Continued)

Matrix scoring	■ Systematic comparison of technologies, resources, land use, etc., according to locally generated criteria ■ Quantification of benefits according to local criteria ■ Classification and use of local land types
Systems, flow and impact diagrams	■ Impact of interventions or adoptions of new technologies ■ Changes in diversity and resilience of livelihoods ■ Flow of resources and information in and out of village and farm ■ Changes in sources of information and resources
Wealth ranking	■ Changes in welfare—who has benefited, who has not ■ Identification of potential focus groups ■ Distribution of impacts on various households
Village meetings and exhibitions	■ Sharing, analysis and triangulation of findings ■ Farmer-to-farmer exchanges ■ Role reversals (farmers present and analyze; researchers listen and learn) ■ Preparation and planning of research activities
Semi-structured interviews of key informants and focus groups	■ Description and analysis of local criteria, perceptions and priorities ■ Changes in input costs, wage labor rates, land use, etc. ■ Investment in new technologies
Venn diagrams	■ Frequency and strength of interactions between the various farmers' groups and other grass-roots organizations, and between local and external organizations ■ Perceived importance of external support organizations to local people
Pie diagrams	■ Resource and land use patterns and changes
Team contracts, reviews and discussions	■ Multidisciplinary teamwork and effective group dynamics

Source: Thompson and Pretty 1995.

These tools can readily be applied in the context of IMR, as will be observed from the case studies presented in the next chapter. Through a continued process of using these methods in irrigation, some of these tools will be fine-tuned for the distinct characteristics of irrigation. Wealth ranking, for example, would become water ranking, where water users of a particular

water course command area rank their water supply and determine who has benefited from certain management improvements. Maps would be topical, depicting the location of tubewells and environmentally degraded parts of the command area and provide a sample of water users. Seasonal calendars provide the patterns of water supply throughout the year, and pie diagram chart shares of groundwater versus canal water. Venn diagrams will produce insight into the relative importance of the various actors involved in irrigation for a given group of water users. The challenge is to provide an inventory of PRA applications for IMR in the near future.

Participatory Mapping

In the participatory process villagers use the floor, ground and paper to produce maps (village, resources, social, topical, impact and monitoring, etc.) or models (Chambers 1994a). People use local materials (such as sticks, stones, leaves) and outside materials. Mapping however is not a one-off process (Shah, quoted by Mascarenhas et al. 1991) but it leads to further discussion, a transect walk or planning. An example of a village/watershed resource map is shown in Figure 2 (p.20) (Mascarenhas and Prem Kumar 1991), which may form an important tool in the planning of watershed management. In combination with transects and other PRA tools it generates a good understanding of problems and opportunities, and may thus lead to better and more detailed planning.

Participatory Diagramming

In participatory linkage diagramming local people express their ideas of how a certain intervention may impact on their lives in terms of linkages, flows, connections and causality (Chambers 1994a). The example presented in Figure 3 (p.21) illustrates an analysis by a group of men on how they perceive the potential impacts of an irrigation system on their lives (Guijt and Thompson 1994). The same exercise for women (not reproduced here) led to important insights into the social and economic issues that could arise from this introduction not taking into account existing internal problems.

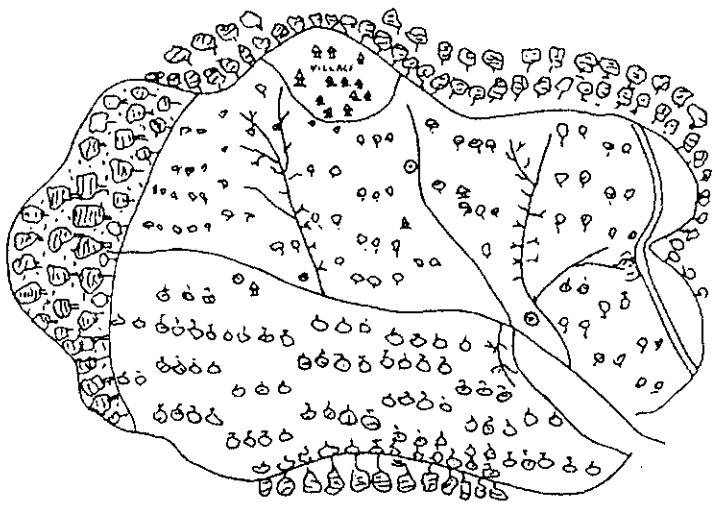
Seasonal Calendar

This tool will explore seasonal constraints and opportunities by diagramming changes month by month throughout the year. It may represent patterns of rainfall, crops, food consumption, illnesses, debts, etc. (Mascarenhas et al. 1991). The example given in Figure 4 (p.22) is a gender-disaggregated activity calendar (Feldstein and Poats 1994), and reveals the periods of labor demand for men and women, which in turn determines the availability of labor for projects and programs.

Benefit Analysis Flow Chart

This technique as shown in Figure 5 (p.23) will describe who in a household or community uses a product, how it is used, and who controls the money if sold. This is repeated for the various livelihood activities (Thomas-Slayter et al. 1993).

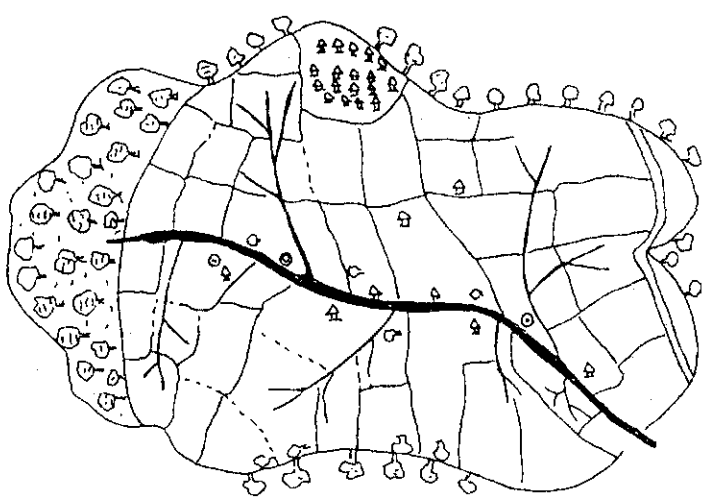
Figure 2. Two watershed models, 50 years ago and today.



50 years ago

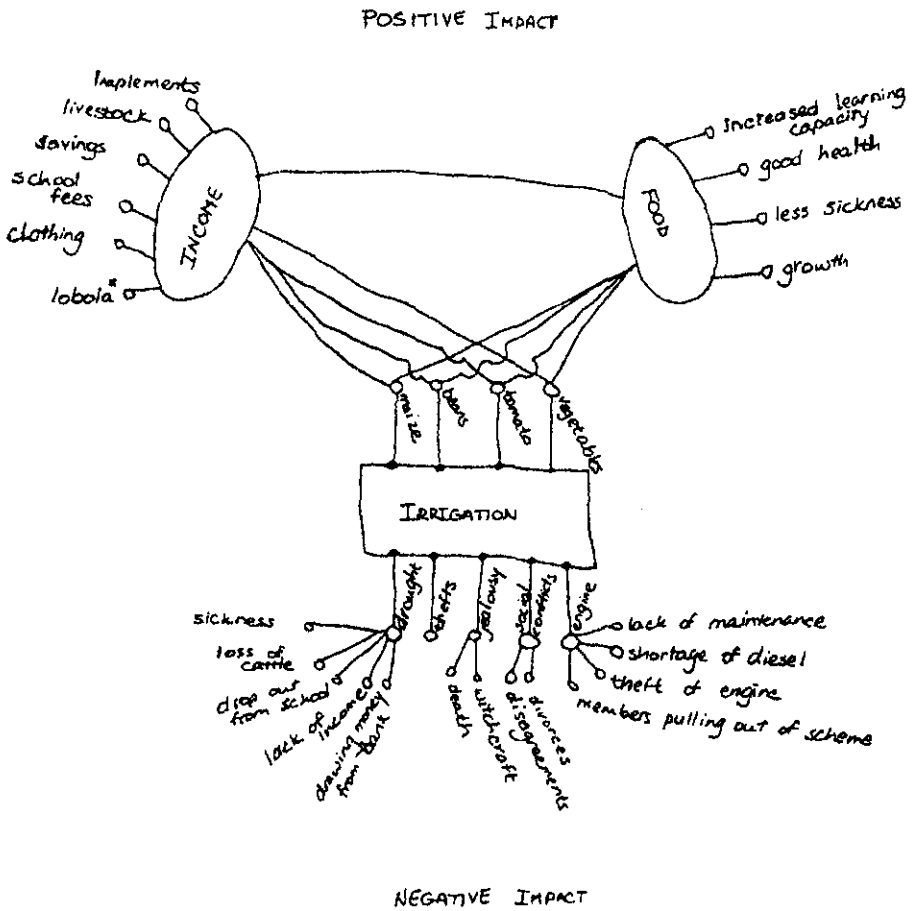
Housing
Nullah
Road
Well
Spring

Today



Source: Mascarenhas and Prem Kumar 1991.

Figure 3. Expected impacts of irrigation as perceived by young men in Zimbabwe.



Source: Guijt and Thompson 1994.

