AN OVERVIEW OF PARTICIPATORY RESEARCH AND LEARNING PROCESSES AND THEIR RELEVANCE TO WATERSHED MANAGEMENT AND DEVELOPMENT

Table of Contents

Introduction

An objective of each theme of the Challenge Programme on Water and Food is the development of a conceptual framework useful to research teams formulating *research **for** development* strategies for watershed management in developing countries. An input to this conceptual framework is the development of **synthesis papers** intended to address gaps in clarity or understanding of key subjects. One of these is the role of participatory research and learning in innovation processes for gendered, adaptive management of natural resources such as upper catchments. Several members of a working group on Participatory Natural Resource Management associated with the CGIAR's Systemwide Programme on Participatory Research and Gender Analysis developed this synthesis, drawing extensively on published works. It is specifically aimed at researchers involved in the Water and Food Challenge Programme and at reviewers who will be evaluating their proposals.

What began as a critique of the "transfer of technology" paradigm for innovation development in agriculture has developed into rich area of theory, practice and methodological innovation that addresses both how rural innovation can be fostered and how formal research can become more relevant and responsive to rural constraints and opportunities. The paradigm shift goes beyond food security to equity, well-being, sustainable livelihoods and ecosystem health. An analysis by Pretty and Hine (2001) of 208 cases of sustainable agriculture from 52 countries involving almost 9 million farmers on close to 30 million hectares concludes that successes have been founded on participatory approaches involving local experimentation, and building a capacity to learn about biological and ecological complexity. Although it is beyond the scope of this paper to present an in-depth picture of the state-of-the-art, or of prevailaing methodolgies, we hope to provide an overview of the hallmarks of participatory research and learning approaches and their relevance to management of land and water resources in upper catchments.

This paper is organised in four major sections:

1. General concepts of participatory research and learning
2. The relevance of participatory approaches to Natural Resource Management (NRM) and specifically to watershed research
3. Elements of good practice for participatory research and learning in the content of gendered, adaptive watershed management
4. Considerations for proposal development and review.

The first three sections provide a summary of key concepts and issues and suggestions for further reading. The final section is a list of questions for researchers and reviewers to consider as they formulate or evaluate proposals.

Bibliographic sources are given at the end of each section. An extended bibliography is included at the end of the paper.

1 General concepts of participatory research and learning

What is participatory research?

Participatory research is relevant in many contexts. Our context here is research for gendered, participatory adaptive management of natural resources (such as water and land resources in watersheds) when this research is part of a learning process shared by multiple stakeholders, including the state, non-governmental organisations, community-based groups, private individuals and research organisations, and when the NRM agenda is embedded in a social agenda of poverty alleviation. Terms such as 'participatory management', 'participatory research', 'participatory action research' and 'participatory learning' are frequently used interchangeably and with little concern for distinctions or overlap among them. In order to discuss these participatory approaches it is useful to clarify and review some elements that are common to all and to discuss why the analysis of gender and other forms of human is central to all of them.

Participatory Natural Resource Management involves the management of resources by the relevant stakeholders. It requires the negotiation of goals and acceptable tradeoffs among multiple stakeholders, who may include researchers and other communities. It also involves participatory problem definition, visioning and building a shared agenda for action. Agreeing upon rules of resource management (including ways to enforce compliance) and encouraging knowledge sharing among stakeholders to build a common analysis of a problem or opportunity are both characteristic of participatory resource management. Some of this knowledge may need to be generated through research, but this is often not the case. In many cases, the knowledge exists in a stakeholder group, but it may need to be shared.

Participatory learning is an approach aimed at socializing knowledge based on principles of discovery-based learning popular in Adult Education because adults learn better when they uncover principles and facts for themselves. Farmer field schools are a good example of the use of participatory learning to share knowledge. Participatory learning often evolves into participatory research because questions arise that none of the stakeholders can answer satisfactorily. Participatory learning that changes people's fundamental understanding of resource management processes, including their own behaviour, may be a means of empowering stakeholders, in particularly the underpriveleged, to take more control over resources important to them. Participatory learning processes need to be designed with awareness of how they may affect and be affected by power relations since it cannot be assumed that they will definitely provide benefits to the less powerful.

Adaptive, participatory Natural Resource Management. The addition of the adjective "adaptive" means that the integration of participatory knowledge sharing and knowledge generation is achieved in an NRM process. Iterative learning and research loops are a major feature of the adaptive approach to management and they involve changes in social institutions as well as in environmental conditions. This is not just a question of degree, as participatory management often stops short of operationalising these feedback loops, and as a result is unable to self-correct or to scale up. The importance of learning lessons is to limit mistakes and create new ways of looking at resource management challenges. Successful adaptive, participatory NRM usually involves a process in which one or more stakeholder groups combine their efforts to understand environmental feedback, do participatory

research and use the results to inform the learning process, intervene jointly in resource management, monitor the status of the ecosystem including its people, and learn from this experience in order to adapt the next management intervention. Adaptive, participatory NRM revitalises and institutionalises many practices common in successful local resource management systems.

Adaptive, participatory NRM can be viewed as a form of *Participatory action research* applied at the landscape level with the added objective of enabling participants to analyse and act more effectively based on their own improved understanding. Action research combines intervention in the process being studied with investigation of the changes produced by the intervention. Findings emerge as approaches are developed, tested and improved upon. These cannot be firmly fixed ahead of time given the interactive nature of the inquiry process and the adjustment that is required. Participatory action research involves stakeholders in a cycle or spiral process of intervention, analysis though monitoring of indicators, troubleshooting and reflection on what worked, what didn't work and why. The response of the system to the methods in relation to the objectives determines whether the intervention has been successful or not, and in turn generates knowledge for subsequent cycles of planning and improvement for adjusting actions to better meet objectives. Finally, principles may emerge from analysis and synthesis in the form of research findings on how to best accomplish an envisioned outcome in a given context.

Gendered, adaptive, participatory NRM means that there is explicit concern for ensuring that both men and women are included in participatory processes, and that attention is paid by researchers to understanding gender differentiation in terms of ability to participate. Efforts are made to reduce barriers or obstacles that preclude or debilitate equitable participation within stakeholder populations. Gender is explicitly included as an analytical variable in studying how resources are understood locally and how they are management by local populations. Gender differentiated interests in projected outcomes are included in the construction of resource management alternatives to be tested via participatory processes

Participatory monitoring and evaluation helps to make NRM more accountable to stakeholders and to give participants greater confidence in the results. Easily understood criteria and indicators are developed by local communities, researchers and other stakeholders. These provide a framework for later monitoring and for assessing key factors and their direction of change. This monitoring process creates the opportunity to feed back information and learning into the management process.

It can be seen from the discussion above that p*articipatory research* is not a single approach, but rather cuts accross a broad collection of approaches intended to enable participants to develop their own understanding of and control of the process and phenomena being investigated. Box 1 summarises several key principles that distinguish participatory research.

Box 1. Principles of participatory research (Ashby et al 2000; Ashby, 2003; Vernooy and McDougall, 2003)

1. *The research reflects a clear and coherent common agenda (or set of priorities) among stakeholders and contributes to partnership building.*
2. *The research builds a capacity for innovation by including stakeholders in joint enquiry and co-development of new resource management regimes*
3. *The research addresses and integrates the complexities and dynamics of change in human and natural resource systems and processes, including local understanding of these.*
4. *The research applies the 'triangulation principle'. It combines multiple sources of information and methods, and links together various knowledge worlds through participatory learning and joint enquiry.*
5. *Monitoring and evaluation of participation and the research process occur according to agreed codes of conduct and standards of research practice*
6. *Power and risk sharing are conscious research strategies*
7. *The research process is based on iterative learning, feedback loops and two-way sharing of information.*
8. *Relationships among partners are founded on mutual respect, accountability and joint decision-making*

What is the relationship of diversity analysis to participatory research?

We have already drawn attention to the importance of gender analysis to participatory research, however it is essential to weave these considerations within a more inclusive approach to social diversity.

While it is an integral element of traditional and participatory research, diversity analysis is so significant and complex that it merits separate consideration. It is obvious how human diversity affects some research dimensions, such as methods. Yet diversity also interacts in subtle ways with other research dimensions; it influences, for example, the issues of rigour, validity and objectivity. These, in turn, affect the confidence and credibility that can be accorded to research results, and the domains into which they can be disseminated.

Human diversity not only refers to ethnicity, but also to many other dimensions of social and biological difference, including gender, wealth, age, class, religion and caste. As with gender, this term refers not only to roles, but also to the dynamic aspect of power relations. The various dimensions of diversity (or identity) overlap with one another in each individual, and can act to reinforce positions of relative power or disempowerment. In other words, societies ascribe roles, relations and power structures on the basis of gender in combination with other forms of diversity.

The *Sustainable Livelihoods* approach explores human diversity by analysing five sets of capital assets: human capital (knowledge, health), social capital (structural and cognitive[1]), financial capital (cash in hand or indirectly accessible), physical capital (infrastructure) and natural capital (land, water, plants, animals). Families might be poor in some assets, but relatively rich in others. An increase in one set of assets might be accompanied by a decrease in another. Taken together with an analysis of the external (institutional, political, legal and cultural) contexts and of those conditions exposing families vulnerability to disaster, the analysis of capital

[1] For an explanation of structural and cognitive social capital see the section below entitled : *How can participatory approaches improve the outcome of research for watershed development?*

assets can help to understand, or develop, livelihood strategies that are relevant to individual families, taking into account their particular circumstances and aspirations.

