Local Participation in Research & Extension for Conservation & Development of Natural Resources: A summary of approaches[1]

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Introduction: Community Based Environmental Protection

Engaging in behavior to change a local situation, whether by an individual or an organizations, requires *discovering* that the current situation is problematic and related to human activity and that alternatives to current behavior and its consequences are possible. Once that has happened, individual, community and institutional actors can engage in mobilizing resources to bring about change. Awareness of a threatening situation at an international, national, or even state level may not lead to awareness of local issues and alternatives nor lead to local action. Discovery and engagement are intrinsic social activities. However, if that discovery and engagement are not widely present within a local area, action related to improving ecosystem health while at the same time dealing with issues of social equity and economic vitality is unlikely to be sustainable.

Water quality protection is one example of a global shift to local natural resource management. There is growing concern about the protection and supply of drinking water to citizens. Governments in many parts of the world suffer from a conundrum when it comes to water. They are mandated to maintain legitimacy through the provision of safe drinking water to their citizens. Yet, years of experience has shown that protection of water quality is not best carried out at the central level—except in the cases of where large water bodies have been diverted to provide water resources. Even in these cases (southern California and Israel are examples), the delivery of water over vast distances through centralized delivery

systems is eventually wrought with political problems. For instance, the residents of the inland West and environmentalists are demanding that the Owens Lake, the water from which has composed a major component of the Los Angeles drinking supply, be at least partially refilled to mitigate negative environmental consequences to air quality (Braxton 2000). In Israel, the damming of the Jordan River at the base of the Sea of Galilee (Lake Tiberias) is a major source of conflict, as Palestinians and Jordan demand rights to that water--which is the major contributor of Israel's "National Water Carrier" (see Wolf 1999.)

For years, national and international agency representatives thought of water quality and other natural resource management as a fundamentally technical set of issues—a matter of understanding the hydrology and the practices necessary to make that hydrology work for the benefit of humans. Engineers straightened channels, developed filters and chemical purifiers to make water potable, developed best management practices, and designed erosion mitigation measures. Communities, once concerned significantly with the provision of water (Nelson 1986), slowly became complacent that surface water could be controlled and a deeper well could always be dug should groundwater become contaminated (Postel 1992).

While the technical aspects of environmental protection are important, there is growing recognition that long-term environmental protection must happen at the local level. This has been codified in the legislative and administrative environmental protection initiatives around the world in the last several years. Community-based environmental protection should build on experience, gained primarily from international development work that often built on farming systems approaches, to include provisions and increasingly define methods for participatory natural resources management. Participatory development and natural resources management need much more specificity than simply a call for natural resources policy and management that is community-based.

Ideally, both drinking water protection initiatives and watershed management should now be locally based and community led. The ideal is laudable. But what are the elements that lead communities to take action to protect ecosystem health? What activities build the capacity for on-going water quality protection, and how do we know if this mobilization is successful? The operating assumption has been that the provision of information would be the essential ingredient in spurring communities to protect natural resources.

Our conceptualization of local action on issues of ecosystem health links context, process, and impacts (see Figure 1). The context refers to the social, economic, political and natural conditions of a given community as it organizes to protect drinking water. The process refers to the kinds of actions taken by community or other organizations and interim results of those actions to bring about change, such as structures built, organizations founded, membership increased, actions taken. The impacts refer