Monitoring Form

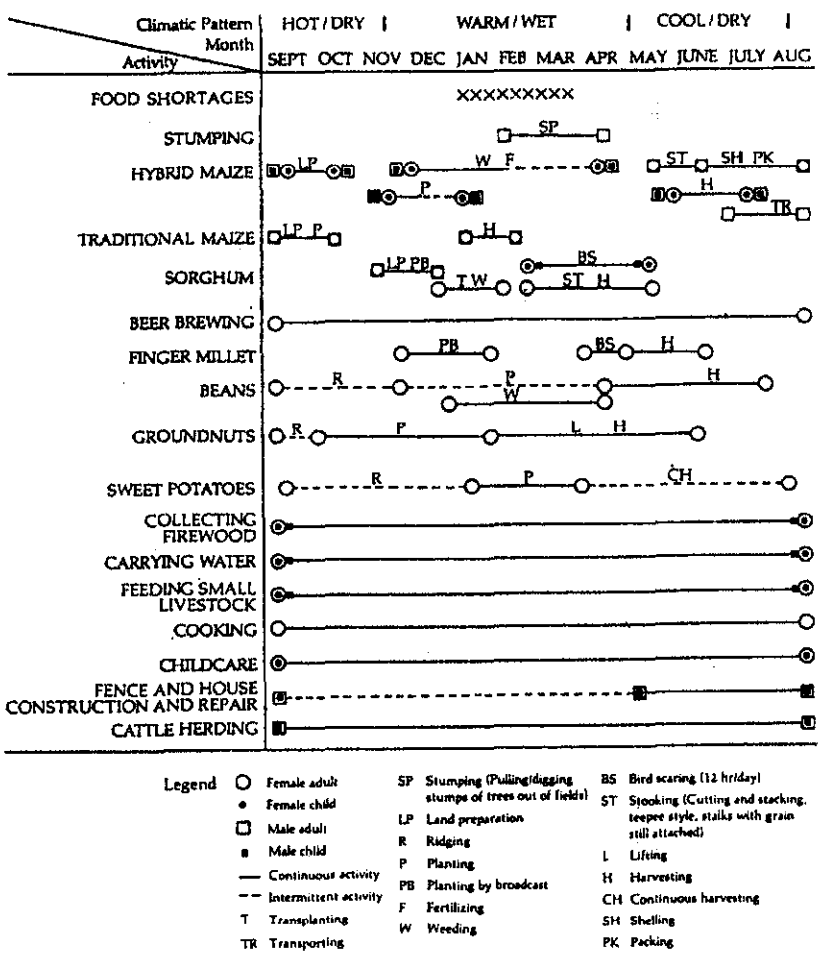
To assess the impact of a project participatory monitoring and evaluation can be implemented by using monitoring forms accessible for local people. The example in Figure 6 (p.24) monitors the time the water is being supplied, the flow of the water (fast, medium, slow, if at all), the standpipe platform (clean, not clean) and whether meetings are organized as a feedback to discuss felt problems (Bolt 1994).

CRITIQUES OF PRA

PRA has spread rapidly and the merits of PRA have been documented extensively. An immense domain of knowledge of applications of PRA tools and techniques is readily available for potential practitioners and researchers (e.g., PLA Notes 1988-1995. Even the dangers of

the swift adoption and expansion of PRA have been given appropriate attention[9] (Chambers 1994c). However, literature on constraints to the use of PRA in, for instance, practical, cultural, institutional or conceptual terminology, is scarce; and well-documented evaluation of PRA methodologies (including comprehensive comparisons with other more traditional approaches) is most of the time neglected and still too rare.[10] In many cases, the evaluation of PRA approaches is limited to the participatory issues (the assumption made is that what is participatory is good by principle), and does not include any analysis of impacts and their sustainability.

Figure 4. Gender-disaggregated activity calendar, Zambia.



Source: Feldstein and Poats 1994.

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[9]Chambers (1994c) perceives four dangers which together threaten the quality of PRA: i) instant fashion; ii) rushing; iii) formalism; and iv) routinization and ruts.

[10]For a recent review and evaluation of PRA practices, see IIED (1995).

The critiques of PRA expressed so far are difficult to categorize at this stage, but one of these involves the consideration whether PRA is able to generate qualitative data only (Buchanan-Smith 1993). The roots of this criticism lie in the fact that policymakers and decision makers have a normal inclination towards "hard" data which are relatively more easy to interpret. The majority of the irrigation researchers and system managers will presumably display the same tendency. There are several domains where PRA did produce numerical data commensurable to questionnaire surveys (Gill 1993; Chambers 1994b). These areas are: farm and household surveys, wealth and well-being ranking; and village censuses and rainfall data. In all of these examples PRA produced validated and cross-checked figures, which revealed more detail and precision than a questionnaire could have presented.

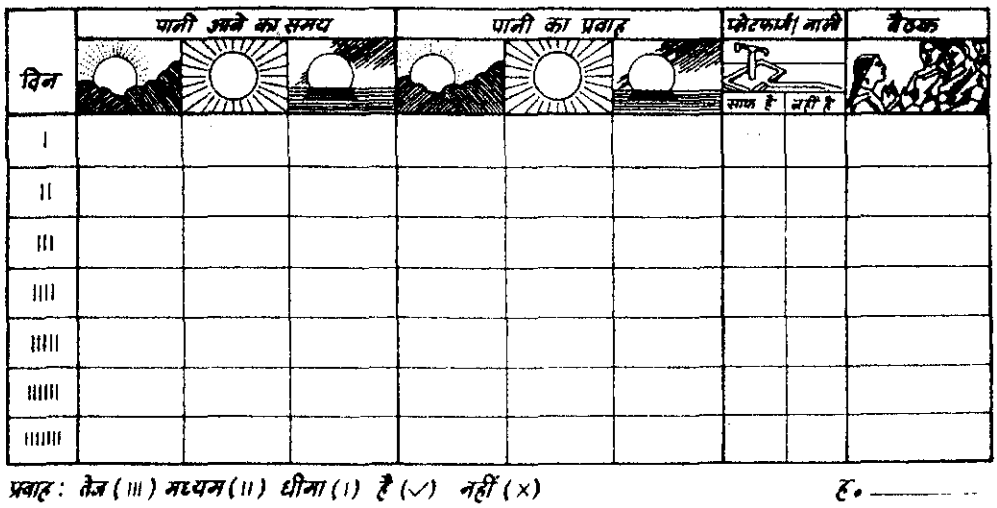
Figure 5. Benefit analysis flow chart (the Philippines).

BANANA PALM

BY-PRODUCTS	HOW USED	WHO DECIDES ON USE	WHO DOES IT	IF SOLD HOW CASH IS USED	WHO DECIDES ON CASH USE
LEAVES	• umbrella to protect from sun and rain	anybody	anybody		
	• as dish or platter				
	• as wrappers for foods	♀	♀		
FRUIT	• sold at local markets & stores	♀	♀ /Children	• to buy household food needs and other basic necessities	♀
	• give to friends/family if asked (social exchange)	♀ ♂	♀ ♂		
	• home consumption: eat boiled, fried or raw	♀	♀		
	• Processed & sold at local social events	♀	♀ /Children		
FLOWER	• home consumption: eat as vegetable or salad	♀	♀		
	• give to friends/family if asked (social exchange)	♀ ♂	♀ ♂		
TRUNK			♂	cutdown	
	• shaved into pig feed	♀	♀	process	
SPROUTS	• transplanted onto household plots	♀ ♂	♀ ♂		
	• given to friends/family if asked (social exchange)	♀ ♂	♀ ♂		

Source: Thomas-Slayter et al. 1993.

Figure 6. Monitoring water-collecting patterns and women's participation in a project in India.



Source: Bolt 1994.

During interactions with participants the cultural appropriateness (or neutrality) of PRA is a matter of importance. How commensurate are our perspectives with those of local people? Jones and Townson (1993) discuss what they call the "sophistication" of Sri Lankan villagers which might embarrass illiterate people who were encouraged to use symbols instead of words which precisely had the effect of emphasizing their illiteracy. Thus, they state that *it cannot be assumed that the people being interviewed are equally comfortable with every technique.* Further, the suitability of wealth ranking is challenged:

> *... The reason for the caution with using wealth ranking is that wealth differences and peoples' perceptions of such differences can be very subtle and rarely (and with difficulty) verbalized. To bring up such perceptions, especially at a group meeting, may disrupt the social structure of a village creating problems of jealousy, resentment and animosity that last much longer than the RRA visit we would be undertaking'*[11] (Jones and Townson 1993).

[11]Empirical evidence of PRAs in Sri Lanka (including one of the authors' personal experiences) however does not support this observation (Thompson and Nott 1992).

However, Fussel (1990) provides the opposite conclusion when he states that the PRA *seems to be well suited for maximizing possibilities and placing intervention activities in step with the community value system.* And in addition *...that the PRA methodology can be especially effective in addressing the goals of cross-cultural understanding....*

Another criticism of PRA refers to the specific concentration on tools, techniques and attitudes to data collection at local level while neglecting the analyses of how this information is used at higher levels (Buchanan-Smith 1993). For PRA to have an impact at a wider scale will to a large extent depend on the acceptance and adoption of the methodology and its outputs by policymakers.