Diversity analysis is more than analysing data by gender or ethnic group. It is an approach in which key elements of human difference, such as gender, wealth, caste, age and ethnicity, become analytical variables throughout the research or programme, from design to implementation, analysis, and evaluation. It involves exploring a range of questions and issues spanning both the structure (roles) and dynamics (relations) of human systems. Some of the points for exploration include*:*

- What are roles and responsibilities of the different groups relating to NRM?
- How and why are these roles, relationships, patterns and differences changing over time?
- What are the differences how resources are valued?
- What are the differences in criteria for decision-making about resources and why?
- Who controls access to resources? Who makes decisions about them and why?
- Who benefits from each activity or enterprise? Who bears any associated costs?
- What are the relationships amongst the groups? What are the power dynamics?
- How do relationships, power and roles influence the decision making of the group regarding resources, and ultimate outcomes?
- What options exist for increasing equitable access to decision-making and natural resource benefits, especially for marginalised stakeholders?

As with the participation typologies, there is no single 'correct' type of diversity analysis; instead the researcher must identify the key dimensions of diversity or difference that merit inclusion, and navigate the spectrum of participation to find the appropriate level for the given objectives and context.

How is participatory research different from and complementary to conventional research?

Conventional and participatory research do not exist as neatly definable and independent concepts. These terms refer to collections of approaches and experiences bundled together out of convenience and necessity, as a way of making sense of experience. Some would say that ***the*** fundamental dimension of difference between conventional and participatory research is the issue of 'who controls and makes decisions' about this process, and this is the basis of several well-known frameworks or typologies (Box 2).

The related question of ownership also needs to be considered when defining participation. W*ho is participating in whose process*? Scientists might invite farmers to participate in formal research process using different types of participation, or on the other hand, they might participate to varying degrees in a locally-owned innovation process

Box 2. A Typology of Participation (adapted from Biggs, 1989; Probst et al, 2000)

Contractual Participation: One social actor or stakeholder group has sole decision-making power over most of the decisions taken in an innovation process, and can be considered the 'owner' of this process. Others participate in activities defined by that stakeholder group, i.e. they are (formally or informally) 'contracted' to provide services and support.
Consultative Participation: Most of the key decisions are kept with one stakeholder group, but emphasis is put on consultation and gathering information from others, especially for identification of constraints and opportunities, priority setting and/or evaluation.
Collaborative Participation: Different actors collaborate and are put on a more equal footing, emphasizing linkage through an exchange of knowledge, different contributions and a sharing of decision-making power during the innovation process.
Collegiate Participation: Different actors work together as colleagues or partners. 'Ownership', responsibility and risk are equally distributed among the partners, and decisions are made by agreement or consensus among all actors.

A second fundamental difference between participatory and conventional research is the significant difference in the links between the research and implementation phases of development. Conventional research collects results, typically for several seasons, before data and/or technologies are analysed or evaluated, put into reports and then "released". These are (ideally) taken up by (separate) extension services and translated into extension messages, which are then disseminated. In participatory research, particularly participatory action research, the implementation of research findings, and the related technical and social changes in the rural areas, is integral to, rather than separate from, the research process, and often takes place in a simultaneous, integrated fashion.

'Conventional' research (if it involves local people) is often associated with the '*contractual* participation' and 'participatory' research with *consultative*, *collaborative* and *collegiate* participation. We have also noted that conventional research operates with research and implementation as discrete phases, while participatory research tends to integrate or iterate between the two. But the terms 'conventional and 'participatory' research also embody other dimensions. In Table 1 we illustrate these differences with a *simplified* view of the 'extremes' of a multi-dimensional spectrum.

Table 1 shows how the ends of the spectrum reflect different assumptions and foci and how approaches positioned differently on the spectrum can complement one another. Gradients stand out in the complexity and 'activeness' of the research and in researcher and farmer roles, moving from single to multiple perspectives and types of knowledge; from neutral or passive roles to active and engaged; and from single level/linear to multiple levels/directions of dissemination. Another point of interest in this matrix, and in the Biggs typology, is the greater degree of overlap in methods compared to other dimensions of difference. Many assume that any research that uses some participatory methods cannot be 'conventional; and that 'participatory' research cannot apply 'conventional' scientific tools. Methods, however, are less important in distinguishing these research approaches than the other dimensions or the degree of control over decision-making. One of the reasons for this is the increasing frequency with which conventional types of research (for example, the 'transfer of technology type') use participatory methods of accessing information as a means of increasing accuracy of information or legitimacy in the community.

Table 1. Comparison of conventional and participatory research on several key dimensions (adapted from McDougall and Braun 2003)

Dimension	Description of the "*Ends*" of the Research Spectrum	
	"Conventional"	**"Participatory"**
Primary objective	Enhanced understanding, prediction and control by discerning general laws or principles Widespread adoption of scientific outputs Increases in productivity, profitability and environmental sustainability	Expanded flexibility and choice of options for sustainable livelihoods and NRM; Improvements in local sites and broader impacts/influence Increases in production, food security, income, equity and environmental, institutional and financial sustainability Empowerment of communities to identify and address their own priorities Changes in power relations towards greater equity for the less powerful members of society
Research approach	Rigorous, controlled experimentation and statistical analysis Focus on problem-solving Places a premium on standardisation, replicabilility, quantitative analysis, disengaged objectivity, representativeness, reduced bias; statistical significance Historically associated with biophysical research; and more recently with social science as well.	Intertwining of research with action through a conscious and deliberate iterative, adaptive cyclic or spiral process which alternates between action and critical reflection Balances problem-solving with identification and development of opportunities Analysis is predominantly qualitative (sorting, scoring, ranking, weighting, drawing); Analysis is iterative and optimises tradeoffs between needed information and representativeness. Accepts that many problems are site specific and that statistically significant, generalisable conclusions may not be possible. Mix of social and biophysical research; sometimes pure social research Research questions differentiated to enable analyses relevant to both men and women and to different social groups.
Assumptions	Reality is "out there" in nature to be discovered through detached, value-free observation	Reality is socially constructed and interpretations are filtered through prevailing cultural values, and social, political, financial and resource-access contexts ; the research process itself influences outcomes
Roles of scientists	Objective and impartial observer who gathers information for diagnosis, planning and evaluation; shares outside information and mediates between parties.	Facilitator and co-learner, active participant in supporting local processes of change and empowerment
Roles of local stakeholders	Clients/users are passive recipients of the research results	Local people become researchers, co-learners and experts and are involved in decision-making at each step from identifying problems and opportunities, defining the research objectives, planning approaches, monitoring and evaluating results to the dissemination of the findings
Research methods	- Controlled experimentation - Modeling - Formal Surveys - Key informant interviews	- Formal and informal experimentation and action research - Semi-structured interviews, personal histories

	- Semi-structured interviews - Participant/site observation - Analysis of secondary information - Ecological statistics, population dynamics, meta-population theory and landscape ecology; analysis of water and soils, and crop agronomics - Can use participatory rural appraisal tools as a means of generating data for scientists	- Focus group discussions - Facilitated discussions (reflection on situations, issues and possible actions) - Learning workshops and facilitated stakeholder meetings - Participatory mapping and modelling - Participant/site observation - Records/document checking - Gender and diversity analysis - Institutional and stakeholder analysis - Sustainable Livelihoods analysis - Support to local initiatives - Analysis of secondary information
Dissemination, adoption and impact pathways	Application generally occurs after several seasons of testing, analysis and interpretation of results by outsiders, followed by a process of relaying these translated messages through a separate extension service. Publication in scientific journals, websites and books; Reporting in popular media; Policy briefs Emphasis is on "getting technology out" to target groups over a wide geographical area. Research and its application are two separate processes with weak inter-dependencies	Application can be immediate at research site since the user-experimenter owns the research. Generates insights relevant to similar situations; if successful, other user groups take up new ideas once clear benefits are noted (which can be in the first season) Farmer-to-farmer dissemination (externally facilitated and/or through traditional communication mechanisms). Emphasis is on institutional processes and learning among networks of stakeholders Research and its application at community level are one continuous (often cyclical) process

Scientists attempting to work across the spectrum of conventional and participatory methods have encountered both successes and failures. Innovations have been identified, as well as pitfalls among the panoply of methods available. The early days of debate for and against the participation of farmers, residents and local land users in research have given way to more grounded discussions about appropriate approaches and specific methods for particular circumstances.

Rather than advocating one "brand" of research over another, researchers are increasingly focusing on innovating and experimenting to match the methods and the situation. They are also working to bring the insights of everyday practice in the field back to the design of new technologies and future research practices, protocols, structures and strategies. These changes are evidence of maturation in a decades-long conversation between social and biological scientists, farmers, fisherfolk and forest dwellers on the possibilities for a collaborative science of agriculture, forestry, and watershed management. It is also part of a wider movement to support people's ability to envision, choose and create their own futures. Promising trends include:

- A focus on the ethics and power relations involved in participatory research approaches
- A much wider (though still insufficient) effort to bring gender considerations into participatory research methodologies and to analyse gender differentiated outcomes of participatory NRM.
- A call for more accountability, standards of practice, codes of conduct and constructive critique among practitioners of participatory research
- An exploration of research on the process of participation under uneven relations of power, including conflict resolution
- A shift from participation in technology transfer to collaborative science
- A creative proliferation of hybrid methods, mixing quantitative and qualitative

analysis, and social and biological approaches
- The experimental combination of geographic information systems (GIS), remote sensing, maps, models and participation
- A serious effort to scale up from farm to landscape level participatory research and an exploration of regional and national applications
- A willingness to place research questions and results in social and historical context
- Attempts to link specific practices and information to broader meaning, including interpretations of history and visions of the future, through scenarios and other integrative tools for negotiation and planning.