to the results of actions and outputs or outcomes, such as cleaner water or a more inclusive process of decision making that takes into account upstream and downstream stakeholders.
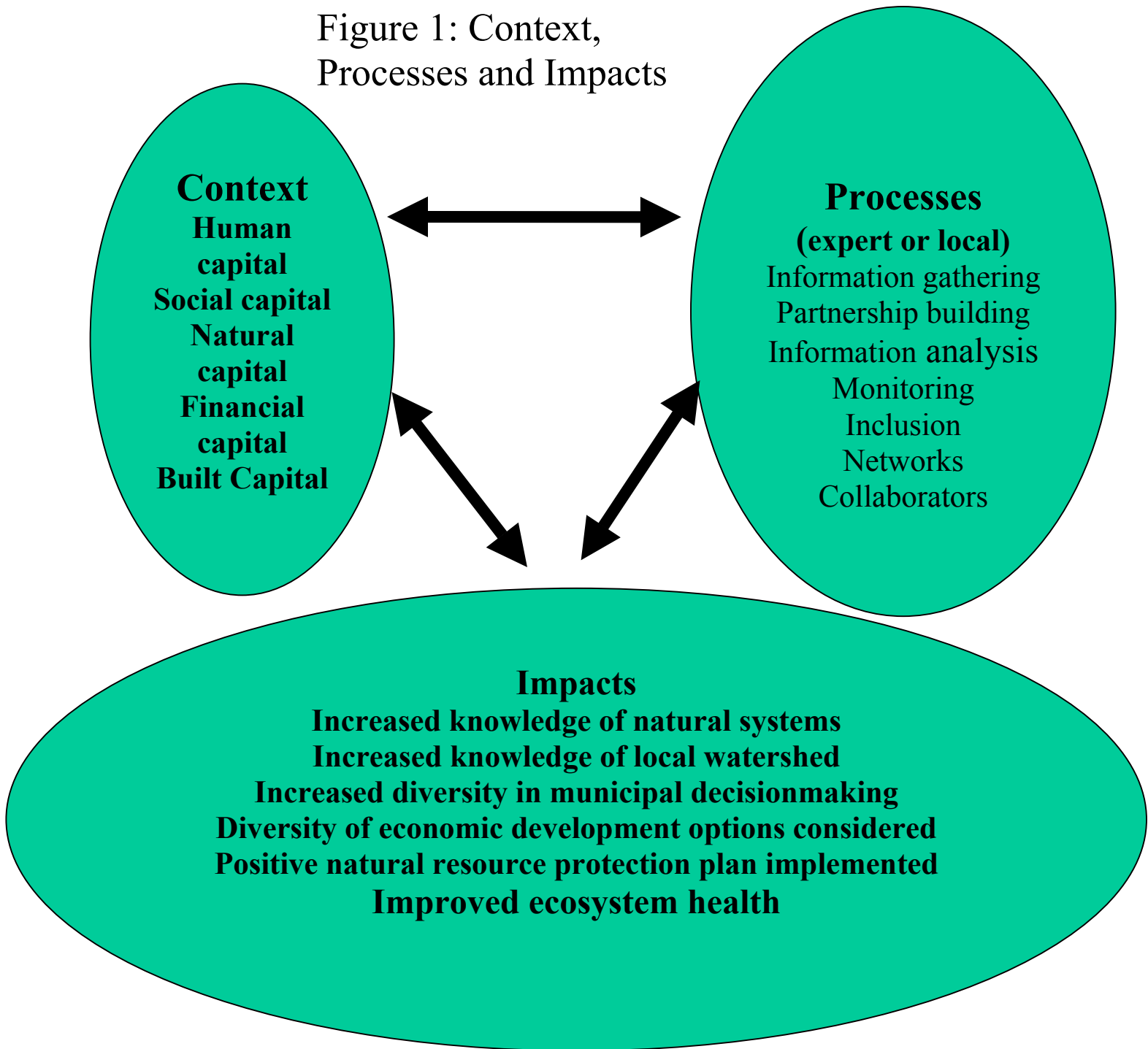
As an analytical tool we have used indicators of human, social, financial, built, and natural capital to measure the state and change at each of these phases of the process. (Figure 2) Policy analysts and social scientists trying to measure quality of life and sustainable development at the community level increasingly use these diverse kinds of capitals (Flora, et al. 1999; Hart 1999). Human capital relates to capacities, skill levels and abilities, such as health, education and training. Social capital relates to the social networks—density of relationships and interactions, numbers of social organizations in a community and participation in those organizations, relationships with groups and individuals outside the community or a clique within the community. Financial capital is the amount of financial resources available to the community, internally and externally—access to credit, ability to fundraise. We refer to infrastructure—roads, dams, and factories, for example—as built capital. Natural capital is represented by those natural resources in the area that are recognized as important—either as related to ecosystem health or human well-being. Recognition of the value of natural capital may play an important role in building coalitions (social capital) for protecting water quality—such as has happened in the Pacific Northwest with Salmon (Nugent 1997). Perception of landscape may also play an important role in furthering social capital among local people, again demonstrating the connection between social and natural capital (Flora 1997).

Too often in the past, communities, organizations, and government agencies have focused on financial and built capital, and occasionally human capital, to the detriment of social and natural capital. We are arguing that a systems approach to development, which includes discovery and engagement, will balance these aspects of development.

The interactions in this model are dynamic. For instance, in one case we have analyzed, the context of a long history of crabbing in the area allowed the opportunity for local activists (led by former Maryland State Senator Bernie Fowler) to use local knowledge about stream turbidity as a tool to build coalitions around improving water quality. Building on local knowledge of past turbidity, and contacts with the media, they have measured turbidity over the last 8 years by seeing how far they could wade into the river before their white tennis shoes disappeared. This was done first to spur action, and later to measure the results of action (Gasteyer and Flora 2000). We see then that local knowledge (a context variable of social capital based on natural capital) leads to a process that builds social capital that will impact the human capital, physical capital, and ultimately measures the impact on natural capital. The new context for further mobilization would be the common knowledge about the wade-in (which could constitute social capital, a history of past activism), greater knowledge of the impacts of actions on water quality, and newer structures to better prevent farmland and municipal runoff of sewage and storm water

(for more information see http://www.op.state.md.us/info/pressrel2a.html).

Figure 1: Context,
Processes and Impacts

Context
Human capital
Social capital
Natural capital
Financial capital
Built Capital

Processes
(expert or local)
Information gathering
Partnership building
Information analysis
Monitoring
Inclusion
Networks
Collaborators

Impacts
Increased knowledge of natural systems
Increased knowledge of local watershed
Increased diversity in municipal decisionmaking
Diversity of economic development options considered
Positive natural resource protection plan implemented
Improved ecosystem health

Our work on process indicators draws significantly from the literature on natural resources management in developing countries, where by necessity, because of the lack of financial resources, public participation has longer been a focus of development efforts. When implemented correctly, academics and resource management agencies have documented the positive benefits of public participation and civic empowerment as part of the process of better land and resources management. The conclusions of this work are that the process of protecting and managing water resources is necessarily linked to building, strengthening, and expanding the definition of community—and as such that watershed management must be related to community development and empowerment more broadly defined (Shaxson 1999). This means valuing local knowledge and local ways of knowing—not just as a way to get citizens to accept the conventional scientific wisdom, but as a way of expanding the learning and decision making process (Chambers 1983; Cortner and Moote 1999). Deutsch (1997), for instance, describes how locals in community-based watershed projects in both Alabama and the Philippines developed more effective means of measuring water quality at the local level than the implementing federal and state level agencies had developed. To understand the parameters for developing indicators of process, we have conducted a brief overview of participatory approaches to research and development.