That PRA creates high expectations is often expressed by practitioners of this methodology (Edwards 1995). The expectation is typically aid, especially when a foreigner is part of the PRA team. How can PRA for **research** be participatory in the true sense (perhaps only if it leads to a certain type of Participatory Action Research)? *We are farmers. What use are these games to us?* (Jones and Townson 1993).[12]

Mosse (1993) argues that the information PRA generates is strongly influenced by the fact that PRAs involve public social happenings which develop local knowledge which in turn reflects existing social relationships (power, gender). Information would, to a great extent, be determined by what the team thinks is important and relevant (if accessible at all for outsiders).[13] Thus, the issue is addressed as to who participates in and who decides and benefits from the participatory process (see also Thrupp et al. 1994).

Bell (1994) takes Mosse's article as the basis for understanding the "tyranny of methodology" and claims that the application of PRA is *far from being uncontentious*, and continues that *it seems evident that RRA and PRA are only as untyrannical, educative and locally sympathetic as the context and the scientist are prepared to be or, perhaps more meaningfully, are able to be given the limitations of their own culturally based view of their own methods.*

A final reservation towards PRA which could be mentioned is the reluctance of protagonists to come up with standard guidelines and recommendations for using PRA in a given context. As has been argued earlier, the strength of a PRA lies in its flexibility and spontaneity. This does not mean that PRA as a methodology does not attempt to accomplish a certain level of rigor. It does this by combining three methods: i) through active intervention; ii) through management and observation of process; and iii) through the exercise of critical judgement (Chambers 1994b). A framework for judging trustworthiness has been developed and distinguishes elements of the participatory process which enhance trustworthiness (Pretty 1994).

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[12]For example, this problem has been encountered in two of the case studies (Nepal and Pakistan) presented in the following section of this paper.

[13]This issue is stressed by the Nepal case study presented in the following section. In this case, the composition of the PRA team (the inclusion of women team members for example) is recognized as an important factor explaining the directions taken by the appraisal.

Examples of the Use of PRA for IMR

LITERATURE REVIEW ON PRA FOR IMR

THE CONCEPT OF greater farmer participation in irrigation management has followed the general evolution of thoughts on greater stakeholder participation in development projects. The specific motives to promote greater farmer participation in irrigation management stem from several objectives, with the desire to reduce the operation and maintenance costs for irrigation agencies and improved maintenance of irrigation systems being examples of these. Participation could mean something like a process by which water users influence irrigation management decisions that have an impact on the performance of their irrigation system.

Whatever the reasons to foster larger farmer participation in irrigation management may be and, similarly, to the changes that have occurred in other fields and development activities, new methodologies in IMR have emerged from this development. These methodologies attempt to avoid the biases of conventional assessment procedures (Chambers 1988) as it is realized that incorporation of water users' views is essential as they will benefit from the findings of high quality research (Healy 1994). Participation of water users in IMR would mean that water users are accepted as stakeholders in setting the research agenda, designing research procedures and judging the relevance of research findings. In addition, water users would be recognized partners in assessing performance of a technology or management strategy and partners in training and institutional development (Vermillion 1994). And one could also imagine farmers taking responsibility for part of the data collection and directly participating in the implementation of research activities. Therefore, PRA would qualify as an instrument which could guide irrigation management researchers to explore water users' problems and needs, where farmers are joint partners in identifying research priorities and analyze research outcomes.

In the 1980s, rapid appraisal methods have also been widely applied in the field of irrigation management and related research. In a bibliographical review of RRA and its application to irrigation, Potten (1985) discusses irrigation RRA principles and techniques, in which good organization, to escape spatial and project bias, to escape person bias, to take time and keep a low profile, and to appreciate local knowledge and season bias are of particular importance. Guidelines emerged to assist irrigation system managers and researchers to apply these principles in their day-to-day practices (Yoder and Martin 1985; Chambers and Carruthers 1985; Pradhan et al. 1987; Groenfeld 1989).

A more recent review of the use of participatory methodologies in irrigation reflects the absence of documentation specifically dedicated to PRA (Healy 1994). Rapid and participatory research methodologies have been applied for various purposes and contexts. However, PRA and irrigation information seem to be unpublished and meant for internal use of research institutes, development agencies and NGOs only. Most of the time, PRA is mentioned in more general documents focusing on the topic (irrigation management) rather than describing and evaluating the approach, thus making difficult a comprehensive and detailed literature review on PRA and IMR.

The review undertaken for the present paper was restricted to two sectors of PRA applications which were identified by Chambers (1994a, and see the previous chapter), namely natural resources management and irrigated agriculture. The types of processes in which applications of PRA were found were mostly participatory appraisal and planning and participatory implementation, monitoring and evaluation of programs.

Participatory Appraisal in Irrigation Systems. A large number of RRAs have been implemented by irrigation system managers and irrigation management researchers all over the world. This category of RRAs attempts in a "quick-and-dirty" manner to determine major problems in a system and opportunities to improve the system performance. The approach is not necessarily interactive and participatory nor is it always followed by planning and action in collaboration with the water users (Chambers and Carruthers 1986). As an example, an irrigation resource inventory as the basis for planning sustainable development strategies in Nepal (IIMI 1994a) will be described and discussed.

Participatory Implementation of Watershed Management and Soil and Water Conservation Programs. Although watershed management is broader than irrigation management, there are close links between the two. Watershed management as a coordinated approach to soil and water conservation is a common practice and by its very nature offers a high potential for stakeholder participation. In a selected catchment in Kenya, evidence suggests that the use of participatory approaches and community mobilization may lead to a high rate of adoption of soil and water conservation measures (Pretty et al. 1993). Using participatory and informal approaches to elicit farmers' perceptions to and practices of soil and water resources, farmers' practices can be contrasted with recommended practices evolved by scientists through formal research (Sanghi et al. 1994), with significant differences in practices of soil conservation, water harvesting and moisture conservation. IIMI's experience in watershed management and participatory approaches in Sri Lanka is described under *Stakeholder Participation in Watershed Management in Sri Lanka* (pp. 35-37) (Wijayaratna 1995).

Participatory Implementation of the Design of Irrigation Systems. In the conventional design process, the role of water users is relatively limited. As shown by Vermillion (1990), there is a great potential for farmers to contribute to the design process if they are allowed to express their alternative sets of design criteria which take into account their local knowledge and experience. Thus, participatory approaches are adopted in (rehabilitation of) irrigation projects which attempt to incorporate the multiple perspectives of water users. In a series of meetings, water users plan the design of their shallow well irrigation scheme (PATA 1994). Povel (1990) reports on the participatory development of an irrigation scheme in Kenya, where women, landowners and agency staff work together at the various stages of design and implementation.

Participatory Monitoring and Evaluation of Programs. Participatory procedures of monitoring and evaluation of irrigation system performance or self-assessment and self-

correcting processes of water user organizations have been explored and implemented by IIMI and others and reveal evidence of success (Lauraya et al. 1993). Uphoff (1988) has developed a methodology for participatory evaluation of small group capacities and performance for water user associations in Sri Lanka. Criteria for evaluation are selected and agreed upon by participants, the irrigation system stakeholders themselves, and maps, symbols and simple records are used to assess performance. As Uphoff (1988) observes that most of the approaches to evaluation are top-down, the challenge is to design the process in a really participatory manner. Participatory gender impact assessments of irrigation interventions have been documented by van Walsum (1993ab) and Gianotten et al. (1994).

The following sections of this chapter discuss examples of studies in which participation of stakeholders has been part and parcel of the research design, and where water users are invited to be the researchers themselves.

An Example of the Use of PRA for Problem Analysis in Irrigation Systems in Kenya

Although not describing activities undertaken under IIMI's research program nor focused on IMR *per se*, the present example is summarized below as it is one of the rare applications of PRA focused on irrigation systems that has been reported in a rather comprehensive manner in the literature (Thompson 1990). The PRA methodology and its different phases are clearly described, including very practical details regarding the implementation and field-testing activities. The main objective of presenting this paper is to give a practical flavor to the reader on PRA activities implemented in a very specific context.

Thompson (1990) describes the experience of researchers from the National Environment Secretariat (NES) of Kenya who applied PRA in a very specific context of water resources planning and management. PRA methods and approaches are used by the NES for local-level studies that are part of a global program on environment resources management titled *From the Ground Up*. The main objectives of this program are:

i. To identify institutional and managerial elements that contribute to effective environmental resource management at the local level;

ii. To determine the potential for community-level institutions to act as effective agents of resource management; and,

iii. To ascertain means for communities to identify long-term needs and opportunities for sustainable resource use.

The PRA approach that is used by the National Environmental Secretariat staff comprises 8 consecutive steps, from the selection of sites to the monitoring and evaluation of specific activities implemented as a result of the PRA activities. These steps are:

i. Site selection (at the request of local communities or the government department);

ii. Introductory site visits and planning sessions (involving a cross-section of the farming community as well as government officials), with a strong emphasis on the PRA approach, its implementation and its limitations;

iii. Data collection: spatial data (development of a natural resources map by farmers and members of the PRA team, transects for on-the-spot discussions of localized problems with farmers and government officials), temporal data (description of seasonal calendars for land and water use, major historical events, long-term trends in land and water use, changing role of local institutions); and socioeconomic data (for a cross-section of the community, information on water supply and distribution, system maintenance, agricultural production, organizational capacity and links with water users' associations, etc.);

iv. Data synthesis and analysis (with emphasis on triangulation and optimal ignorance, for production of a preliminary document on problems and opportunities);

v. Ranking opportunities (by community members, government officials, the PRA team) during a 1-2 day workshop;

vi. Prepare a Village Resource-Management Plan (VRMP), which is the workshop's main output and describes the activities planned to address the main problems of the community, with a clear definition of roles and responsibilities of the different stakeholders;

vii. Adoption and implementation of VRMP; and

viii. Monitoring and evaluation of VRMP activities.