How can participatory approaches improve the outcome of research for watershed development?

Watershed development aims to establish an enabling framework for the integrated use, regulation and development of land and water resources in a particular area in order to reduce poverty and improve ecosystem health. The area of operation can be defined at various physical scales: at one extreme watersheds cover whole regions or countries, at the other they occur within individual farms. The definition of watershed areas should be based on a combination of biophysical criteria (e.g. levels of erosion, groundwater potential, livestock numbers), social criteria (e.g. landholding size, migration levels, literacy rates) and institutional criteria (e.g. functioning of community groups, history of collective action, presence of NGOs).

User participation is increasingly recognised as critical for success in watershed development and management projects. Past experience has often shown that when local residents were not considered in the formulation of projects, the resulting plans and technologies were inconsistent with real needs and ignorant of local land use knowledge and practices. Empirical evidence suggests that user participation results in projects that are more efficient and effective, in opening up wider access to decision making, and fostering processes that lead people to perceive themselves as able and entitled to occupy decision-making space.

Likewise by changing the way technologies and practices are developed and disseminated, participation broadens the research agenda bringing in critical new issues (like organisational behaviour, collective action and conflict resolution).

Participatory management that is not firmly linked to research is often hindered by a lack of appropriate technical options, information and institutional relationships. Participatory research methods can provide a liinkage between research and management, by involving the right stakeholders in envisioning opportunities, defining problems, evaluating solutions and disseminating technical, informational and institutional innovations.

Participatory research adds value to NRM processes in multiple ways:

By introducing new information and feedback into participatory learning and adaptive management and helping to establish agreement about what information stakeholders need to make collective decisions:

Participatory learning is an essential part of research for development and adaptive management of complex ecosystems. Participatory research has a vital role to play in making sure that the learning process that drives adaptive management can draw

on different kinds of knowledge and is not biased by just one explanation of key cause-effect relationships. When power relationships in the participatory research process are negotiated in a forum where different perceptions of cause-effect can be aired, then research can add value to participatory management by bringing new information to the table. Negotiation of power relationship and revealing new information that runs counter to the interest of some stakeholders may also incite or exacerbate confict. This is not so say that power relationships should not be negotiated or even challenged; however, better understanding of the potential impacts of such negotiations is needed as are techniques and tools that can result in more equitable and less conflictive outcomes.

By increasing capacity to cope with complexity and diversity:

NRM takes place in complex, diverse human landscapes. Multiple stakeholders such as local people, various levels of government, non-governmental organisations, researchers and private sector actors have different perspectives, interests, entitlements, knowledge, capabilities and power. This is true at all scales of NRM, and in all 'sectors', including forestry, fisheries and agriculture. W*ithin* stakeholder groups, tremendous diversity also exists - a reality that dispels commonly-held assumptions of homogeneous, consensual 'communities'. Within a single community or resource user group, for example, there are overlapping categories of human diversity, such as gender, age, ethnicity and caste, religion, wealth, and proximity to resources. These 'internal differences' underpin critical issues of equity, power, and access to resources and decision-making. This complex human landscape is also *dynamic* in nature. This is especially true in today's global economy: there are no closed social systems; governments are decentralising; roles and rights are changing rapidly; rural people are often relocating in search of viable livelihoods or to escape environmental or political hardship; and, households rely on a constantly changing mix of livelihood activities and strategies.

One of the implications of this human system complexity, diversity and dynamism is that individuals and institutions face constant changes in terms of risks, opportunities and decisions. The majority of decisions in NRM affect a number of different stakeholder groups, and may affect them differently. Especially where resources are scarce, or of high value, or where differences in power exist between and within stakeholder groups, NRM becomes an on-going process of negotiation and conflict management. This varies in nature and by degree; from the forging of agreements, to explicit violence, such as in illegal logging conflicts.

Biophysical complexity is very familiar to conventional researchers and conventional research has often been identified with resource management practices that reduce this variability, although this can slowly change ecosystem functioning and resilience, undermining the capacity to withstand or recover from shocks and stress. If natural variability is reduced too far or disturbances prevented, they may accumulate and return at a later stage on a much broader scale. Diminishing variability tends to increase the potential for larger-scale, less predictable and less manageable disturbances which can have devastating effects on ecosystems, and to reduce the capacity of ecosystems to provide environmental services in the future.

Because they are highly decentralised, adapted to location-specific conditions and stakeholder-driven, participatory approaches add value to research for NRM by working with and building on natural human and diversity. They cope with the complexity by:

- Developing and establishing clear processes for working with farmers and other

stakeholders

- employing methodological tools that work with existing human and biophysical variability and diversity, often integrating qualitative and quantitative approaches
- employing methodological tools that help capture farmer's and other stakeholders experience and opinions.

By promoting the involvement of extended communities in science:

Stakeholder involvement is particularly critical when there is high level of uncertainty about cause and effect, disagreement about measurement, and debate on ethical aspects. Participatory research approaches are especially needed in situations where there is disagreement and conflict over the appropriate management. Debate heightens the need to include a broad array of expertise in the research process and to end the conduct of research exclusively by technical specialists. Inclusion of other expertise promotes exchange among different forms of knowledge and cross-fertilization across diverse knowledge forms. Research for development requires: willingness to engage in non-scientifically generated knowledge; acceptance of a plurality of knowledge forms, and preparedness to engage with stakeholders' concerns. The inclusion of natural resource user's knowledge in the identification of problems & opportunities, in monitoring of change enables diverse stakeholders to challenge accepted wisdom and potentially levels the playing field and breaks down the monopoly of 'one version of the truth' which is often that of dominant elites, and which can short-circuit collective action.

By increasing capacity for innovation:

The conception of innovation has changed drastically over the last forty years. During the 1950s, innovation was considered as a discrete event resulting from knowledge developed by isolated inventors and isolated researchers. Today, successful innovation is considered as the result of a process of interaction and exchange of knowledge involving a large diversity of actors in situations of interdependence. This evolution in the conception of innovation has generated two consequences: first, innovation is no longer conceived as a discrete event only involving the development of technical solutions, but as a process also involving social interactions; second, innovation is no longer explained by the sole combinations of physical and financial capital, but also by combinations of intangible forms of capital, especially social capital.

Recent social network theories of innovation lay emphasis on the strategic importance of relationships rather than technical tools, and on knowledge rather than technological networks. Knowledge-based innovation requires not one but many kinds of knowledge. Furthermore, it requires the convergence of many kinds of knowledge detained by different categories of actors. These new criteria require a new organisational and functional paradigm where the performance of innovators depends on the density and pertinence of relations and cooperation between actors in the productive system

A frequent conclusion of monitoring and evaluation of successful participatory innovation processes is that the construction of social capital can be viewed as both a cause and an effect of these.

Gendered participatory innovation processes have a special propensity to open up previously invisible windows on problems, needs or conflicts that women may experience, but which are not brought to the surface for analysis in spaces generally dominated by men (e.g. water management research).

By building social capital which can 'spill over' into collective action:

When participatory research is successful in promoting the involvement of extended communities in science, their interaction can generate and enhance social capital. Social capital can be understood by distinguishing two interrelated categories; *structural* and *cognitive*. These are analogous to the distinction between renewable and non-renewable resources as natural forms of capital. The structural category is associated with forms of social organization, particularly *roles, rules, precedents* and *procedures* and *networks* that contribute to cooperation, and specifically to mutually beneficial collective action, which is the stream of benefits that results from social capital. The cognitive category derives from mental processes and resulting ideas, reinforced by culture and ideology, specifically *norms, values, attitudes and beliefs* that contribute to cooperative behavior and collective action.

The elements of social organization in the first category *facilitate* collective action by lowering transaction costs, having already established patterns of interaction that make productive outcomes from cooperation more predictable and beneficial. Ideas in the second category *predispose* people toward mutually beneficial collective action, in part because once they are widely shared they make cooperation more likely. The norms, values, attitudes and beliefs that constitute cognitive social capital are those that rationalise cooperative behavior and make it respectable..

How are stakeholder and institutional analysis relevant to NRM in watersheds?

Researchers can play a role in clarifying the respective roles and responsibilities of different stakeholders, in empowering local communities *and* local governments; and in strengthening the linkages between communities and their governments. This implies addressing the question of how local institutions play a significant role in shaping resource access and use for different user groups, and micro-level research that could elucidate the less visible rights held by disavantaged groups and the social processes through which these rights are upheld or denied. It also implies capacity building in order to foster strong, well-designed participation of local institutions and government agencies as important stakeholders in NRM. Another critical research gap is the identification and exploration of customary norms, statutory laws and power relations guiding distribution of land, water and other resources,and analysis of the complex nuances of the institutional arrangements that determine who has access to, use of and control over resources. Other key themes for research include:

- Understanding the changing gender dynamics of local institutional arrangements in light of ongoing processes of decentralization and the implications for participation and equity in access to and control over local natural resources.
- Understanding the different logics that govern local and state responses to environmental management issues at the community level.
- Understanding the implications of different indigenous logics and values for local institutional arrangements, and for participatory methodologies.