Participatory Approaches: A Brief Overview

Participation is now widely touted as an essential component of development. While there is still a great deal of attention to the physical infrastructure in development, everything from planning to implementation of physical projects is carried out with some level of meetings and discussion with local citizens. This is particularly the case in projects that involve the management of resources—such as water—over the long term. Citizens, after all, will still be there after the engineers, scientists, agency managers and academics have moved on to new projects (see, for instance, the paper by Thomas Davenport, presented at the Soil and Water Conservation Society Conference, Watershed Management Fact or Fiction, March 27-29, 2000, La Crosse, Wisconsin). Their comprehension and support of the project will maintain the work done to protect the resource, or not.

There is increasing recognition on the part of officials involved in watershed management that there needs to be more attention to the 'social component' of watershed management. This is reflected in the amount of web space on agency web sites devoted to promoting 'partnerships' with communities. The 'gray literature' on ecosystem protection[2] increasingly mentions concepts such as 'partnering', 'stakeholder-based approaches', and 'community involvement' in natural resource management (see, for

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[2] This refers to reports and booklets by agencies such as the Environmental Protection Agency (EPA) and non-governmental organizations (NGOs) such as the National Audubon Society, League of Women Voters, and the National Groundwater Foundation.

instance, the list of resources in the League of Women Voters Education Fund 1994 report, "Protect your Groundwater: Educating for Action"). Even environmental protection that depends on farmer activity works best when the whole community is involved (Monson, 2001; Mountjoy, 2001).

This emphasis has led to a plethora of practices and processes aimed at involving local communities in natural resource management. The success of these efforts at bringing about participation of the local community, however, is less clear. This paper will outline the major theoretical approaches used in participatory resources management and development and to analyze how key agencies and NGOs have attempted to implement participation at the local level. Theories of participatory research and development, while they share common elements, also have differences. We summarize the literature on participatory research approaches, but focus based on participatory resource management approaches. Based on our summary of the theories of development and analysis of the approaches, we will propose indicators that may be used to measure the participatory process used in local level development.

Theory of participation

Participation in sustainable natural resource management involves both the *discovery* of threats to ecosystem health and alternative ways to reducing the risks from these threats and *engagement* in choosing, implementing, and managing the alternatives chosen. Traditionally, agencies have referred to discovery as research and engagement as development. However, in the field of natural resource management, the newer terms are more appropriate and provide a better description of what actually takes place (Kellogg Foundation, 1999).

Participatory approaches to research and development date back to the Frankfurt School of sociology in the 1960s. That group of critical scholars called for the development of true democracy by breaking down the presumptions of rationality behind science. Development of 'action sociology' and eventually 'action research,' which aimed to enhance local problem solving abilities through widening discourse, dialogue and respect for different kinds of knowledge, was based on the theoretical frameworks provided by Adorno and Horkheimer, (1974) and Marcuse (1964).

More recently participatory approaches have been distinguished as either Participatory Research or Action Research (Brown 1993). Action Research is more typical of the United States and Europe. It focuses on the freedom of the individual to make choices and act on those choices (individual agency), analyzing the problem and finding a solution rather than addressing the broader structural issues (Eldon and Chisholm, 1993). Citizens participate developing the solution to a problem, such as significant sedimentation of a stream, and then work with an outside researcher or development agent to jointly develop erosion control structures and practices in their community (see, for instance,

www.waterquality.iastate.edu/~bearcreek/). While this process solves the immediate problem, it does not necessarily build the long-term community capacity to address new problems in the future.

Participatory Research is more rooted in the liberation struggles for local people in the global South, though it is increasingly utilized in the United States with disadvantaged communities. It is heavily based on the work of Paolo Freire (*Pedagogy of the Oppressed* 1990, 1973), Fals-Borda (1984), Rahman (1993), and Tandem (1984). Conscientization and empowerment are parts of the goals of research (Brown, 1993). The aim is to empower local people with the skills and abilities to address the larger structural issues through addressing local concerns. For instance, as farmers collaborate to teach each other techniques in rotational grazing, they may be emboldened to begin address the larger questions of why so little of the state research dollars are spent on sustainable agricultural technologies (Hassenein and Kloppenburg 1998, Kroma 1999).

PR is criticized for focusing on local knowledge development and local inclusion in the development process and too little on the political and funding context that drives what can be done at the local level. While this criticism may have merit in many cases, it is not necessarily true that PR focuses on the local context to the exclusion of the political and funding context. Indeed many projects coalesce around pots of money that have been made available for natural resource protection or management. Additionally, more recent attempts to implement participatory management have focused not just on local process, but on the ability of local actors to establish relationships at the state and national level to make standards and regulation more relevant for local conditions, secure funding for ongoing work and ensure political support.

PR has been criticized for non-generalizability of findings. Findings are so site specific, according to some, that it is impossible for researchers to use the findings from one site in other situations. Traditional scientists stress control over the research process so that their findings may be generally applied. There has been a great deal of progress over the last decade in specifying what components of participatory research might be more generalizable. This progress has come not only from locally-based research developing more definable methods and research designs, but also from the academic community becoming more tolerant (at least in rhetoric) of participatory approaches. There is, however, still a long way to go before citizen-led discovery is broadly accepted as a basis for action by policy makers and implementors. (See Rocheleau 1994.)