The main output of the appraisal phase is the VRMP. This action plan identifies problems related not only to irrigation management, but also to agricultural production and marketing, health, income generation, etc., based on the relative importance of these problems for the situation and the community targeted. It clearly identifies appropriate and practical options for solving these problems, and defines roles and responsibilities in the implementation of the action plan that would improve the functioning of the irrigation systems.

In his paper, Thompson (1990) describes activities that have focused on two small-scale, farmers-managed gravity irrigation schemes of Kenya. Six weeks have been spent by a multidisciplinary team of six persons from the NES, i.e., three physical scientists and three social scientists comprising three from each gender. The main driving force of the team's approach was an active participation of local people in the appraisal of their problems and analysis of information collected. Although belonging to a governmental department, the PRA

team was seen more as a facilitator of dialogue between local people and government agencies, and even among local people themselves, than as an agent of the government.

Although the final evaluation of the approach is not reported in the paper, Thompson already provides a list of the benefits obtained because of the use of PRA. These include:

i. A very close involvement of local people in the appraisal and analysis of problems related to irrigation management;

ii. Mobilization and participation of local community members for the implementation stage (implementation of VRMP);

iii. The development of a holistic and ground-based approach not biased by any sectoral way of looking at the irrigation systems;

iv. The production of high quality information at low cost and after a short period of time;

v. A clear assessment of the capacity of local institutions in planning and implementation of specific activities, and an understanding of linkages between the different actors involved in the management of irrigation systems; and

vi. The development of a simple monitoring and evaluation method that does not require external assistance and/or large investments in terms of financial and human resources.

It is important to note that only the last three items are tangible benefits obtained through the use of the PRA methodology. It is more difficult to asses whether items i, ii and iii above are benefits[14] in themselves or characteristics of a process expected to lead to sustained interventions.

IIMI's EXPERIENCE IN THE USE OF PRA FOR IMR

Farmer-Managed Irrigation Systems in Nepal[15]

The irrigation resource inventory is the basis not only for proper planning for sustainable development strategies, but also for well-designed research on irrigation management. For

[14]Whether "local people participation" is a benefit in itself has been and still is a matter of debate at IIMI. The involvement of local people can be seen as a goal in itself, or as a means to reach desired outcomes and address the sustainability issue of these outcomes.

[15]The information used is drawn from IIMI (1994a) and Pradhan (1994).

example, it is important to collect basic characteristics of irrigation systems for financial resources allocation at the local level for new construction or rehabilitation. In addition, the selection of representative irrigation systems for micro-level and in-depth studies requires basic information on the characteristics of large numbers of irrigation systems. Inventories usually focus on socioeconomic and physical resource base information. In some cases, especially when the systems considered are rather small and managed by individuals or groups of farmers (i.e., Farmer-Managed Irrigation Systems or FMIS), information may also be required on the institutional dimension of the system.

In Nepal (and probably in most of the countries with irrigation), the main problem with FMIS is their number and their spatial dispersion. To collect information on each FMIS would be a rather cumbersome task and may prove very expensive. Thus, there is a need to develop a very specific approach to provide the information required for planning and research purposes.

Along with other institutes that simultaneously started to be involved in the inventory of irrigation systems in Nepal (IIMI 1994a), IIMI started to develop an approach that intended to address financial and implementation issues related to the inventory of the large number of FMIS. This approach was implemented with the objective of collecting the necessary information to enable decision making for assisting FMIS. One of the main thrusts of the approach is the use Rapid Rural Appraisal (RRA) and PRA, linked with a Geographic Information System (GIS) for spatial analysis of the information collected. However, the link between RRA/PRA and GIS has not been tested yet and the testing of the approach detailed below did not go up to linking GIS and RRA/PRA.

The preliminary step of the approach is the development of a checklist of topics, including water and land resources, water allocation, physical system and infrastructure, management structure, agricultural system, etc. The main objective of the checklist is to provide an initial (but comprehensive) evaluation of all the FMIS of a river basin. Based on this information, a subsample of systems is selected for RRA/PRA, based on water resources, land resources and institutional capability potential. The FMIS selected for the RRA/PRA approach are the ones with the highest potential for productivity improvement.

It is not only the tools but the participatory approach, and the rather comprehensive examination of irrigation systems that are seen as important, and have been discussed and tested. Innovations also include aspects related to the functioning and the composition of the team that implements the RRA/PRA activities. Two of the team-related innovations stressed in IIMI (1994a) are the inclusion of (i) female members, to improve and refine the assessment of gender-related issues in irrigation activities and management; and (ii) a rural-based NGO farmer as a member of the inventory team (in the case of IIMI's field-testing of the approach, this farmer had already been involved in the initial evaluation phase of all the systems of the given river basin), to improve the quality of the information collected, to better emphasis the analysis of the irrigation systems from a farmer's perspective (farmers discussing with farmers), and to enhance the credibility of the team efforts.

The main participatory activities to be carried out, and involving different types of farmers of the system (head and tail farmers, rich and poor farmers, etc.) are: transects, walk-through with farmers, semi-structured interviews and development of maps. A clear objective for the RRA/PRA team is to narrow the gap among researchers, academics and farmers leading to

effective learning, experience-sharing, congenial atmosphere, and a mutual respect for each other (IIMI 1994a).

The information collected is then reported to farmers and provided to them, mainly to cross-check the information collected with a larger group of farmers from the selected FMIS. As a matter of fact, the information gathered and analyzed is perceived as useful (or effective) only if the users of the irrigation systems have access to the information generated by the inventory and they can use it for their own decisions and development strategies. The final step in the inventory methodology is the development of a database for planning purposes, including all the information collected through the RRA/PRA in the sample FMIS, and with a potential link with a GIS for spatial analysis.

As stated above, this approach has its origin in several approaches developed simultaneously in Nepal by research institutes and development agencies for the inventory of FMIS. The approach has been tested by IIMI in two projects in Nepal as described below.

In the first case, an initial survey of 160 systems of the district of Tanahu has led to the selection of 35 systems for PRA, based on the potential area for irrigation, the adequacy of the water supply during the winter and spring seasons, the potential for crop diversification, the importance of environmental problems, etc. The team comprised faculty members with a background in agricultural engineering, agronomy and sociology, along with male and female students and a rural-based NGO farmer as explained above. The information obtained through PRA has been used for ranking the different systems in accordance with priority for external assistance.

In the second case, an engineer, an agronomist, a sociologist, an environmentalist (only present during the reconnaissance survey) and a rural-based NGO farmer formed the inventory team. No female was included in this team that subsequently did not collect information on gender issues. Totally, 239 systems were surveyed in the Lamjung District during the initial phase of the approach, and 30 were selected (based on criteria similar to those detailed for the first case) for the RRA/PRA phase. Similarly, 162 systems were initially visited in the Dang District, out of which 24 were found suitable for the RRA/PRA phase of the inventory. A scoring system helped to identify systems with high priorities for external assistance.

The evaluation of the approach (IIMI 1994a) shows that improvements in the collection of information could still be made by further focusing on emerging issues of irrigation management such as gender, water rights and environment. At the same time, the improvement in the approach and techniques used are to be developed in the context of the adaptation of the approach to the capabilities of institutions and professionals of Nepal. IIMI (1994a) fully recognizes the specific requirements in terms of capabilities and skills for several individuals at the same time (to form a well-functioning RRA/PRA team), which are not necessarily readily available in institutions and research institutes involved in FMIS issues.

Although IIMI (1994a) describes the approach and its different steps, it is rather difficult to clearly assess the level of participation that took place during the different activities performed by the RRA/PRA team. Moreover, these activities have mainly involved *key informants among the water users, functionaries of the Water Users Associations and local leaders* (IIMI 1994a), and were led by the researchers who had initiated the process as summarized below.

One of the team members led the discussion, focused on the checklist and moderated/facilitated the respondents if they happened to deviate from the main topic, and other members recorded the information (IIMI 1994a).

The experience, however, clearly stresses the need to deal with the expectations of farmers in a better way. The problem of farmers' expectations is seen as one of the major drawbacks of this participatory methodology. As summarized by Pradhan (1994),

... The (final) presentation disappointed some participants, since the FMISs in their Village Development Committees were not on the priority list... Interviewing and discussing irrigation related issues with farmers in these FMISs inevitably raised the expectations of farmers. No matter how much explanation was provided regarding the purpose of the inventory, farmers tended to expect assistance in terms of a project for their village....

The other stakeholders involved in the exercise such as local government officials were satisfied with the exercise and its output, as the results (especially the ranking of project according to some priorities) were of direct use to them for implementing an ongoing project on assistance to FMIS.

The comparison between the results obtained by the two teams (Pradhan 1994) highlights differences in the emphasis of the analysis and identification of priorities, related to the background of the different team members. Thus, although the two teams used RRA/PRA, the team members influenced the process and did not succeed in playing only the role of facilitators in the PRA process.

Pradhan (1994) also concludes about the need for complementing this method with other methods (field observations, intensive PRA, case studies) for a fuller understanding of the dynamics of these systems and triangulation of the information obtained. However, as already tested and developed now, the incorporation of this methodology at the planning stage of any FMIS sector development program would improve the efficiency of this program. Efforts are to be made to assess what the proper role of irrigators in the approach is, and how to make them co-partners in the research process in order to readjust their expectations.