Participatory research is not limited to process of joint enquiry involving farmers and researchers. Depending on the research and management objectives, the involvement of authorities and organisations at different levels may be critical. At lower geographical and political scales (e.g. plot, farm, community, microcatchment) participants are individuals and functionaries of local organisations while at higher scales professional researchers are more likely to be working with representatives of

different types of consituencies. This has implications both for how participatory approaches are organised, for the way diversity analysis (e.g. gender, wealth, ethnicity) is structured, for how different perspectives (e.g. that of women, the poor) are included in planning processes, and when considering how to scale up an innovation.

Can participation work across scales?

Scale can be referred to as the spatial, temporal quantitative or analytical demensions used to measure and study objects and processes. Both social and natural scientists acknowledge the importance of scale effects and how relationships and processes operate differently at different scales, and many have concluded that a multiscale approach is necessary to understand social and biophysical processes, nevertheless much research is still conducted at a single scale of analysis. Although observations at local scales are widely used to inform policy makers whose decisions affect regional and global change, it is unclear to what extent local scale phenomena scale up to regional and global scale effects. Certain phenomena are observable at some scales while unobservable at others. And even if a relationship is observable at multiple scales, the magnitiude or strenth of that relationship may differ across scales. Since data availability and cost isuses limit capacity to conduct research at multiple scales awareness of when scale dependent relationships may be present is critical.

An example of this is the challenge of retaining key gender and diversity issues as the scale of analysis increases. In practice this means that the larger the physical scale, the greater the tendency for local opinion, concerns, priorities and knowledge to be aggregated and expressed through institutional or governmental representatives rather than through local individual participation. A key challenge for watershed management or development consortia is the creation of effective linkages across size or political scales where concerns from local levels are conscienciously included and considered.

What are some of the challenges faced by 'conventional' researchers in embracing participatory approaches?

Participatory approaches are time consuming for local resource users, researchers and other stakeholders, particularly at the outset. Much time is spent in negotiation and on building capacity. Higher time costs are especially significant for women and the poor. The traditional 3-5 year research project funding is generally insufficient. There are challenges in balancing: efforts on diagnostic work and participatory innovation development; social and biophysical research and in collecting and integrating qualitative and quantitative information.

The increased complexity impled by multiple objectives and partners and the challenges of integrating knowledge from many sources can be daunting for conventional researchers, especially if the reward systems in their institutions effectively penalise them for investing time in building interinstitutional and interdisciplinary relationships. .

Researchers may also experience frustration related to difficult power relations for example, at the reticence of political systems to give communities more power to manage local resources. Participatory methodologies and interdisciplinary work are complex and require new skills that may not be available in many research

institutions – especially social science, communication, and leadership skills.

As researchers are being pressured to be more client, impact, and results-oriented, research managers are also being pressured to change their organisation's orientation. The changes sought in research practice so as to more directly address local capacity needs and support sustainable, self-led change requires supportive changes in institutional operations, arrangements and values. This path of change should lead to a more 'learning type' research system – one that internalises the necessary changes in attitudes, structures, and research practices so as to increase responsiveness to local community development needs, consideration of economic, institutional and social aspects, and the ability to positively influence policy. Public research organisations are, in fact, currently being challenged to embrace a two-fold change: to move towards the use of participatory, gendered approaches in research practice and, to become 'learning organisations' so that they can continue to effectively innovate in the future.

To date, the promotion of participatory, gendered methods has been primarily addressed through projects and one-off training programs. Very few of these projects or programmes are conceived to, or have, strategies that influence the core attitudes or working practices of the institutions, so that many of the experiences remain isolated, and as a result there is still a dearth of public institutional support for these new approaches.

There is also some recent, rising interest by public research organisations in the processes of organisational change and learning as a means for improving impact of research and of participatory, gendered, integrative NRM approaches. Beyond cultural transformations, changes in managerial and structural terms could include an array of new modes of operating, for example: new forms of leadership, new ways of linking with external agencies and partners, new ways of managing and promoting personnel, new incentive structures, new planning, reviewing, resource allocation and monitoring and evaluation modalities. Two challenges are that there are few organisational change experts working for the public research sector and that change experts tend to draw upon experience derived from private sector organizations in developed countries. However, private organisations have different driving forces to change, for example, profit motivation and market orientation, compared to public ones. Many public organisations are led by 'researcher-managers' who are not expert in organisational assessment, and their institutional culture may not include innovation or creative exploration of new ideas. These institutions are often part of larger, more bureaucratic government structures that do not encourage innovation.

At the local level, researchers may find that low human capacity, institutional hierarchies and bureaucracy, paternalism and poor community cohesiveness deriving from political instability and histories of conflict, corruption and ingrained mistrust can make participatory processes difficult to initiate and sustain. Capacity or readiness for participation on the part of communities, researchers and other stakeholders cannot be assumed and does not develop overnight.

Success at small scales is necessary but not sufficient for scaling up and out to larger scales. Even If researchers have been involved in participatory work focused on relatively short term concerns at the level of individuals, groups and communities, the experience gained does not automatically pave the way for effective participation in the much more complex multistakeholder processes associated with research for the management or development of larger natural units (e.g. watersheds), larger scale issues (eg. transboundary pollution), or longer-term concerns (e.g. soil fertility decline, resource degradation).

Sources

Ashby, J.A., A.R. Braun, T. Gracia, M.P. Guerrero, L.A. Hernandez, C.A. Quiros, J.I. Roa. 2000. Investing in Farmers as Researchers. Experience with Local Agricultural Research committees in Latin America. CIAT Publication No. 318. International Center for Tropical Agriculture. Cali. Colombia. http://www.ciat.cgiar.org/catalogo/producto.jsp?codigo=P318

Ashby, J. 2003. Uniting science and participation in the process of innovation – research for development. IN: Pound, B., S.S. Snapp, C. McDougall and A. Braun (Eds). Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation. Earthscan/IDRC.

Biggs SD. 1989. Resource-poor farmer participation in research: a synthesis of experiences from nine National Agricultural Research Systems, OFCOR Comparative Study Paper ISNAR, The Hague, pp 3-37.

DFID. 2001. Sustainable Livelihoods Guidance Sheets. London, UK. http://www.livelihoods.org/info/info_guidancesheets.html

Evans, T. E.Ostrom and C. Gibson. 2003. Scaling Issues in the social sciences. IN: Rotmans, J. and D. Rothman (Eds). Scaling in Integrated Assessment. Swets Zeitlinger Publishers.

Johnson, N. H Ravnborg, O. Westermann and K. Probst. 2001. User participation in watershed management and research. Water Policy 3:507-520.

Landry, R., N. Amara and M. Lamari. 2000. Does Social Capital Determine Innovation? To What Extent? 4th International Conference on Technology Policy and Innovation, Curitiba, Brazil, August 28-31, 2000. http://www.rqsi.ulaval.ca/ang/pdf/publication5.pdf

McDougall, C. and A. Braun. 2003. Navigating complexity, diversity and dynamism: reflections on research for NRM: IN: Pound, B., S.S. Snapp, C. McDougall and A. Braun (Eds). Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation. Earthscan/IDRC.

Poats. S. How to include gender in the construction of management plans for portected areas: Case Study Antisana in Ecuador. (chapter from a forthcoming book)

Probst, K, Hagmann, J, Becker, T and Fernandez, M (2000) 'Developing a framework for participatory research approaches in risk prone diverse environments', Proceedings, Deutscher Tropentag 2000, University of Hohenheim. http://www.uni-hohenheim.de/atsaf/download/iaks/probst_et_al_pr%2Bnrm.pdf

Rocheleau, D. 2003. Participation In Context: What's Past, What's Present, and What's Next.: IN: Pound, B., S.S. Snapp, C. McDougall and A. Braun (Eds). Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation. Earthscan/IDRC.

Stroud, A. 2003. Transforming institutions to achieve innovation in research and development. IN: Pound, B., S.S. Snapp, C. McDougall and A. Braun (Eds). Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation. Earthscan/IDRC.

Uphoff, N. 2000. Understanding Social Capital: Learning from the Analysis and Experience of Participation. IN: P. Dasgupta. and I Serageldin, (Eds) Social Capital: A Multifaceted Perspective. The World Bank. Washington D.C. http://www.sls.wau.nl/mi/Activities/Papers/000913_1.pdf

Vernooy, R. and C. McDougall. 2003. Principles for good practice in participatory research: relfecting on lessons from the field IN: Pound, B., S.S. Snapp, C. McDougall and A. Braun (Eds). Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation. Earthscan/IDRC

2 The relevance of participatory research and learning to watershed research

The characteristics of participatory research described above are especially relevant in the field of watershed management in upper catchments. During the past two decades, important challenges in participatory water and land management have emerged as a result of both growing awareness about the scarcity of naturally available water resources and the general shift towards decentralisation and devolution of governance authority. Worldwide, it has also been recognised that the physical nature of water resources and multiple water uses warrant management in an integrated way at catchment level and also when basins cross national boundaries. In many countries governments have promulgated new water laws or revised existing fragmentary laws and introduced new multi-tiered basin institutions, mostly on a pilot basis. Public participation has become obligatory by law, while devolution of power to the lowest approriate level is the longer-term policy aim. The roles of line departments and administrative government departments, the private sector and water users themselves at national, basin and local level are redefined. However, this global learning process on participatory water management, "participation" may figure high on policy agendas, but there is still a considerable gap between these national and international initiatives and reality on the ground.