Still, proponents of participatory research have documented its advantages. Participatory research tends to often be more **efficient** than conventional research and development, as it potentially takes care of the outreach and technology transfer components of moving research from test plots to the field. Related to this is the important aspect of training local people as part of the discovery process. Gaventa and Horton (1981) describe this with the Appalachian residents who were trained in research

methods so they could carry out the research that they needed to empower themselves to act to improve local conditions. Likewise literacy was incorporated into research projects in Mali, and World Neighbors provided training in research methods so that farmers in Latin America could carry out on-farm tests (Kleene 1984; Bunch 1990). This is often done to ensure that the research methods and the knowledge recognized remain within the bounds of traditional scientific research. Training to carry out local discovery can leave the community useful skills through the research process and into the engagement phase of implementation.

PR is also more **holistic** than conventional research, as it incorporates a range of issues into the research design. Guijt and Thompson (1999) document how participatory approaches better incorporate multiple aspects into discovery and engagement by addressing the needs of locals that relate not only to reductionist, single issues, but to relationships between biophysical/natural resources, economy and local/political concerns.

Ashby (1987) identifies three types of participatory approaches in agricultural research that led to three types of post-research management patterns by farmers.

1) Process-nominal participatory approaches involved farmers through asking their opinion to verify researcher findings. There may also be consultation with farmers or locals so that the researchers can better adapt this context into the research design in future research. There is little capacity built for post-research decision making by farmers

2) Consultative participation. Farmers are consulted in the research process, and farmers sometimes carry out research. The scientist always manages the research process. Likewise, farmers/locals are unlikely to gain capacity for decision making when the researchers are not in the area.

3) Farmer decision-making. Farmer/locals help to develop research design and methodology. This methodology builds decision-making capacity. It is more likely to lead to change of behavior by locals/farmers, as they develop, learn and test new skills themselves. In the case of pesticides, the farmers were not burdened by needing to consult with experts—they had learned decision-making skills in the process.

In other cases, as in conventional on-farm trials and demonstrations, the discovery process involves a certain level of training so that community members, in this case, farmers, can implement the research. The researchers also consult farmers about local conditions, practices, and equipment. Baker (1988) describes this process in a project where new seed varieties were introduced in northeast Brazil. That discovery process is an example of consultative participation, where the researchers controlled the discovery process and fed the results and insights into their models. The community residents, while possibly learning how to carry out randomized block design for testing seed varieties, and learning which varieties responded better to their conditions, gained relatively little in terms of developing decision

making capacity. They further, came no closer to a consensus about the major problems and opportunities in the community and how the project might address these issues (Baker 1988).

Participatory approaches in discovery are of two types. The first are *extractive* approaches, designed help researchers from outside the community get more grounded information out of the community and back to the laboratory so that it may be inserted into the research design. The second are *non-extractive*, where the researcher and the community work together in designing, implementing, and evaluating the discovery of problems and alternative ways of dealing with them. The research is designed primarily to be beneficial to the local community. In other words, the non-extractive methods are built on the concept of joint inquiry by the researcher and the local population. Participation is a critical part of the process of discovery toward the fulfillment of practical needs leading to empowerment of (especially disenfranchised) people (Gaventa 1999).

An important aspect of this is the respect for different kinds of knowledge. Bebbington (1993) argues that participatory approaches in the context of agriculture must recognize the farmers as legitimate agricultural experts. Likewise, Chambers (1983) argues that in development more generally, scientists and managers of development projects need to approach local people as the experts in the area where they live and work. While outside technical experts have a sound knowledge about specific issues, they often lack the holistic knowledge of interrelationships within a given place. Chambers (1983) and others such as Savory (1989) and Allen (1996) argue that local people are better able to discover this information as they have place-based, experiential knowledge. This means that scientists and technical managers need to spend more time working with and deferring to the insights of local people in development initiatives. Development and resources management -- engagement -- should be seen as a process of negotiation between local and outside interests regarding objectives, goals, outputs, outcomes and indicators for evaluation, rather then an agenda set by outsiders.

It is unfortunately widely reported that often, even in projects that purport to be participatory, only partial negotiation takes place. Too often, the community is consulted about the project *after* researchers or project managers have established the goals and objectives of the initiative. Or, if project managers decide the goals later in the process, they do so on criteria other then local advice (Mazur and Tittola 1992). Mosse (1993) asserts that outsiders and researchers often determine the ground rules for projects that are based on assumptions that may or may not be applicable in the local context. This imposes a value system and "ideas of relevance that determine what is accepted as knowledge," and possibly ignores other epistemologies and ways of knowing that may exist within a given community. The answers to the questions of 'who participates' and 'whose knowledge is represented' can indicate the strength of participation of different individual and institutional actors. Rocheleau (1994:4) argues that

participatory approaches might be used as a way to make conventional, top-down development look better.

On the other hand, researchers face a conflict between the demands of respectable research and that which can be achieved with participatory approaches. Participatory approaches tend to take longer and often require at least a combination of qualitative and quantitative methods. Research journals, however, usually require disciplinary and methodological purity and adherence to orthodox standards of acceptable data gathering protocols. Even development professionals often feel they need results—often counted in terms of structures built or technologies adopted—after a finite (and generally relatively short) period of time in the field. Disciplinary purity and meeting exact schedules are hard to accomplish using participatory approaches, where the process is often the most important result (Bentley 1994).