A final comment relates to the context under which this approach has been developed. The fact that the information collected leads to a national development program and the identification of priorities means that some systems (the ones not selected for the intensive RRA/PRA phase) are not provided with action plans and action programs for follow-up. Moreover, the approach seems to have a bias towards improvement with external assistance. A higher focus on possibilities of development by farmers themselves would lead to development of action plans for all/most of the systems visited.

Stakeholder Participation in Watershed Management in Sri Lanka[16]

In 1993, IIMI initiated a 3-year project titled Shared Control of Natural Resources (SCOR), to be implemented in close collaboration with the Government of Sri Lanka, local organizations and user groups and nongovernmental organizations. Participatory action-research is the key component of this project focused on the development and testing of a holistic approach to integrate environmental concerns with production objectives at the watershed level. The specific SCOR project objectives are (Wijayaratna 1995):

a. To improve the incentive and institutional context in which land- and water-related activities are undertaken in pilot watersheds through appropriate modes of production and state-user partnership to ensure both the productivity and the sustainability of these resources;

b. To get resources user groups and managers to consider environmental implications of land and water use more explicitly and to internalize environmental considerations in decision making and implementation at all levels;

c. To enhance information and the understanding (of the government, groups and individuals) about potentials of and prospects for the natural resources (land and water) base for production and protection; and

d. To strengthen the capacity of the provincial/divisional government authorities in planning for land and water resources utilization in an integrated manner, gradually transforming the strategy of development of land and water resources from a "project" mode to a "program" mode.

The SCOR Project is the first watershed management project undertaken by IIMI. It draws from past experience in IMR in Sri Lanka in terms of approaches, research methodologies, etc. The project concentrates its efforts in two pilot watersheds, one in the wet zone and the other in the dry zone of the country.

The participatory approach of the SCOR Project includes several methodologies for increased participation by the different stakeholders in situation analysis, development of action plans and also (shared) management of the natural resources. PRA is one of the participatory methodologies used by the SCOR Project staff for the analysis of the situation and diagnosis of problems related to natural resources management.

PRA is carried out in sample sub-watersheds. The main objective is to assess the present natural resources use pattern (supply and demand characteristics of land and water), the status of resource degradation and the potential for development and improved management of the resources. Based on this (or assessment), an integrated plan for the improvement of natural

[16]Information reported here is drawn from Wijayaratna (1995).

resources management is developed. This plan is then implemented with each actor having a clear definition in terms of commitment, activities, roles, etc.

The PRA activities involve not only farmers, as mostly reported in the literature, but also relevant local officials and IIMI staff as catalysts. The main objective of this PRA is to prepare a detailed map of the sub-watershed with information on landholding, land and water use, main characteristics of the physical environment, information on production and productivity, and major constraints of production and conservation activities, in order to establish the baseline resource use pattern and sensitize all the stakeholders of the importance and need of such an exercise, and obtain their commitment for further actions and programs for a balanced development of the sub-watershed.

The major participatory exercise undertaken is the development of a map of the sub-watershed indicating individual landholdings, cropping pattern, type and quality of vegetation, water supply and water use, main types of irrigation methods, etc. However, the participation does not involve the drawing of the map itself as this is done by a draftsman supporting the group. The exercise is done twice, once for the current situation, and the second time (using the current situation map as a support) to identify the future development of the sub-watershed with clear environmental and production objectives. The information put together by the different participants in the participatory activities is eventually entered into a Geographic Information System (GIS) for further use by the different stakeholders.

The analysis of the current situation and the future planned land use leads to the identification of an action plan, including activities such as the introduction and adaptation of new conservation practices (increasing soil moisture retention using mulch, establishment of contour bunds and drains, reforestation of high slopes zones, agro-forestry practices, etc.) and/or the development of new commercial enterprises (cultivation and processing of medicinal plants for example), and novel modes of partnership between the different government agencies, NGOs and the end users in the management of natural resources.

End users, government participants and other project participants are also involved in the monitoring and evaluation of the project activities. Groups of users monitor their own activities (status of activities, production and protection practices implemented, farm budget) through self-monitoring and assessment. Again, a participatory resource use survey and mapping provide most of the information required for a proper monitoring.

A few issues can be discussed based on the presentation of this experience in Sri Lanka. First (and similar to the Nepal case study), it is not only farmers and resource users, but also other actors such as government officials, who have been involved in the PRA activities. Improving communication between different actors and increasing their joint understanding of specific local conditions are seen as the major benefits obtained from this mixed participation.

Second, only a few of the PRA tools have been used (mainly resource mapping). This limited use of PRA tools may be related to a formalized inclusion of PRA in a more general watershed management approach. As the tools become objectives in themselves (in this case, maps to be developed for further analysis with GIS), the flexibility of the approach and its "PRAness" in terms of match with the basic PRA principles are reduced. This was further emphasized by the fact that farmers seem to be more a source of information for the preparation of maps (prepared with the assistance of a draftsman and entered into the GIS) than leaders in the PRA exercises.

Third, this example stresses the importance of linking PRA to other data collection methods and analytical approaches. To link PRA with other participatory approaches (such a Participatory Action Research) and recent data analysis techniques (GIS in this case) may strengthen the effectiveness of PRA itself (if this mix of methods does not threaten the basics of PRA as discussed in the previous paragraph).

Performance Indicators from Water Users' Perspectives in Pakistan[17]

Although it is acknowledged that most of the irrigation systems perform poorly, little has been done to assess irrigation system performance in a comprehensive and systematic way. The importance of performance assessment was recognized by IIMI at the early stages of the Institute's development, and a separate program solely focused on performance was initiated in 1992.

The main objectives of the Performance Assessment Program (IIMI 1994a) as stated in 1994 are to:

1. Assist irrigation managers and policymakers to incorporate a performance assessment system as an integral part of the management process;

2. Develop and disseminate methodologies to enable policymakers and irrigation managers to select appropriate indicators set for use both in the systematic evaluation of the performance of irrigated agriculture and in the planning of changes in those systems to meet future agricultural requirements;

3. Establish a database which can be used for comparative information on the performance of irrigated agriculture in varying agro-climatic and management situations; and,

4. Identify management practices associated with high performance and assist agencies in their adoption.

IIMI's performance program has identified three groups with interest in irrigation system performance: policymakers, irrigation managers and farmers. The different documents describing the program objectives and planned activities recognize that the objectives, and consequently performance indicators used by and of interest to the three groups are not necessarily similar. However, nothing has been planned to identify differences and similarities between objectives and indicators of each group. For farmers, for example, only two indicators, i.e., **predictability** and **profitability** of the irrigation service, have been identified: predictability expressed by the ratio of the actual duration of the water delivery to the planned duration of

[17]For more information on this research, see Hoeberichts (1995).

water delivery; and profitability as the net values of additional output per unit of land, unit of water or unit of labor.

However, the complexity of irrigated agriculture and the difficulty to clearly identify the links between irrigation and water users' decision-making process made the choice of these two indicators appear rather simplistic. Moreover, the need to carry out activities to analyze and understand the different objectives and performance indicators used by each actor (or set of actors) was felt, as this is required not only for the analysis of performance from a given user's perspective, but also for an effective communication and dialogue with users on irrigation system performance.

To address part of this issue, a preliminary study was started in December 1994 (IIMI 1994c), focused on water users' perceptions of the performance of their irrigation water supply. The main objective of the study was to analyze irrigation supply from water users' perspectives, to identify performance indicators as defined by water users, to understand how these indicators were used in monitoring and evaluating of water supply performance, and what the impact of different levels of performance on water users' decisions were, in order to identify differences between performance assessment as carried out by IIMI and performance assessment effectively undertaken by water users. Although it was not clear whether the study results would lead to modification of the performance indicators currently used in the context of the Performance Program, a change in the identification of potential improvements (for **whom**) was expected. Moreover, the research would be a first step in developing a proper communication and dissemination of results related to performance analysis to water users.

PRA was selected as the methodology for identifying performance indicators from water users' perspectives. The research site selected for this activity is the Chishtian Subdivision of the Fordwah/Eastern Sadiqia Irrigation System (South Punjab) where IIMI-Pakistan has focused most of its research efforts since 1994. Some of the PRA activities were undertaken by a group of three persons, while others involved up to eight persons with different backgrounds. In total, 4 weeks were spent in the field to achieve the following:

1. Identification of performance indicators: mix of interactions with individual water users and water user groups from several tertiary canal command areas, using different PRA tools and techniques, to identify irrigation-related problems, performance indicators used by water users, and actions undertaken as a reaction to observed performance levels;

2. Water users' perceptions of irrigation system performance: group meetings for cross-checking and consensus, with water users from one watercourse where IIMI has been working for 4 years;

3. Interactions with individuals using indicators recognized by water users during group meetings, for the evaluation of individual water supply performance (to check the practical use of the different indicators as communication tools with water users, and to compare water users' responses to monitoring data of water supply collected as part of IIMI's regular research activities);

4. Analysis of irrigation system performance from the water users' perspectives: group meetings to present analysis of performance from the water users' point of view, and compare this information with data collected by IIMI to understand reasons of differences (if any), and discuss potential changes accessible to water users and required for the improvement of the performance of the system

The main participatory tools used during field activities were the Venn Diagram (to identify the share of tubewell and canal water in total irrigation water supply), trend line (to identify periods when performance assessment is more important for water users), mapping (identification of zones with poor and good performance, factors responsible for level of performance), walk-through (to observe effects of poor performance such as salinity in fields), and chance exercise (to discuss predictability issues related to canal water supply).