Questions on horizontal integration and vertical representation and accountability etween the various tiers of multi-tiered basin organisations are still largely unanswered. Knowledge is especially lacking with regard to communities' own arrangements to manage scarce water and land resources for domestic and productive uses according to indigenous laws and institutions, and grassroots cooperation and conflict between centers of decision-making, including groupings within communities, local governments, water users associations (often typically irrigation-oriented), line agencies, NGOs and other institutions. Participatory research on watershed management in upper catchments can contribute to filling this gap by providing new knowledge and decision-support tools, and by forging well-informed networks for bottom-up participatory water and land management. 'By forging strategic alliances at the local level with key governmental and non-governmental institutions and by anticipating national and basin-level iniaitives, priorities, needs and capacities, technical and institutional innovations emerging from local-level participatory research can be widely replicated wlsewhere and feed intot the new legal frameworks and basin organisations. Participatory research can facilitate the inclusion of the voices of the poor in basin and national level debates, by generating feasible recommendations to ensure an equitable, bottom-up representation of women and other marginalised resource users in the higher-tier decision-making bodies, due recognition of customary water and land management in formal laws, better protection fo poor people's water rights, more tranparency in public decision-making and in sharing of hydrological knowledge.

Source

Schreiner, Barbara, and Barbara van Koppen. Forthcoming 2003. Water Policy and Legislation to Eradicate Poverty and Redress Racial and Gender Inequities: the Case of South Africa. Water Policy. Volume 5, Issue 5. October 2003

3 Elements of good practice for participatory research and learning in the content of adaptive watershed management

Although it is beyond the scope of this paper to elaborate a "good practice guide" for gendered, participatory research in the context of watershed management, we offer some useful elements gleaned from the literature and from field experience. The first is an action-reflection cycle appropriate for the watershed management context (Fig 1.). The second is a collection of points to consider before embarking on proposal development. These refer especially to stakeholder relations, gender and diversity issues and to anticipation of the scaling-up process if the project or programme is successful.

The action-reflection cycle includes the stages described in most participatory innovation development approaches (Table 2), however it incorporates an additional element. The purpose of the new element is to integrate the concept of adaptive management so that the design of projects or interventions integrates research, management, monitoring and evaluation to provide a framework for testing assumptions and hypotheses, adaptation and learning in a participatory context at the landscape level. Rather than trying different interventions in a trial-and-error fashion, stakeholders identified through a careful and conscious process collectively analyse the prevailing situation, envision desired outcomes, and develop hypotheses about how given interventions can lead to these. Monitoring and evaluation mechanisms are implanted so that progress towards outcomes can be tracked along the way and a collective understanding can be developed of what worked, what didn't and why.

The goal of linking research to management and to learning is to influence biophysical and social processes in a landscape (a watershed) through technical, informational and institutional innovations in order to achieve a particular target condition or development outcome. Accordingly, an action-reflection cycle for this context should provide for the development and ongoing refinement of a conceptual model of who the stakeholders are and how they believe the system works. The model should be usful for developing hypotheses about how different interventions will perform, and in particular, how they will differentially affect different communities and social groups. The model should also provide a basis for defining the criteria and indicators that will be used in monitoring and evaluation and for assessing these criteria over time. The model should portray the way stakeholders understand the situation at the start of the project and how they think specific events, practices, attitudes, beliefs and behaviours affect the situation that they want to influence.

Figure. 1. An action reflection cycle for gendered, participatory, adaptive natural resource management, integrating research, management and learning (adapted from Margoluis and Salafsky, 1998).

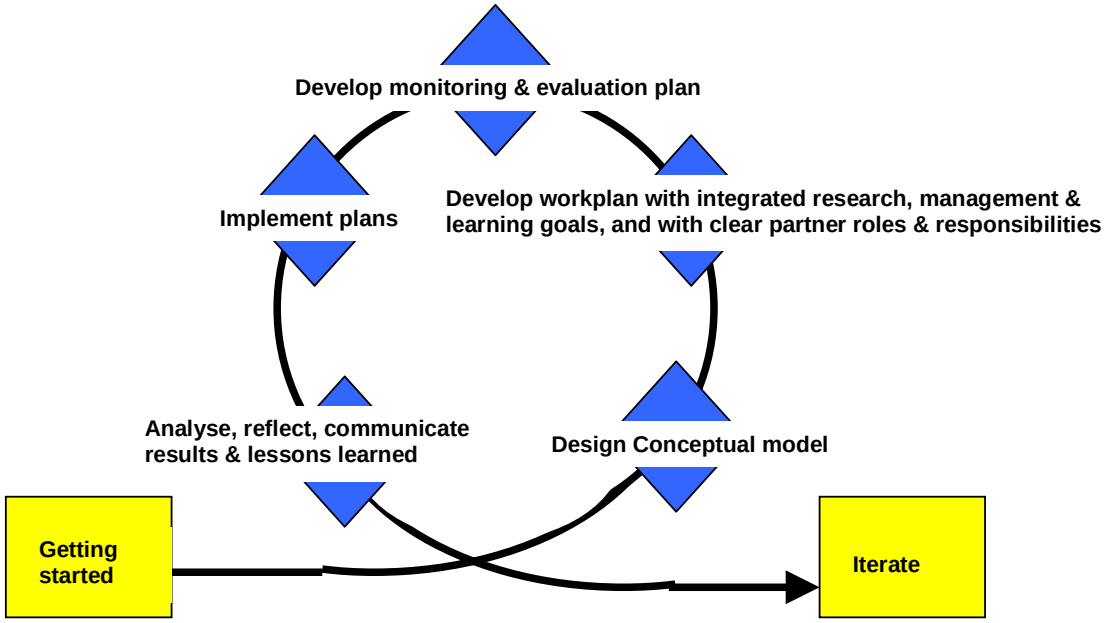

Table 2: A general process for participatory innovation development (adapted from Haverkort 1991)

Activity	Description	Examples of operational methods	Examples of output indicators
Getting started	• building relationships for cooperation • preliminary situation analysis and site characterisation • awareness mobilisation	• organisational resource inventory • community walks • screening secondary data • community surveys • problem census & projective techniques • visioning exercises	• inventories • protocols for community participation • core innovation network • enhanced agroecological awareness
Agreeing on priorities and identifying options	• identifying priorities • identifying local, community and scientific knowledge and information • screening potential options • developing selection criteria	• local expert workshops • techniques to tap indigenous knowledge (case histories, diagramming,preference ranking, local 'repertoire' and indicators, critical incidents • study tours • options screening workshops	• agreed research agenda • improved local capacity to diagnose a problem and identify 'options for improvement' • enhanced self-respect
Designing research	• review existing information and methods • planning and designing research • designing evaluation protocols	• • design workshop & prompting questions, slides/videos, case histories • testing alternative designs • farmer to farmer training	• research designs that are manageable, evaluable, reliable • protocols for monitoring and evaluation • improved local capacity to systematically design research

Conducting research	• implementation of experiments and studies • measurement/observation evaluation	• step by step implementation • regular group meetings • field days/exchange • supporting activities	• ongoing research programs • enhanced local capacity to implement, monitor and evaluate options systematically • enlarged and stronger exchange & support linkages
Sharing results with others	• communication of basic ideas and principles, results and process • training in skills, proven technologies, and use of research methods	• field workshops • visit to secondary sites • farmer to farmer training & hands-on training	• spontaneous diffusion of ideas & innovations • enhanced local capacity for farmer to farmer training & communication • increasing number of individuals and communities involved in participatory innovation development
Sustaining the innovation process	• creation of favourable conditions for on-going research for development	• organisational consolidation • development of resource materials • participatory monitoring of impacts on agroecological sustainability	• consolidated community networks/ organisations • resource materials • consolidated linkages with R&D institutions

Points to consider before initiating proposal development:

Local communities play a central role in the planning, implementation and funding of activities within participatory watershed development projects. The characteristics of proposed project should be defined with their participation. It is important to ensure that project activities:

- do not provoke conflict between resource users; where conflict is unavoidable, conflict resolution mechanisms should be specified early on
- do not further isolate marginal households that may not be able to participate in activities that require a labour or financial contribution
- do not undermine viable indigenous soil and water conservation techniques
- are informed by an understanding of existing practices (e.g. they do not immediately promote group activity if there is no history of communal cooperation)
- are feasible given current capacity within the community and external organisations;
- take into account underlying climatic, hydrological, soil and land use characteristics.
- Start from a position of familiarity with what has already been done and what issues have already been raised.

Participatory approaches are more likely to succeed if complex collaborative activities, such as soil and water conservation interentions, are delayed while local support and social capital are developed.

Watershed management and development projects can be institutionally complex. Effort is required to understanding the institutional environment in which they operate and to find ways to promote coordination. Key questions include:

- Which government departments, non-governmental organisations/institutions. community organisations,and individuals have a stake in the project ?

- How will these work with each other and any proposed new institutions (e.g. watershed committees)?
- Can local champions and lead organisation be identified? (vision, willingness to experiment and reach into the community are important qualities for any lead organisation)
- What are the main constraints to improved links between organisations (e.g. conflicting organisational mandates, resource control problems)?
- How can these be resolved (e.g. through earmarking funds to facilitate links, lobbying for changes in legislation, increasing the flow of information between organisations)?