Kroma and Mears analyzed 24 randomly sampled participatory research case studies from 334 cases found through systematic combing of academic and research indexes. In a survey of the literature about participatory approaches, they summarized the major advantages of participatory approaches. In spite of the multiplicity of meanings, goals and interpretations surrounding participation in research, certain common elements emerge in participatory research literature that underscore its potential as a valid paradigm for engendering a holistic understanding of our complex human environment that would then lead to constructive engagement. These common elements include:

1) **Efficiency** increases, as the link between discovery and engagement are relatively seamless. Participation often allows research to skip the extension and outreach function of moving research from the research site to the field;

2) **End-users knowledge base expands.** Participatory research can be targeted at improving local capacity, and the process can involve passing on skills to the local people that may be used in future decision making;

3) **Quality of data,** including both reliability and validity, can increase for social science and some biophysical data. Often participatory approaches allow data to be far more reliable, as it is related directly to end-user interests and concerns and they themselves gather the data;

4) **Contextualization of the research** enhances future action. Participation allows researchers to do much more grounded research that relates to the local context far better than conventional approaches to research. While this may be considered a problem in terms of the generalizability of data, it is also an asset, as research is more locally applicable and can address real problems in the areas where the discovery work takes place;

5) **Logistical sustainability** increases. Examples from Senegal, Brazil and elsewhere demonstrate that participatory approaches to discovery are better at finding "a technical solution to a socioeconomic or

technical constraint identified in the real environment" (Matlon 1984, 133), as a result of being better rooted in the local context.

6) **Conscientization of the researchers and local community** is more likely in participatory approaches due to the dialogic process that is necessary. Gaventa and Horton (1981) demonstrate how the process of participatory research helped local people understand the roots of their disenfranchisement and poverty and to empower themselves to change those conditions. At the same time, researchers came to better understand these conditions.

7) **A holistic approach to the research process** is more likely using participatory approaches, as local residents, particularly farmers, tend not to see the world through the sectoral lenses of technicians and scientists.

Distinguishing Approaches to Participatory Research from Management and Development.

Participatory approaches have been designed to serve either the needs of community researchers (discovery) or development implementers (engagement). There is an important linkage between the two, but there are important distinctions as well. Research is often aimed at answering a predetermined question stemming from disciplinary or centralized bureaucratic imperatives. When participatory approaches are used, it is more likely that the discovery objectives will address problems of concern to the local community and that the question will be broadly framed. Participation in both discovery and engagement increases the probability that what is discovered will eventually lead to action and leave any lasting impression on the community.

Development projects -- which we conceptualize as engagement -- are explicitly place and problem oriented. Such projects attempt to use the results of discovery -- either locally determined or from general principles -- to guide the implementation of particular activities aimed at particular outputs. The implicit assumption is that over the long-term, the outcomes of the activity will be positive, as the outputs facilitate achieving the desired future conditions. Too often, however, projects are developed that solve a specific problem in the short term, but in so doing create longer-term difficulties because the solution did not address the systemic causes of the problem. Flooding is a good example, as the short-term solution of putting in dams, dikes and levies may only further upset the hydrological function of the waterway, leading to even greater water management problems in the future.

Core Elements of Participatory Community-Based Natural Resource Management

From a review of the theoretical literature on participatory approaches to community-based natural resource management, which we view as the product of discovery and engagement, we have identified ten core elements of participatory development.

1) **Diverse perspectives**: The realization that conventional natural resource management has tended to try to solve problems from a narrow range of options has been one of the main motivators for

participation. Often, for example, citizens in resource extraction communities believe they must chose between preserving the environment and economic well being. As long as the perspectives voiced in addressing the issue are only those of a particular sector (class, ethnic group, industry, occupation), development of alternatives to such zero sum thinking is not likely to occur, and other voices who may present less stark alternatives will be excluded from the discussion. By seeking perspectives of those who have not conventionally participated in decision making, the community may develop other options that will allow for solutions that serve multiple interests, rather then trading off one for the other (see Freire 1973, Chambers 1983, Habermas 1989).

2) **Systematic learning**: Participatory resource management is often an ongoing process that values constant learning and adaptation to new insights and constantly changing conditions. Communities develop a process for understanding the local economic, social, and natural system and analyzing how actions and policies impact that system. By establishing processes that encourage constant learning and adaptation, communities debunk the myth of the silver bullet that will solve the problems in perpetuity. They are more likely to decide to take actions to address identified important issues, but develop a systematic approach to measure the impacts of those actions. Community members are likely to begin valuing their own insights and knowledge systems if they are helped to develop a systematic way of learning about the ecological, social, and economic system in which they live—and evaluating actions in reference to those systems. Ultimately natural resource management should be about empowering communities to improve their quality of life through better investments in their natural resources. Through developing a systematic learning approach, community members potentially develop the tools for ongoing analysis in the management of natural resources, rather than having to depend on outside experts (Pretty and Chambers 1994, Guijt, et al. 1999, Innis and Boherman 1999).

3) **Context specificity**: Conventional natural resource management often presents technologies and methods that can be applied in many places simultaneously. Examples of this are the agricultural technologies, such as hybrid seeds, that were widely distributed to farmers as improvements with relatively little adaptation to the local ecological, economic, and social context. While these technologies created some improvements in quality of life for some farmers, they also contributed to ecological and social problems (Hazel 1990, Pretty 1996, Allen and Bosch 1999). Participatory approaches often emerge out of an effort to create development processes that are much more rooted in the local context. Communities carry out activities, such as transect walks, where a group from the community walk across the various ecosystems and microclimates of their community or farm, to understand the ecological/environmental, social, and economic aspects that make up their community. The community and outside experts together identify issues, propose solutions, and evaluate actions

based on an understanding of the local context. Outside technology may be brought in, but is adopted based on, rather than in spite of, the local context (Savory 1989, Pretty and Chambers 1994).