The preliminary output of the study has been a clear understanding of problems related to water supply performance, and the identification of indicators used by water users for assessing irrigation water supply performance, and ultimately taking decisions (in terms of water management and agricultural practices) based on their assessment. The following have been identified:

i. Indicators used by water users such as adequacy, timeliness, tractability, hassle, quality, etc.

ii. Hierarchy among problems of water supply (timing, quantity, quality, etc.), and for different categories of water users (this has been identified by different types of water users).

iii. Solutions developed by water users to compensate for poor performance of their canal water supply.

iv. Constraints on irrigation water supply performance, and role of different stakeholders involved in the management of this water for improvement of water supply performance.

The analysis of performance from the water users' perspectives has been the first experience in PRA for IIMI-Pakistan. Thus, this activity has been a learning activity at the same time. One of the limitations of the approach has been the large number of watercourses selected for the initial phase of the research that did not allow the team to build a longer-term relationship with most of the water users interviewed. Another restriction is related to the choice of some of the sample watercourses where IIMI has already been working for 3-4 years in a more conventional way with information extraction as the main objective. In these watercourses, it was not always easy to clearly implement the participatory approach as water users did not feel IIMI could really learn something more than what it had already collected as information.

The last point relates to the use of the output of the study. As specified above, and although the study used participatory tools to put performance on the table, a potential action plan implicit in most of the PRA approaches was not a primary objective for the researchers involved in the study. At the same time, discussions with water users always led to the request for external assistance by IIMI for lining tertiary canals or increasing canal water supply at the head of the tertiary canal, activities that are not directly within the mandate of the Institute. Thus, there was a mismatch between water users' expectations and the end results for the water users, a problem also identified for the use of PRA in the irrigation system inventory in Nepal.

Summary of Experiences

The different examples of applications of PRA in IMR that have been described in the previous paragraphs are summarized in Table 5.

Table 5. PRA in practice: Practical implementation versus desired principles?.

Condition required for proper PRA	Kenya	Nepal	SCOR	Pakistan
A defined methodology and systematic learning process	Yes	Yes, but method may become rigid	Yes, but method may become rigid	Yes, but mainly by researchers
Multiple perspective	Yes	Yes, strengthened by presence of other actors	Yes	Yes, focus on water-related diversity
Group enquiry process	Yes	Yes	Yes	Yes, but individual exercises seen as necessary complementary activities
Context-specific	Yes	Yes, but possible limitation for issues not initially identified	Yes	Yes, new tools developed
Facilitating experts	Yes	Yes, but improvements identified within the limits of project activities	??	Facilitation of information-gathering attempted, but leading role of team for specific activities
Leading to sustained action	Yes (but sustainability part still to be checked); action by village community	Yes, action by line agencies and researchers, but not necessarily by communities; strong bias towards externally supported actions	Yes (but sustainability to be checked); action by local communities and agencies, but not necessarily related to the use of PRA	No, action by researchers only (modification of performance indicators and research design?)

In addition, the three IIMI case studies and the Kenyan example could be reviewed in terms of the level of participation of the water users. As described earlier, PRA is characterized by interactive participation preferably leading to self-mobilization. Table 6 provides an overview of the level of participation of each case, which makes clear that the adoption of a PRA strategy at the outset of the research activities does not necessarily lead to interactive participation or self-mobilization. Further, it should be realized that all cases are restricted by the design of the projects which narrow the boundaries and framework for potential actions. This is the reason why all cases score an "X" at the category "passive participation."

Table 6. Participation in practice: Passive or interactive?

	Kenya	Nepal	SCOR	Pakistan
Passive participation	X	X	X	X
Giving information		XXX		XX
Consultation		XXXX	XXXX	XXXX
Material incentives				
Functional participation	XX		XXX	
Interactive participation	XXXX	XX		XX
Self-mobilization[18]	XX		X	

[18]It is never clear how independent from external institutions stakeholders are in taking initiatives.

Discussion and Conclusion

SUMMARY

> *HOWEVER, IF THE PHILOSOPHY BEHIND PRA IS NOT UNDERSTOOD—OR, WORSE STILL, IF IT IS NOT REALIZED THAT THERE IS A PHILOSOPHY BEHIND IT AT ALL—THEN THE SO-CALLED PRA BECOMES JUST ANOTHER FORM OF RURAL DEVELOPMENT TOURISM, WITH ALL THE DANGERS THAT IT IMPLIES. (Gill 1992:27)*

A LITERATURE REVIEW of the use of research methodologies in IMR has revealed that, in general, only a limited number of reports document the methodologies applied in an extensive way. More specifically, there is a lack of research papers that discuss the methodologies and the use of participatory approaches and PRA in IMR. This, however, does not imply that PRA has not been used in IMR, but reflects the relative underdeveloped state of a generic discussion on research methodologies and its impact on the quality of the information and the relationship with water users at IIMI and at other research institutes involved in IMR.

A general conclusion of the review of PRA applied in IMR would be that while many studies do hold elements of participatory approaches, they are not essentially interactive or truly participatory by design. Indeed, farmers are involved for reasons of cost-effectiveness and obviously as resource persons, but many of these approaches may very well be rushed with water users having no real impact on the potential biases and misperceptions of the researchers. In fact, there is a large gap between PRA core principles as presented in Chapter 3 of the present paper and experiences of PRA documented in the context of IMR.

Although the development of research methodologies is part of the research process and should receive special attention from researchers (as it contributes to the quality of information and research results, and builds the path towards comparative studies), researchers do not seem too keen to clearly describe their research protocols and approaches, and rarely write solely on methodologies. The current criteria applied for the evaluation of researchers' performance, mostly based on research findings, international-standard published articles and "successful" completion of research projects, with little space for recognition for methodology and method development, could explain this bias and move away from methodological concerns.

The examples of PRA applications applied and discussed in the previous chapter show some of the strong points and limitations of PRA. While in general the use of PRA is strongly dependant on the skills and creativeness of the practitioners, some lessons could be drawn from the reviewed (but limited) IIMI case studies in Nepal, Pakistan and Sri Lanka. These lessons are summarized in Table 7.

Table 7. Advantages and disadvantages of PRA: Analysis of three case studies.

Case study	Advantages	Disadvantages
Inventory of FMIS (Nepal)	■ Involvement of several stakeholders ■ Multidisciplinary approach ■ Large number of systems visited in a short period of time	■ Skilled team required ■ Conflicting interests of water users and other participants ■ Loss of flexibility because routine activity
Participatory Watershed Management (Sri Lanka)	■ Involvement of several stakeholders ■ Establishment of rapport with stakeholders ■ Spatial analysis accessible to all users	■ Limited use of PRA (mainly one tool applied) leading to loss of flexibility ■ Tool (to produce map) is the main objective
Water Users' Perceptions of Performance (Pakistan)	■ Incorporation of water users' broad perspective ■ Triangulation (however could have been improved) ■ Visual tools facilitating contacts and discussions	■ Skilled team required ■ Action-plan was not an initial objective ■ Conflicting expectations of farmers. Bias as areas with already intensive IIMI research activities

Based on this evaluation of PRA, two important questions emerge for PRA, to be more easily accepted as an appropriate approach and tool by irrigation management researchers (in addition to the institutional requirements which will be addressed below). These are:

i. How does PRA (qualitative, case-study-oriented) relate to more formal quantitative approaches in IMR?

Within IMR formal and quantitative research is required and should be conducted as usual. The application of PRA will enhance our ability to deal with the complex dynamics of irrigation management and quickly changing realities. It will teach irrigation researchers, for example, that water users do experiment within the boundaries of their system; that water users have different criteria for performance assessment; and, more generally, that water users' analyses provide significant insights which are different from those of irrigation managers or researchers.

ii. Scaling up: how can water users' insights (localized and highly variable within the irrigation system) provide a broader view for the whole system and be used to improve the management of the whole irrigation system?

Here the scope for PRA lies in the possibility of linking PRA with more traditional sampling techniques. Through PRA the social/organizational aspects for sampling planning, so far relatively neglected, could be incorporated. In addition, the variability of the relative importance of certain issues could be assessed through a series of participatory visits.

The main point to be made here (and valid for the two questions) relates to complementarity between methods and approaches. The main challenge for researchers working in the field of IMR is to identify the appropriate set of methods and methodologies, for research on a specific topic (i.e., the intersection between the three questions w***ho/what/how*** of the framework presented in Chapter 2). PRA is one of these methodologies (and not the only participatory one) and is an increasingly important one.

POTENTIAL USE OF PRA IN IMR

The CGIAR (IIMI 1992a) uses a typology that characterizes research by its objectives and distinguishes between:

* *Basic research* designed to create new knowledge or understanding;

* *Strategic research* designed to solve specific research problems or develop new techniques;

* *Applied research* designed to create new technology; and

* *Adaptive research* designed to adjust technology to specific needs or a particular set of environmental conditions.

Based on the strong points of PRA as identified in the case studies, it could be argued that PRA has a major role to play in adaptive research which is context-specific. However, its applicability is not limited to adaptive research alone. PRA in strategic research will be required to identify new research issues based on interactions with water users. In this case, PRA-generated information will be required to enlighten researchers how to solve the problems (Pimbert 1991; Fujisaka 1994).