Successful projects have often facilitated rather than directed watershed activities. They have worked with local people and other institutions flexibly and as equal partners. They have embraced participation and gender equity principles as part of their internal modes of operation. They have also placed a particular emphasis on the development of strong local groups through:

- devoting significant resources to social organisation
- engaging a high proportion of staff with skills in this area
- explicitly tracking changes in social organisation as part of project monitoring
- rewarding staff according to their success in group development.

The effectiveness of watershed development initiatives in alleviating poverty will depend on the distribution of costs and benefits in the short and long term. Particular attention should be paid to understanding and supporting the livelihood strategies of women and the landless. Key questions include

- Which resources are most important to the poor?
- How are land and water resources distributed within the community? If proposed activities will affect this distribution who gains and who loses?
- What non land-based activities can be promoted to benefit landless households (e.g. livestock, non-farm employment)?
- What impact will proposed activities have on women's workloads?
- Can these be reduced by introduction of drudgery-reducing alternatives (e.g. improved energy sources, better water supplies)?
- Will women have access to wage-earning opportunities? If so, what can be done to help ensure that they retain control over the money they earn?
- What is the inter and intra-household use of water in the uppper catchments and how does this vary among social groups (wealth, gender, caste, etc)?
- Who does what (e.g. water collection, distance and times) and who knows what with regard to resource use? What are different strategies used by different groups with regard to water management?

Specific capacity building efforts may be required to ensure that women, indigenous people and other marginalised groups are involved in decision-making about watershed development activities and the use of funds. Capacity building may also be required in order to:

- improve awareness of local technologies and how to adapt new technologies to local contexts;
- help NGOs and community-based organisations develop effective working relations with government departments;
- ensure that groups are able to manage finances effectively; and
- enable local people to be fully involved in monitoring and evaluation processes.

Effective monitoring of participatory watershed development is challenging because of the multiple objectives (social, economic and environmental) of initiatives and trade-offs (e.g. between environmental protection and short-term productivity gains). At the community level, monitoring can become a powerful catalyst for participation. Indicators should be negotiated with the local people, government organisations, research organisations, environmental lobby groups etc. who will be responsible for tracking progress and proposing changes where necessary. Systematic process documentation is a key part of ensuring that adequate analysis, reflection and learning can take place. Data collection and analysis need to be managed so that they can support monitoring and evaluation at different levels and scales.

There is still relatively little quantitative data on the scale of environmental or social benefits of wateshed development programmes. Success at a small scale may be difficult to scale-up to the level required to achieve a significant impact on poverty reduction. To improve the scope for scaling up, project design should consider:

- Which upscaling pathways will best facilitate wider replication?
- Is funding for networking and sharing experience included in the programme?
- Do NGO-led programmes have adequate linkages with relevant government organisations?
- Are project costs realistic? (Can the public sector, NGOs and communities afford to replicate the approach?)

Sources

Carney, D. (Ed). 1999. DFID Keysheets for Sustainable Livelihoods: http://www.keysheets.org/green_5_watershe_rev.pdf

Haverkort, B. 1991. Famers' experiments and PTD. IN: Haverkort, B., J. v. d. Kamp, A., Waters-Bayer,. Joining Farmer's Experiments. Experiences in Participatory Technology Development. IT Publications. London.

Margoluis, R. and N. Salafsky. 1998. Measures of Success: designing, managing and monitoring conservation and development projects. Island Press

4 Considerations for proposal development and review

What are some characteristics of a proposal that reflects a gendered, participatory approach to research as part of a adaptive watershed management and development process?

Evidence that a proposal embraces a participatory approach:

- Involvement of local people and other stakeholders at various stages in the work and not just at the end of the project or in a subsequent phase.
- Involvement of local people and other stakeholders in decision-making
- Priorities of poor men and women taken seriously as priorities for the project
- Appreciation for and building upon local knowledge and local institutions.
- Methodological descriptions indicate how local people and other stakeholders are to be involved in the work.
- Use of facilitation
- Sharing of findings
- Flexible approach to allow for adjustment to the process
- Iterative planning, action, reflection and replanning.
- Impact orientation.
- Development of documents, guides, etc useful to local people and other stakeholders
- Local involvement in monitoring and evaluation
- Project management operationalises concepts of gender and participation and assigns corresponding resources in the budget

Evidence that a proposal has not embraced a participatory approach

- Only scientific understandings and characterization work without involvement of local people (a study from the outside rather than one based on direct involvement)
- Only reports and scientific papers as outputs.
- Monitoring and evaluation that mainly relates to “numbers” and does not reflect the impact or outcome orientation of the work.
- Resource use assessments are not disaggregated by social criteria (gender, wealth etc)

Evidence that the participatory research is a key element of the proposal

- Research questions are clearly formulated
- Links between research and development outcomes are clearly drawn
- A process for participatory research is clearly described

Additional evaluation questions

- Is there evidence that the priorities of poor men and women and social groups have been identified?
- Is there a space for clarification of stakeholder expectations, negotiation about how research will be done, how the results will be disseminated?
- Is there evidence of mechanisms to support effective communication among resource users, researchers and other stakeholders
- Is there evidence that local sources of innovation are valued/utilised?

- Are women/women's groups included as important stakeholders
- Is there evidence that options for entry points have been explored?
- Are plans included for analysis of existing land water management institutions (formal, informal) in the watersheds?
- Have the full range of factors (policy, institutional, biophysical, social) that affect the quality and availability of water and other resources been considered?
- Are both technical and social options considered for improving resource use and availability ?
- Are local capacity-building activities contemplated and are correspoding resources assigned in the budget?
- Is capacity building contemplated for a number of critical areas: (e.g. collective action, advocacy, technology evaluation, group management)
- Is strengthening local decision making capacity in an equitable and inclusive manner a priority and are mechanisms and resources in place for doing so ?
- Is there an intention to establish an iterative process of role negotiation and clarification?
- Is there an action learning component?
- Are mechanisms in place to involve researchers and stakeholders in reciprocal learning processes
- Is documentation built in to support learning purposes?
- Is participatory monitoring and evaluation an integral element and provided for in the budget?

5 Extended Bibliography

Introduction

Pretty, J., and R. Hine. 2001. Reducing food poverty with sustainable agriculture: a summary of new evidence; final report from the SAFE-World Research Project. University of Essex, Colchester, UK. http://www2.essex.ac.uk/ces/ResearchProgrammes/CESOccasionalPapers/SAFErepSUBHEADS.htm

What is participatory research?

Allen, W.; Kilvington, M., Horn, C. 2002. Using participatory and learning-based approaches for environmental management to help achieve constructive behaviour change. Prepared for Ministry for the Environment, Landcare Research Contract Report LC0102/057, Lincoln, New Zealand. http://www.landcareresearch.co.nz/research/social/mfe_0102-057.doc

Ashby, J. A. 2001. Integrating research on food and the environment: an exit strategy from the rational fool syndrome in agricultural science. Conservation Ecology **5**(2): 20. http://www.consecol.org/vol5/iss2/art20/index.html

Borrini-Feyerabend, G., Farvar, M. T., Nguinguiri, J. C. & Ndangang, V. A.: *Co-management of Natural Resources: Organising, Negotiating and Learning-by-Doing.* GTZ and IUCN, Kasparek Verlag, Heidelberg (Germany), 2000. http://nrm.massey.ac.nz/changelinks/cmnr.html

Douthwaite, B. 2002. Enabling Innovation. Zed Books.

Guijt, I, Shah, M.K. (Eds) 1998. Myth of Community: Gender Issues in Participatory Development. Intermediate Technology Publications.

Margoluis, R. and N. Salafsky. 1998. Measures of Success: designing, manageing and monitoring conservation and development projects. Island Press.

NRM Changelinks: http://nrm.massey.ac.nz/changelinks/

Prabhu, R., Colfer, C.J.P., Dudley, R.G.. 1999. Guidelines for Developing, Testing and Selecting Criteria and Indicators for Susutainable Forest Management. CIFOR. http://www.cifor.cgiar.org/acm/download/toolbox1.zip

Reij, C. and A. Waters-Bayer (Eds.) 2001. Farmer Innovation in Africa: A Source of Inspiration for Agricultural Development Earthscan.

Waters-Bayer, A. Trials by scientists and farmers: Opportunities for cooperation in ecofarming research. IN: Koch, J. (Ed). Ecofarming Practices for Tropical Smallholdings. Verlag Josef Margraf.

What is the relationship of diversity analysis to participatory research?

Cuvi, María. 1996. Making the Link: Women and the Environment in Ecuador en Gender and Sustainable Development: A New Paradigm. New York: The United Nations Development Fund for Women.

Quisumbing, A. Ed). 2003. Gender, Household Decisions, And Development: A Synthesis Of Recent Research. International Food Policy Research Institute. http://www.prgaprogram.org/download/hosted_docs/quisumbing_gensys.zip

Van Koppen, Barbara. 2001. Gender in integrated water management: an analysis of variation. Natural Resources Forum 25 (2001) 299-312. United Nations. Elsevier Science Ltd.

Van Koppen, Barbara. Women and Water Rights. In: Quisumbing, Agnes, and Ruth Meinzen-Dick (eds). 2001 Empowering Women to Achieve Food Security. Focus 2020 – 6. IFPRI Policy Briefs. Washington: IFPRI

Zwarteveen, Margreet. Z., 1997. Water: from basic need to commodity: A discussion on gender and water rights in the context of irrigation. World Development. Vol. 25. No. 8. Pages 1335-1349. Great Britain: Pergamon Press

Zwarteveen, Margreet Z.. 1997. A plot of one's own: gender relations and irrigated land allocation policies in Burkina Faso. Research Report 10. International Irrigation Management Institute. Colombo, Sri Lanka: International Irrigation Management Institute

How is participatory research different from and complementary to conventional research?