4) **Group inquiry**: Often conventional development involves decisions made by a small group within the community, often in collaboration with outside experts (sometimes scientists) who interact with other development experts or researchers, but not others in the local community. Many participatory approaches, in constrast, explicitly attempt to widen the circle of decision making to involve more of the community. Group inquiry involves an open process where community members meet and identify the major issues of concern and existing community assets and begin a process of identifying possible solutions for those concerns, using local tools as much as possible. Numerous methodologies, such as the development of cognitive maps, have been developed to facilitate group inquiry into problems and possible solutions (see Slim and Thompson 1996, and Rocheleau 1994).

5) **Facilitating External Agents**. While most of the writing on participatory approaches has emphasized the need for empowerment of local citizens, many approaches also recognize that external development agents (either from government agencies or non-local non-governmental organizations) will play a key role shaping management of natural resources and development at the community level. These external agents can provide technical and scientific knowledge, but also can provide an essential outsider's view that will illuminate certain factors or patterns in the community. They can provide alternatives to the local assumptions about how to manage natural resources, and economic, social system options. They may also have the freedom to challenge existing social hierarchies, taboos, and power structures--allowing for future local processes that are more inclusive and participatory. In some cases, literature on participatory approaches has explicitly tried to outline the appropriate role for external agents in community development and the points in the process where they should be more or less dominant (Rocheleau 1994; Chambers 1983; Engel and Soloman 1997).

6) **Sustained learning and action**: Many of the approaches to participatory development emphasize that community development and management of natural resources implies a commitment to long term management, rather then quick fixes and immediate technical solutions to existing problems. It has been necessary, then, to design approaches to participatory development, planning, and natural resources management that are based on long term, sustained learning and action. Often, this involves activities that will reward accomplishment by members of the local community. For instance, the project might involve organized field visits to local farms where the owners are trying innovative approaches. Other initiatives might also develop and publish the indicator frameworks the community has developed to monitor progress toward agreed upon goals. Community learning sessions are a good way to allow community members to learn from each other about the history,

ecology, and society they live in. In other cases, experts train residents of the community in research techniques so they can carry out future research of interest. This is all done as part of empowering the community in long term development decision making and natural resources management (Innes 1996, Guijt, et al. 1999, Engel and Soloman 1997, Rocheleau 1994).

7) **Outcomes**: Part of the process of empowering communities to approach development and management as a long term learning process is rooted in encouraging communities to think of desired outcomes, rather than about outputs. Conventional development has been based on the construction of outputs--the physical results of activities—infrastructure and events. For instance, the attempts to alleviate poverty in the 1960s often involved the construction of infrastructure such as roads and sewer systems. While these outputs produced countable products for the dollars spent, they often did little to change the social structures in persistently poor communities that kept poor people marginal, disenfranchised, and poor. By deciding on desirable outcomes as a first stage of the project, activities can be designed, evaluated, and amended according to those outcomes, so that they lead toward achieving project goals (Engel and Solomon 1999; Flora 1998).

8) **Monitoring**: A number of the elements of participatory approaches mentioned above (such as 'systematic learning,' 'sustained learning and action,' 'group inquiry,' 'outcomes') are linked to the development of a community monitoring system. In the last couple of years there has been increased effort by both practitioners and academics to develop monitoring systems that are applicable at the community level. Monitoring depends on the community agreeing on social, economic, and environmental goals and desirable outcomes of activities. These negotiated outcomes are generally built from a community visioning process, often present in strategic plans. Based on these, the community can then participate in a process of developing indicators and then a framework for monitoring the community's activities to assess whether the activities and outputs of those activities lead toward the desired outcomes. Whether the monitoring is done using indicators developed locally or indicators available through academic or agency databases depends on the availability of appropriate information, how that information is going to be distributed, and the purpose of monitoring. For some communities, local indicators, such as a wade-in systematically done on an annual basis to check turbidity, are more effective in spurring action then scientific indicators in encouraging community action (see Gasteyer and Flora 2000). Other contexts (such as large urban areas) require the legitimacy of monitoring using scientifically accepted indicators (Hart 1999; Innes and Boherman 1999, Innes 1996, Flora 1998, Andrews 1996).

9) **Evaluation**: Often participatory approaches involve evaluation both by the end users and the researchers or technical managers of the development or management initiative. This allows community members to voice an opinion about the initiative, whether it accomplished anything

important for the community, and what would make the process more useful in the future. Comparing the community and outside agents' perspectives on the project may also illuminate differences in perception and lead to better interactions between these groups in the future (Guijt, et al. 1999; Slim and Thompson 1994).

10) **Participatory Contract**: Projects develop a participatory contract to ensure that the rights and responsibilities of community members and researchers and outside managers are transparent and explicate. All members of the initiative sign an agreement that states clearly what they will do and what they expect to receive in return for their efforts. The contract also specifies when each party is empowered to break the agreement. In this way expectations of what the process will produce are clear from the beginning of the initiative (Pretty 1996).

Participatory Approaches and the Core Elements

We identified 12 theoretical approaches to participatory resources management and community development, which we briefly describe. We then compare them on the ways in which they include the core elements of participation.