IIMI's research (be it basic, strategic, applied or adaptive) consists of four different phases: (i) identification of research issues and diagnosis; (ii) planning and design; (iii) implementation and monitoring (testing) and (iv) evaluation of impacts. PRA can be applied throughout all stages of IIMI's research, and its use is to be promoted. However, involvement of water users in the first stage seems imperative, in order to focus on relevant issues and constraints that may limit potential improvements. Similarly, a proper evaluation of changes and impacts (with direct feedback to the identification of new research issues and development of research activities) is to include a water user perspective.

Although a large range of issues can be addressed by PRA, the potential for using PRA as part of the research process appears higher for activities under Local Management, Environment, Health and Gender programs. However, it is important to stress that PRA is not applicable only for research using the farm or the household as the basic unit of analysis. The PRA activities undertaken in Pakistan, for example, indicate that the approach has a role to play for research at higher levels of the irrigation systems, including the sector and policy levels.

By referring to the simplified framework presented in the second section of this paper, PRA seems to have the highest potential for research activities related to farmers (***who***) undertaking most of the functions (from acquisition to water disposal) listed under the ***what*** question. At the same time, the link between the enabling environment and the trilogy ***who/what/how*** requires PRA approaches for a proper identification of constraints and an initial assessment of potential for improvement. Similarly, the analysis of the expected impact of changes in the irrigation management also provides opportunities for PRA.

The analysis of the three IIMI case studies highlighted the importance of water users' expectations in the implementation of PRA. Adaptive research activities would provide the highest opportunities for follow-up activities to be implemented with the water users, and would probably be able to tackle the issue of raised expectations in a proper way. For other types of research, specific attention will be given to the expectations of participants involved in a PRA exercise. The three case studies also showed the importance of involving skilled team members to ensure the quality of the PRA. To achieve this, training should be an important component of IIMI's training and staff development programs. However, it should be emphasized that one-off training workshops are necessary but not sufficient conditions for accomplishing PRA competence. A suitable institutional environment inducing participatory learning and action is required as well (Thompson 1995).

Three of the case studies (Nepal, Sri Lanka and Kenya) provide some insights in the composition of the team undertaking the PRA. The most important aspect highlighted is to include other actors (such as government agency officials and NGO members), using PRA or other methods[19] to obtain their involvement in the research process. This involvement of other actors is seen as particularly important for a proper communication among actors, and also for the implementation of the follow-up activities to PRA. For example, in the case of the identification of research issues, to involve the line agency operating the irrigation system and the extension services dealing with irrigation and farming practices would improve their understanding of the system, which might help farmers, staff from these agencies and researchers reach agreement on main issues and priorities.

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[19]Several participatory approaches have been developed to involve actors other than farmers. For example, the Department of Communication and Innovation Studies, Wageningen University, the Netherlands, has developed an approach titled Rapid Appraisal of Agricultural Knowledge Systems (RAAKS) that focuses on the role of different actors and their involvement in the exchange of information and development of knowledge. This approach has been applied in irrigation management research in Senegal and will be tested in Pakistan in the context of the IIMI research program.

IMR AND WATER USERS—PROSPECTIVE FOR ALLIANCE?

This Working Paper has also attempted to discuss the important issue of what the role of water users is in influencing IIMI's research agenda, and what their capacities are to work with IIMI as active research partners, taking on key roles and responsibilities. Through the review of case studies some light was shed on the role of PRA, based on the hypothesis that participatory research methodologies are a starting point for water users to have a voice on the research agenda of the research institute.

A major conclusion of the literature review on the use of participatory approaches in IMR revealed that for whatever reasons participation in irrigation **management** has become a normal way of thinking in the irrigation world, but that participation in IMR is still fragmented and does not constitute an element of the irrigation research paradigm. This is surprising given the fact that IMR and PRA have much in common such as being interdisciplinary, collaborative, field-based and client- and action-oriented. It is even more surprising given the increasing presence of social scientists in IMR (Merrey 1994) and IIMI's focus on applied and adaptive research where there is an obvious niche for the end users. Possible factors explaining this are proposed below:

* IIMI perceives its primary clients to be irrigation management agencies, research institutes and policymakers (IIMI 1992a) and leaves the provision of services to water users to national agencies;

* IIMI's definition of irrigation is *the totality of the means employed by people to augment and control the supply of water to the soil, for the purpose of enhancing the production of crops*, where there is more emphasis on engineering and management issues than for example on irrigation and livelihood issues;

* Lack of comparative research and evaluation of the outcomes of participatory IMR which synthesize the results in a coherent way in order to influence and inform the research program of IIMI;

* Lack of a critical mass of participatory IMR activities;

* IIMI has no accountability to the end users of irrigation systems which may make the Institute susceptible to designing a research agenda which may reflect the personal interests and preoccupations of researchers; and

* Water users are still perceived as recipients of irrigation management improvements which does not alter the traditional relationship between irrigation management researchers and water users.

Our assumption is that the quality of the research outputs and the impacts on water users whose livelihoods depend on irrigated agriculture will be enhanced if participatory research

approaches are employed and if water users are engaged actively in setting the research agenda. This requires a change of attitudes, behavior and policy within IIMI as an institute.

In terms of development of partnerships with water users in research design, there is a wide area for IIMI where it could enhance its way of working. The challenge for IIMI is to become a client-responsive research institute, where client means the irrigation agencies, policymakers *and* water users. A first step in this direction would be to adopt participatory research approaches on a larger scale, which systematically consider and incorporate water users' (and other stakeholders') interests at all levels of the irrigation sector. It should be realized, however, that the adoption of participatory research methodologies alone cannot guarantee success. At least two conditions should be met in order for water users to have a say on the agenda of IMR. These are: (i) a flexible and open process of development of IMR (who decides and who prioritizes?), and ii) support to water users to influence IIMI's agenda of IMR (after Collion et al. 1992).

While a great deal of IIMI's work involved the empowerment of water users in their dealings with irrigation managers and agencies, it has devoted hardly any time to support water users in exploring and prioritizing their own research needs and how to communicate these effectively to IIMI or to the irrigation agencies. The question then is "how can IIMI's process of research design be managed and opened up to water users' participation?" Instead of using researchers or representatives from irrigation agencies as proxies for farmers (Collion et al. 1992), it should be defined at which stages water users' input is imperative to enhance the appropriateness of the research activities.

Table 8 summarizes the different roles of stakeholders in IMR (excluding other stakeholders such as donors, urban food consumers, traders, etc.) (after Collion et al. 1992). Water users' input is especially required during the stages of problem analysis, review of results of previous research, determination of research objectives, evaluation of alternative solutions and prioritization of different research projects, where they have a comparative advantage in knowledge over irrigation management researchers. The vast majority of researchers do not depend on irrigation to sustain their livelihoods and, therefore, they cannot be proxies for those who do, namely, the water users. It is they who possess site-specific and detailed information about causes and effects, and reasons for past failures and successes, and the historical knowledge necessary for carrying out analyses of viable options.

A NEW IMR PARADIGM?

Similar to what took place in the 1970s with the development of the Farming System Research and the criticisms of the linear technology transfer (from the researchers via the extension services to the farmer), there is a felt need to change the actual links between research institutes, clients (as defined by IIMI) and beneficiaries (i.e., water users) in IMR. Direct contacts are to be developed between research institutes and farmers, between research institutes and clients, and between clients and beneficiaries. At the same time, accompanying the shift from irrigation management to irrigated agriculture, the number of actors to be involved

in the information and knowledge system on irrigation management has increased and this has to be taken into account while designing and implementing research on irrigation management.

Table 8. Research design incorporating stakeholders' inputs.

Stages in Irrigation Management Research Design	Main Actors				
	Research Institutes	Water Users	Irrigation Agencies	Policy-makers	IIMI
Sector analysis of irrigated agriculture	*			*	*
Problem analysis of irrigated agriculture (constraints, causes and effects)	*	*	*	*	*
Assessment of research findings in the sector relevant to issues identified in sector analysis	*	*	*	*	*
Determination of irrigation management research (objectives and strategy)	*	*	*		*
Assessment of alternatives and identification of research projects	*	*	*		*
Prioritization of projects	*	*	*		*
Irrigation policy recommendations for implementation in the sector	*		*	*	*

Source: After Collion et al. 1992.

Pretty and Chambers (1994) argue that the CGIAR of which IIMI is a member is not adequately alert to fill two global lacunas which exist in international agricultural research. These are:

* The development and dissemination of methods for analysis conducted by farmers themselves; and

* The approaches and methods for changing the behavior, attitudes and beliefs of scientists.

The important shift in research focus which recently occurred at IIMI from the management of the irrigation system towards irrigated agriculture offers a good opportunity for water users to participate in IMR. While it can be concluded from the reviewed case studies that IIMI has been conducive in creating room for water or resource users to form a partnership with IIMI

professionals, this does not necessarily mean that farmers had a voice on the research agenda. In all three IIMI examples the research design was primarily done by the professionals.

This conclusion suggests that, shifts are required in IIMI's research development procedures (as described above) and that different approaches and methodologies are needed to facilitate researchers to conduct their work in a different manner. The matter is obviously "how?" Through experimental training approaches, through a revised recruitment policy, through a redefinition of the irrigation paradigm, adjusting its focus to more adaptive research, or through wider collaboration with other International Agricultural Research Centers (IARCs) or National Agricultural Research Centers (NARCs)?