Allen, WJ. 2001. 'Working together for environmental management: the role of information sharing and *collaborative learning*', PhD Dissertation (Development Studies), Massey University, pp 12-29, http://www.landcareresearch.co.nz/research/social/ar_working html

Arnstein, S (1969) 'A Ladder of Citizen Participation', *AIP Journal*, July 1969

Chambers, R (1994) 'Participatory Rural Appraisal (PRA): Analysis of Experience', *World Development*, 22(9):253–268

Cooperrider, DL and Srivastva, S (1987) 'Appreciative Inquiry in Organisational Life', Research in organisational Change and Development, 1:129-169. http://www.appreciative-inquiry.org/AI-Life.htm

Costanza, R, Daly; H, Folke, C, Hawken; P, Holling, CS, McMichael, AJ, Pimentel, D and Rapport, D (2000) 'Managing Our Environmental Portfolio', BioScience, 50(2):149–155

Guendel, S, Hancock, J and Anderson, S (2001) *Scaling-up Strategies for Research in Natural Resources Management*, Natural Resources Institute, Chatham UK ,79 pp http://www.prgaprogram.org/download/hosted_docs/gundel_scaling_up_review.pdf

Lilja, N and Ashby, J. 2000. Types of participatory research based on locus of decision-making. PRGA Working Document No. 6, CGIAR Systemwide Program on Participatory Research and Gender Analysis, Cali, Colombia. http://www.prgaprogram.org/download/working_documents/wd6.pdf

Martin, A. and A. Sutherland 2003. Whose Research, Whose Agenda? IN: Pound, B., S.S. Snapp, C. McDougall and A. Braun (Eds). Managing Natural Resources for Sustainable Livelihoods: Uniting Science and Participation. Earthscan/IDRC

Milne, M, McDougall, C, Siagian, Y and Uprety, L (2001) 'A Participatory Research and Gender Analysis Impact Assessment: The Local People, Devolution and Collaborative Management of Forests Research Programme' CIFOR Report to the CGIAR Systemwide Program on Participatory Research ad Gender Analysis, Center for International Forestry Research, Bogor, Indonesia http://www.prgaprogram.org/download/nrm_small_grants/cifor_small_grant.pdf

Rocheleau, D., B.Thomas-Slayter; and E. Wangari. 1996. Feminist Political Ecology. Global Issues and Local Experiences. Routledge, NY

Vanderwal, J.H. 1999. Public participation in environmental management. IN: Negotiating restoration: integrating knowledges on the Alouette River, British Columbia. MS Thesis, University of British Columbia. http://www.interchange.ubc.ca/plan/thesis/vanderwal/toc.htm

How can participatory approaches improve the outcome of research for watershed development?

Douthwaite, B. 2002. Enabling Innovation. Zed Books.

Engel, P. and M. Salomon Cognition, development and governance, some lessons from knowledge systems research and practice. Pp 49-65 IN: Wheelbarrows full of frogs, social learning in rural resource management. http://www.nethcold.org/images/engel&salomon.pdf

Hagmann, J. and S. Schroder-Beritschuh. 1997. Joint learning for change. Development of innovations in livelihood systems areound protected tropical forests. GTZ, Eschborn, Germany.

Humphries, S. J. Gonzales, J. Jimenez and F. Sierra. 2000. Searching for sustainable land use practices in Honduras: lessons from a programme of Participatory research with hillside farmers. AgRen Network Paper No. 104. http://www.odi.org.uk/agren/papers/agrenpaper_104.pdf

Röling, N.G. (2000). *Gateway to the Global Garden: Beta/Gamma Science for Dealing with Ecological Rationality.* Eigth Annual Hopper Lecture, Canada: University of Guelph/IDRC, October 24th. http://www.uoguelph.ca/CIP/hopper2000.pdf

Oxaal, Z. with Sally Baden. 1997. Gender and empowerment: definitions, approaches and implications for policy. BRIDGE Report No 40. Briefing prepared for the Swedish International Development Cooperation Agency. http://www.snvworld.org/gender/Chapter%202/Oxaal=Baden.pdf

What is the relevance of participatory research and learning to watershed research?

Johnson, N. and Knox, A.. 2002. Participatory Natural Resource Management in Watersheds: Concepts, Issues and Challenges for Research. Annals of Arid Zones 40(3): 1-20.

Ostrom, E. R. Gardner and J. Walker. 1994. Rules, Games and Common Pool Resources. University of Michigan Press.

Thomas-Slayter, B. and D. Rocheleau. 1995. Research frontiers at the nexus of gender, environment and development: linking household, community and ecosystem. IN Gallin, R and A. Ferguson (Eds). The Women and International Development Annual. Westview Press.

International Forestry Resources and Institutions: http://www.indiana.edu/~ifri/

Managing ecosystems and Resources with a Gender Emphasis: www.latam.ufl.edu/merge

Gender and Water Alliance: www.genderandwateralliance.org

The UNDP Gender and Water Resource Guide: Mainstreaming Gender in Water Management : http://www.undp.org/water/genderguide

van Koppen, B. 2002. A gender performance indicator for irrigation: Concepts, tools, and applications. Research Report 59. Colombo, Sri Lanka: International Water Management Institute. http://www.iwmi.cgiar.org/pubs/pub059/Report59.pdf

Bhatia, A., et al. (eds) (1998) Capacity Building in Participatory Upland Watershed Planning, Monitoring and Evaluation: A Resource Kit. Kathmandu: ICIMOD/PWMTA/FAO.

Farrington, J., Turton, C. & A.J. James (in press) Watershed Development and Rural Livelihoods in India. Delhi and Oxford: Oxford University Press.

Kerr, J., et al. The Role of Watershed Projects in Developing Rainfed Agriculture in India. Prepared for the Indian Council for Agricultural Research. Washington D.C.: World Bank.

Poats. S. How to include gender in the construction of management plans for portected areas: Case Study Antisana in Ecuador. (chapter from a forthcoming book).

Pretty, J.N., Thompson, J. & J.K. Kiara (1995) 'Agricultural Regeneration in Kenya: The Catchment Approach to Soil and Water Conservation'. Ambio, 24, 7-15.

Seckler, D. (1996) The New Era of Water Resources Management: From 'Dry' to 'Wet' Water Savings. Research Report 1, Colombo, Sri Lanka: International Irrigation Management Institute.

Wiens, P. The gendered nature of local institutional arrangements for natural resource management: a critical knowledge gap for promoting equitable and sustainable NRM in Latin America. IDRC. http://network.idrc.ca/file_download.php/wiens-Gendered_e.pdf?URL_ID=30039&filename=10534444290wiens-Gendered_e.pdf&filetype=application%2Fpdf&filesize=112837&name=wiens-Gendered_e.pdf&location=user-S/

Resources On Gender In Irrigation and Integrated Water Resources Management

Bastidas, Elena. P. 1999. Gender issues and women's participation in irrigated agriculture: the case of two private irrigation canals in Carchi, Ecuador. Research Report no. 31. International Water Management Institute. Colombo, Sri Lanka: International Water Management Institute

Cleaver, Francis (guest editor). 1998. Choice, complexity, and change: gendered livelihoods and the management of water. Agriculture and Human Values. Journal of Agriculture, Food, and Human Values Society. Vol. 15. No. 4. Dordrecht, The Netherlands: Kluwer Academic Publishers
Jordans, Eva H., and Margreet Z. Zwarteveen. 1996. A well of one's own. Gender analysis of an irrigation program in Bangladesh. Colombo, Sri Lanka: International Irrigation Management Institute

Kabutha, Charity, Herb Blank, and Barbara van Koppen. Drip Irrigation Kits for Small-holder Farmers in Kenya: Experience and a Way Forward. 2000. Paper presented at Micro2000 Congress International Committee of Irrigation and Drainage. 22-27 October 2001

Lahiff, Edward P. 1999. Land tenure on the Arabie-Olifants Irrigation Scheme. South Africa Working Paper 2. Nkuzi Development Association and International Water Management Institute. Colombo: International Water Management Institute

Meinzen-Dick, Ruth, and Margreet Z. Zwarteveen. 1999. Gendered participation in water management: issues and illustrations from water users associations in South Asia. In: Beck, Tony, Pablo Mose, and Barrie Morrison (eds) *The cooperative management of water resources in South Asia.* Vancouver, Canada: Centre for India and South Asian Research, Institute of Asian Research, University of British Columbia

Merrey, Douglas J., and Shirish Baviskar (eds). Gender analysis and reform of irrigation management: concepts, cases and gaps in knowledge. Proceedings of the Workshop on Gender and Water. September 1997. Colombo, Sri Lanka: International Water Management Institute
Saini, Harmeet, and Barbara van Koppen. 2001. Gender in lift irrigation schemes in East Gujarat, India. IWMI Working Paper 11

Schreiner, Barbara, and Barbara van Koppen. 2002. Catchment Management Agencies for Poverty Eradication in South Africa. Journal: Physics and Chemistry of the Earth. 27 (2002) 969 - 976. Devon: Elsevier Publishers

Schreiner, Barbara, and Barbara van Koppen. Forthcoming 2003. Water Policy and Legislation to Eradicate Poverty and Redress Racial and Gender Inequities: the Case of South Africa. Water Policy. Volume 5, Issue 5. October 2003.