I. Participatory Rural Appraisal (Chambers1983, Hinchcliff, et al. 1999)-This is the most well documented participatory approach. It has been most often applied to research and development and research with small farmers. However, it has also been applied to cases ranging from education, to microfinance, to sustainable community development. The premise of the approach is that community participation is enhanced through a reversal of the roles of outside expert and local citizen. While outside, technical experts have certain skills that are important, locals have the true expertise about their own village/town/ borough. Development experts must learn to ask, rather then tell local people what to do. The methodology assumes that popular participation and local knowledge are key at each stage of a given initiative. Participatory development approaches involve respect for local knowledge, technologies, and involve the development of tools that are appropriate to the local context.

II. Institutional Analysis for Development Framework (Ostrom 1987, 1992, 1999)-This framework may be used for the analysis of community management of common resources (as Ostrom did in her 1987 book *Governing the Commons*) or to guide communities as they attempt to develop frameworks for community management of common natural resources. Ostrom describes this in her 1992 book *Crafting Institutions for Self-governing Irrigation Systems*, which outlines how development agents can identify those existing social institutions that will enable a community to sustainably manage resources such as irrigation water. This process defines institutions as organizations (such as firms, government and non-governmental agencies, religious institutions or families) and existing rules that structure patterns of

interaction and behavior (such as markets, social hierarchies, and international, national, and local laws). Participatory approaches derived from this framework would focus on physical/material conditions, community attributes, and the existing rules. These would set the conditions for the "action arena," where those using the framework would list both the actors and action situations. Analyzing the action arena basically involves identifying the following: different actors; their different positions and potential positions; the set of allowable actions within this context; the potential outcomes of these actions, the level of choice about actions; the information available; and the costs and benefits to each actor of actions and outcomes. Using this method an outside development agent can identify the context, actors, and rules that set parameters for actions, the outcomes of actions on each actor, and the ability of actors to change actions. The analysis can lead to the identification of ways to organize society so that the community has the capacity to address future issues.

III. Institutional Analysis for Development Framework (Ostrom 1987, 1992, 1999)-This framework may be used for the analysis of community management of common resources (as Ostrom did in her 1987 book *Governing the Commons*) or to guide communities as they attempt to develop frameworks for community management of common natural resources. Ostrom describes this in her 1992 book *Crafting Institutions for Self-governing Irrigation Systems*, which outlines how development agents can identify those existing social institutions that will enable a community to sustainably manage resources such as irrigation water. This process defines institutions as organizations (such as firms, government and non-governmental agencies, religious institutions or families) and existing rules that structure patterns of interaction and behavior (such as markets, social hierarchies, and international, national, and local laws). Participatory approaches derived from this framework would focus on physical/material conditions, community attributes, and the existing rules. These would set the conditions for the "action arena," where those using the framework would list both the actors and action situations. Analyzing the action arena basically involves identifying the following: different actors; their different positions and potential positions; the set of allowable actions within this context; the potential outcomes of these actions, the level of choice about actions; the information available; and the costs and benefits to each actor of actions and outcomes. Using this method an outside development agent can identify the context, actors, and rules that set parameters for actions, the outcomes of actions on each actor, and the ability of actors to change actions. The analysis can lead to the identification of ways to organize society so that the community has the capacity to address future issues.

IV. Adaptive Management (Walters 1986)—This theory comes out of conservation biology. It was developed as a way of addressing a constantly changing ecological context in management of natural resources (specifically wildlife, but also other natural resources like water). The approach is in response to the conventional approach to management of natural resources that places natural resources management entirely in the disciplinary realm of natural scientists, to the exclusion of other academic disciplines. The conventional approach would attempt to achieve a smooth running ecosystem through excluding humans from the system. Adaptive management recognizes humans as part of the ecosystem and argues for a management strategy that involves consideration of social and economic factors. Adaptive management is rooted in four basic issues: 1) management of natural resources in terms of objectives and social constraints on action; 2) management based on explicit models of dynamic behavior that may change over time; 3) constant monitoring to assess whether actions and models are moving the community toward the objectives; 4) integrating human productivity/development with management of natural resources.

V. Holistic Management (Savory 1989, 1999)—This approach comes out of critical appraisal of conventional range management and agricultural research. It is based on the premise that management of natural resources must be linked systematically to the social and economic system. It bases management on consensual goal setting and determination of outcomes by the community. These, in turn, drive actions, followed by systematic, context based monitoring and observations to determine the impact of a given action on the larger integrity of the system. While sector specific, scientific observations (research results) provide useful information, these observations should only drive action when they are related to the functioning of the entire system.

*VI. Environmental Dispute Resolution (*Smith, L. Graham, et al. 1997)—This approach is an attempt to develop a participatory management framework that is rooted in resolving social and political disagreements over appropriate management of natural resources. It is based on the identification of a wide range of stakeholders in a given situation, their inclusion in a process to develop a better resource management strategy, the identification of political institutions that provide opportunities or constraints, and the empowerment of actors to have access to resources and manage according to long-term goal s of sustainability. The process sees ecosystem, social and political variables as specific to a given context, and thus sound scientific methods of problem and solution identification must be employed in each place where the process is implemented. This includes social science tools for understanding social and political structures that frame empowerment of different stakeholders to act. Information must be open to all stakeholders, as must be the ability for each group to have representation in decision-making bodies.

The resources manager (government agency or other institutional representative) must facilitate attempts at consensus among stakeholders on resources management—possibly dragging unwilling agencies into the process. Formal bargaining and negotiation must be established in cases where consensus is not possible. Thus the approach uses a stakeholder-based approach that combines institutional analysis, empowerment, conflict resolution, and consensus building in resources management.