All of the above seem to be pleading for different choices of clients, new professional attitudes and values and research design and methodologies in irrigation IMR—in other words for a new paradigm for irrigation research. Basically, the new irrigation research paradigm seeks to enable water users (and other stakeholders) to identify research priorities in IMR and to remain involved in the subsequent stages of the implementation process (including monitoring and evaluation of the impacts and effects).

The emergence of this new irrigation paradigm at IIMI runs parallel to the need expressed by Conway et al. (1994) to exploit new research paradigms in international agricultural research. This vision statement for the CGIAR[20] proposes guidelines which should assist the CGIAR in its role in the international research effort. Two of these principles are: (i) subsidiarity, the responsibility for a research activity should be placed at the lowest level of the hierarchy; and (ii) CGIAR research centers should seek partnerships. Applying these principles, Conway et al. envisage, among others, collaborative strategic research programs as a type of global research programs. An example would be: *development and understanding of user participatory approaches in the design and management of irrigation* (Conway et al. 1994:57). Thus, the opportunity is there and only to be seized by IIMI.

FOLLOW-UP FOR IIMI

At IIMI, priority should be given to find ways to expose researchers in a systematic way to methods and methodologies, for them to have an improved choice of appropriate methods and methodologies at the design stages of their research activities. Practically, this would mean to initiate an in-house discussion on this issue, and publish widely on problems and opportunities of different research methodologies which IIMI staff has been using under a wide variety of environmental, socioeconomic, institutional and agro-ecological conditions.

In the short term, IIMI should seek partnerships with national and international institutes which have a wide experience with farmer-led research and application of participatory research tools. Some of these institutes could be sisters of the CGIAR (e.g., ICRISAT, CIAT), while other links with NGOs could be pursued as well (e.g., AKRSP, IIED). In addition, IIMI should take an active role in contributing to the PRA Networks which have been established all over the world.

[20]This paper quotes the IIMI-Nepal example as a case of farmer participation in agricultural research and development.

IIMI has already made a few steps in the direction advocated in this paper. In addition to the SCOR Project which has been extended, there are several other projects in which PRA will be applied. A collaborative study, focused on the role irrigation plays in water users' broader livelihood strategies, has been developed by IIMI and IIED (IIMI and IIED 1995) and is envisaged to commence in 1996. The German Agency for Technical Cooperation/Ministry for Economic Cooperation, Germany (GTZ/BMZ) will support a research program on privatization and self-management of irrigation systems in developing countries. This project of IIMI's Local Management of Irrigation Systems will apply PRA to *elicit and depict farmer perceptions of the turnover arrangements and process how turnover has affected irrigation system performance, gender roles in irrigated agriculture, cost of water and agricultural productivity and profitability (IIMI 1995b).* IIMI and IFPRI are developing a research titled *Institutional Framework for Improved Sustainability and Productivity of Irrigated Agriculture in Pakistan* (IIMI-IFPRI 1995). In this project, an interdisciplinary methodology of combining PRA and other in-depth research methodologies will be applied to analyze and quantify the impact of institutions on the performance of irrigated agriculture. Finally, in a Dutch-supported project in Pakistan, IIMI will use PRA and stakeholder analysis to explore perspectives of the different actors of a particular irrigation system in the Punjab.

This list of examples of (potential) research programs indicates that PRA will one way or another find its place in IMR. This Working Paper is a starting point for more integrated thinking on PRA approaches in IIMI, that may lead to a steady development and "institutionalization" of the use of PRA for IMR. However, a key factor in the success of this "institutionalization" will be a comprehensive evaluation of PRA methodologies tested for their relevance and usefulness in IMR.

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Appendix I

Description of PRA Tools and Techniques

THIS OVERVIEW IS almost entirely drawn from Chambers (1994a), with additions from Pretty and Scoones (1991) and Mascarenhas et al. (1991).

PRA TOOL	DESCRIPTION
Secondary sources	Files, reports, maps, aerial photographs, satellite, imagery, articles and books
Semi-structured interviews	Mental or written checklist, open-ended and flexible
Key informants	Who are the experts and finding them (local resource persons)
Groups	Various kinds (casual; specialist/focus; deliberately structured; community/neighborhood); important element of PRA
Do-it-yourself	Asking to be taught, being taught, and performing village tasks
They do it	Villagers as investigators and researchers; they do the analysis and present the results
Participatory analysis of secondary sources	For example, analysis of aerial photographs (1:5,000) to identify village conditions
Participatory mapping and modeling	Local people use the ground, floor or paper to make social, demographic, health, natural resource, service and opportunity and farm maps, or construct three-dimensional models of their land
Transect walks	Walking with or by local people through an area, observing, asking, listening, discussing, identifying different zones, soils, land uses, vegetation, crops, etc.; seeking problems, solutions and opportunities and mapping and diagramming the zones, resources and findings

(Continued)

PRA TOOL	DESCRIPTION
Time lines and trend and change analysis	Chronologies of events, people's accounts of the past, of how things have changed
Oral histories and ethno-biographies	Oral and local histories of, e.g., a crop, an animal
Seasonal calendars	By season or month to show seasonal changes
Daily time use analysis	Indicating relative amounts of time of activities
Livelihood analysis	Stability, crises and coping, relative income, expenditure, credit and debt, multiple activities, often by month or season
Participatory linkage diagramming	Linkages, flows, connections and causality (cause-effect-local response relationships
Institutional of "Chapati" or Venn diagramming	Identifying individuals and institutions important in and for a community, or within an organization, and their relationships
Well-being and wealth groupings and ranking	Identifying groups or rankings of households according to well-being or wealth leading to the identification of key indicators of well-being
Analysis of difference	By gender, social group, wealth/poverty, occupation and age. Identifying differences between groups, including their problems and preferences. Contrast comparisons: asking one group why another is different or does something different, and vice versa
Matrix scoring and ranking	Matrices and seeds to compare through scoring, e.g., varieties, development alternatives
Estimates and quantification	Local measures, judgements and materials, sometimes combined with participatory maps and models, matrices, card sorting and other methods

(Continued)

PRA TOOL	DESCRIPTION
Key probes	Questions which can lead direct to key issues such as: "what are your major problems in irrigated agriculture?"
Stories, portraits and case studies	Household history and profile, coping with a crisis; how a conflict was or was not resolved
Team contracts and interactions	Contracts drawn up by teams with agreed norms of behavior; modes of interaction within teams, including changing pairs, evening discussions, mutual criticism and help; how to behave in the field, etc.
Presentation and analysis	Maps, models, diagrams and findings are presented by local people, or by outsiders, and checked, corrected and discussed
Sequences	The use of methods in sequence, e.g., participatory social mapping leading to the identification of key informants or analysts, or leading to the sequence: household lists -> wealth or well-being ranking or grouping -> focus groups -> matrix scoring and preference ranking
Participatory planning, budgeting, implementation and monitoring	Local people prepare their own plans, budgets and schedules, take action, and monitor and evaluate progress
Group discussion and brainstorming	By local people alone, by focus groups of local people, by local people and outsiders together, or by outsiders alone
Short standard schedules or protocols	Either for very short and quick questionnaires, or to record data (e.g., census information from social mapping) in a standard and commensurable manner
Report writing	As soon as possible preferably in the field before returning to office or headquarters

(Continued)

PRA TOOL	DESCRIPTION
Night halts	Interaction between outsiders and villagers are facilitated by staying in the village, which is an explicit indication of commitment by outsiders to village and village life
Self-correcting notes and diaries	Private diaries, what should go better next time, what lessons to learn?
Survey of villagers' attitudes	Helps ensure outsiders to be explicit about their work
Intriguing practices and beliefs	To encourage outsiders to give credence to indigenous practices and beliefs (which do not necessarily coincide with scientific thinking)
Traditional management system and local resources inventory	How do local people manage water, trees, credit, etc., using local classifications
Folklore, songs and poetry	Reveals values, history, practices, who knows and who does not
Futures possible	How would you like things to look in a year's time? What would happen if nothing is done?
Slide inventories	Slide programs for villagers by taking a projector and showing what has happened in other PRAs which encourages cross-connections between different villages

Sources: Chambers (1994a), Pretty and Scoones (1991) and Mascarenhas et al. (1991).

IIMI's IMR Principles and Types

IIMI HAS ADOPTED the following principles (IIMI 1992a) for its research program to improve the performance of irrigated agriculture.

* Research will involve the measurement of irrigation performance at various levels, and the use of quantitative performance measurements as objective criteria for defining environmentally sound and lasting improvements in irrigated agriculture;

* IIMI's research process will include the formulation of objectively testable hypotheses about the cause and effect linkages in irrigation management processes. In this way, the consequences of interventions can be predicted;

* IIMI's research process will include an analysis of interactions between the design of an irrigation system and its management in a given environment. The constraints imposed by physical conditions will be distinguished from those imposed by management conditions.

In its research program IIMI employs mainly the following types of research: *collaborative field research* which is normally conducted through specific projects in active collaboration with national agencies; and *generic research* which entails evaluating and comparing the findings and results emerging from field research across countries and regions, yielding results with multi-country applicability. An important element of the latter type of research is **undertaking research on research methodologies** in the special context that irrigation management provides, i.e., a socio-politically complex topic in an area of unreliable or nonexistent data.