Schreiner, Barbara, Barbara van Koppen, and Tshepo Khumbane. 2002. From bucket to basin: a new paradigm for water management, poverty eradication, and gender equity. In 2002 Turton and Henwood

(eds) Hydropolitics in and the developing world: a Southern African perspective. Pretoria: African Water Issues Research Unit. Center of International Politics. University of Pretoria pp 127 - 140

Van der Molen, Irna. An assessment of female participation in minor irrigation systems of Sri Lanka. 2001. IWMI Working Paper 7
Van Etten, Jacobijn, Barbara van Koppen, and Shuku Pun. 2002. Do equal land and water rights benefit the poor? The case of the Andhi Khola Irrigation Project in Nepal. Working Paper 38. Colombo, Sri Lanka: International Water Management Institute

Van Koppen, Barbara, Jacobijn van Etten, Prabina Bajracharya, and Amita Tuladhar. 2001. Women Irrigators and Women Leaders in the Water User Association of the West Gandak Large-Scale Canal Irrigation Scheme, Nepal. IWMI Working Paper 15

Van Koppen, Barbara, Rashmi K. Nagar, and Shilpa Vasavada. 2001. Gender and Irrigation in India. The women's irrigation group of Jambar, South Gujarat. IWMI Working Paper 10

Van Koppen, Barbara. 1999. Sharing the last drop: Water scarcity, irrigation, and gendered poverty eradication. Gatekeeper Series no. 85. International Institute for Environment and Development. Sustainable Agriculture and Rural Livelihoods Programme. London: International Institute for Environment and Development

Van Koppen, Barbara. 1999. Targeting irrigation support to poor women and men. International Journal of Water Resources Development. Vol. 15. Numbers 1&2. Pages 121-140. Hants, UK: Carfax Publishing, Taylor and Francis Ltd

Van Koppen, Barbara. 2000. From bucket to basin. Managing river basins to alleviate water deprivation. The contribution of the International Water Management Institute to the World Water Vision for Food and Rural Development. Colombo: International Water Management Institute

Van Koppen, Barbara. 2000. Gender and Poverty Dimensions of Irrigation. Techniques for Technical People. Key Note Address. Proceedings 6th International Micro-Irrigation 2000 Congress. Cape Town, 24 October 2000

Van Koppen, Barbara. 2001. Gender in integrated water management: an analysis of variation. Natural Resources Forum 25 (2001) 299-312. United Nations. Elsevier Science Ltd.

Van Koppen, Barbara. 2002. A Gender Performance Indicator for Irrigation: concepts, tools, and applications. Research Report 59. Colombo: International Water Management Institute

Van Koppen, Barbara. 2002. Gender Analysis for Improved Irrigation Performance. In: Sally and Abernethy (eds). Private Sector Participation in Irrigation Expansion in Sub-Saharan Africa. FAO-IWMI-CTA Regional Seminar, Accra, Ghana, 22-26 October 2001. Pretoria: International Water Management Institute

Van Koppen, Barbara. Women and Water Rights. In: Quisumbing, Agnes, and Ruth Meinzen-Dick (eds). 2001 Empowering Women to Achieve Food Security. Focus 2020 – 6. IFPRI Policy Briefs. Washington: IFPRI

Zwarteveen M., and N. Neupane. 1996. Free riders or victims: women's nonparticipation in irrigation management in Nepal's Chhattis Mauja Scheme. IIMI Research Report 7. International Irrigation Management Institute. Colombo, Sri Lanka: International Irrigation Management Institute

Zwarteveen, Margreet Z. 1994. Gender issues, water issues: a gender perspective to irrigation management. Working Paper 32. Colombo: International Water Management Institute

Zwarteveen, Margreet Z.. 1995. Gender aspects of irrigation management: rethinking efficiency and equity. In: Johnson, S.H., D.L. Vermillion and J.A. Sagardoy (eds). Irrigation management transfer. Selected papers from the International Conference on Irrigation Management Transfer. September 1994. Wuhan, China. Rome: International Irrigation Management Institute and Food and Agricultural Organization of the United Nations

Zwarteveen, Margreet Z.. 1997. A plot of one's own: gender relations and irrigated land allocation policies in Burkina Faso. Research Report 10. International Irrigation Management Institute. Colombo, Sri Lanka: International Irrigation Management Institute

Zwarteveen, Margreet Z..1995. Linking women to the main canal: Gender and irrigation management. Gatekeeper Series no. 54. International Institute for Environment and Development, Sustainable

Agriculture Programme London: International Institute for Environment and Development

Zwarteveen, Margreet. Z., 1997. Water: from basic need to commodity: A discussion on gender and water rights in the context of irrigation. World Development. Vol. 25. No. 8. Pages 1335-1349. Great Britain: Pergamon Press

Resources in Spanish on Gender and Natural Resource Management

Agencia Finlandesa de Cooperación Internacional. n/d. Análisis de género y forestería. Aspectos operacionales para planificadores, ejecutores y administradores de proyectos.

Borrini-Feyerabend, G. UICN. 1997.Manejo participativo de áreas protegidas: adaptando el método al contexto. Parques Nacionales y Conservación Ambiental. Temas de Política Social. Ginebre, Suiza.

Cuvi, María ed. Ecuador: las mujeres rurales de cara a Beijing +5. Lima: Flora Tristán. Centro de la Mujer Peruana, 2001 (en prensa).

Cuvi, María. "Hacia un enfoque sistémico: las mujeres rurales y el desarrollo" en María Cuvi, Emilia Ferraro y Alexandra Martínez. Discursos sobre género y ruralidad en el Ecuador. La década de 1990. Quito: CONAMU, 2000.

Deere, Carmen Diana y Magdalena León. Género, propiedad y empoderamiento: tierra, Estado y mercado en América Latina. Bogotá: Tercer Mundo Editores y Universidad Nacional, 2000.

FTPP, DFC, PAFE y FAO. 1996. Integrando el enfoque de género en el desarrollo forestal participativo. Seminario Latinoamericano. Memorias. FTPP, Quito.

Fundación Peruana para la Conservación de la Naturaleza. 1995. Experiencias en evaluación rural participativa en el proyecto pacaya-samiria Presentación. Gainesville. USA.

Garrafiel, R., A.,Mesquita, C., Durigan, E. A.,Borges, I. S., Souza, M. A: Rodríguez, M. J. P., de Abreu & N. P. Becerra. 2002. Conservação e participação comunitária com enfoque de gênero en Brasil. En Grupo Randi Randi y Universidad de Florida. Conservando la biodiversidad desde los Andes hasta la Amazonía: un foro internacional sobre conservación comunitaria con perspectiva de género. Quito.

Oliveira, R., S., E., Anderson. 1999. Género, conservación y participación comunitaria: El caso del parque Nacional Jaú. MERGE. Estudio de Caso Nº2. University of Florida /PESACRE/ Fundaçao Vitoria Amazónica. Gainesville

Paulson, S.1998. Materiales que apoyan e iluminan el trabajo con género y forestería comunitaria. FAO-FTPP/CERES. Bibliografía comentada. Cochapamba, Bolivia.

Poats, S. V., M., Cuvi, & P., Arroyo. 2002. Género y biodiversidad: balance y desafíos en el Ecuador. En Grupo Randi Randi y Universidad de Florida. Conservando la biodiversidad desde los Andes hasta la Amazonía: un foro internacional sobre conservación comunitaria con perspectiva de género. Quito.

Poats, Susan V., William Ulfelder, Jorge Recharte y Cecilia Scurrah. Construyendo la conservación participativa:: lecciones de la Reserva Ecológica Cayambe-Coca, Ecuador.2001. The Nature Conservancy, Ediciones Abya Yala, Quito.

Rico, M. 1997. Género, medio ambiente y sustentabilidad del desarrollo. Séptima Conferencia Regional sobre la Integración de la Mujer en el Desarrollo Económico y Social de América Latina y el Caribe. Santiago de Chile.

Rojas, H., M. 200. Trabajando con conservación con base comunitaria y enfoque de género: Una guía. MERGE. Estudio de Caso Nº3. University of Florida /PESACRE. Gainesville. .

Schmink, M. 1999. Marco conceptual para el análisis de género y conservación con base comunitaria. MERGE. Estudio de Caso Nº1. University of Florida /PESACRE. Gainesville

Sepia/Conservación Internacional. 2000. Conservación y manejo de áreas naturales con perspectiva de género y participación local. Encuentro Regional. Lima, Perú.

Van Dam, Chris. La equidad en el convenio sobre diversidad biológica: transitando un campo minado. Octubre 2000. Ponencia presentada en Congreso Mundial para la Conservación. Amman, Jordania.

Varese, M., L.,Dávalos, A.,Delgado, A., Diez, M., Rodrñiguez, M.A., Trigoso & G., Arnillas. 2002. Género y conservación de la biodiversidad en el Perú En Grupo Randi Randi y Universidad de Florida. Conservando la biodiversidad desde los Andes hasta la Amazonía: un foro internacional sobre conservación comunitaria con perspectiva de género. Quito.

Vega, Silvia (comp.). 1995. La dimensión de género en las políticas y acciones ambientales ecuatorianas. SÉPALES y UNFPA, Quito.