VII. Cooperative Ecosystem Management (Yaffee 1996)—This theoretical approach to participatory management attempts to specify how various actors in a given resources management system may work together to protect natural resources. The approach is grounded in naming the various stakeholders and stakeholder visions, developing a shared vision of resources management, and developing an implementation plan that matches the vision. By including the different stakeholders—producers, tourists, residents, non-governmental organizations, scientists—the community can develop a management system that balances the need for resource protection and community economic well being. The process is based on the premises of participatory management—where as many of the stakeholder groups as possible negotiate management of resources based on sound science.

VIII. Integrated System for Knowledge Management (Bosch and Allen,1996)—This approach to participation comes out of the tradition of agricultural systems analysis. It is founded on the perception that conventional, industrial and scientific systems for managing natural resources—both in farming and other resource management systems—are too constrained by sectoral thinking. The process is designed to incorporate the diverse perspectives of multiple actors—specifically with the goal of developing management through a systems approach, thus breaking down the blind spots that are inherent in sectoral management approaches. Respect for alternative knowledge systems is an essential component of this approach.

IX. Environmental Management (Röling 1992)—This approach comes out of critique of conventional agricultural research and development and the focus on productivity at the expense of other values. Röling attacks conventional science for developing a system with rigid divisions between social, economic, and environmental sectors and proposing solutions that only address one sector at a time. In contrast, Environmental Management is based on a soft-system methodology that encourages cross-sectoral exchange of ideas and values local knowledge that views issues holistically. It takes a nested systems approach that assumes that development may happen simultaneously at multiple levels (platforms such as the farm, the community, the ecosystem, the watershed) and that stakeholders at each of these levels must include citizens, farmers, agency representatives, and social and natural scientists.

The management and research system is predicated on respect for insights from each of these groups and responsiveness to ecosystem and social system feedback through information (indicators).

X. Rapid Appraisal of Agricultural Knowledge Systems, RAAKS (Engel 1997)—This approach is designed for rural development, specifically with small farmers. The approach starts with the development of community goals and visions, and from builds an analysis of institutional, social, economic and ecological opportunities and bottlenecks. A systematic approach to analyzing the existing coalitions of social groups in the community is essential to understanding these opportunities and bottlenecks. Systematic monitoring of the outcomes of actions in the other areas is important as well. The approach addresses natural resources issues in three phases—each basing new goals, outcomes and implementation strategies on the outcomes of the previous phase. While an outside expert may assist with facilitating the process in Phase 1, the outside experts should see their role as training community members and then playing purely an advisory role in the later phases.

XI. Communicative Planning (Innes 1992, 1996, 1999)—This planning approach developes a decision making process that is based on dialogue among diverse stakeholders within a given community. The dialogue leads to the development of community consensus around goals and objectives that are related to the existing ecosystem. Development of system indicators that can serve as feedback to the community in reference to actions taken supports achieving the goals and objectives.

XII. Asset Mapping (Kretzman, and McKnight. 1993.)
This approach is an effort to move beyond the traditional problem identification strategies of community development that are often disempowering, especially to persistently poor (and often resources extraction based communities). Communities often become dependent on outside assistance in part because outside analysis only identifies problems and externally driven or derived solutions, rather then recognizing the skills, knowledge and abilities that may exist locally. This approach aims to build and empower the community as part of programs to alleviate poverty and improve management of natural resources, such as water. Community building starts with the process of locating the assets, skills, and capacities of residents, citizens associations and local institutions. Mobilization of peoples' capacities can lead to successful action to achieve community development. This asset-based strategy may involve the entire community in the complex process of regeneration. Development of a community wide vision, goals, identification of social, economic, and ecological assets, developing local leadership, and leveraging outside resources (when necessary) to help solve specific problems are essential elements to the approach.

XIII. Community Sustainability Audit (Walters, Wilkenson, et al. 1998)—This approach to participation is based on the development of a system for indicators that is intended to help communities move toward sustainability. The approach assumes communities to have developed a sense of what 'sustainability' is and to be able to use a compiled set of data to determine movement toward or away from social, economic, and ecosystem (environmental) sustainability. This data set consists of indicators that are already available or can be measured to assess the health of the community social, economic, and environmental system.

The approaches vary the most in the extent to which they involve monitoring, evaluation, and outcome-based approaches. (See Table 1) They also vary in the extent to which outside development agents are seen as potential resources to the community or as assumed players in the development process. Additionally, while all of the approaches mentioned the importance of stakeholder involvement, only Particpatory Rural Appraisal, RAAKS, Asset Mapping, and Holistic Management note the importance of laying out in specific terms the relationship ground rules for the project, in other words a participatory contract. The notions of systematic learning, developing the capacity for long term self development through sustained learning, and context specificity were elements of all of the approaches.

Theoretical Approaches to Participatory Resources Management

To see how the theoretical approaches have been incorporated into more applied settings, we reviewed a collection of manuals and agency or NGO approaches to participatory resources management. These are presented in Appendix 1 and their inclusion of the 10 Core Elements shown in Table 3. While all talked about the importance of involving stakeholders, only the approaches from government agencies call for decisions to be made based on 'good science'. Almost all of the approaches call for consensus-based decision making. Additionally, all the applied approaches emphasize the importance of including a wide array of watershed stakeholders.

The devils, however, are in the details on many of the participatory approaches. What does it mean to emphasize the inclusion of stakeholders in the participation process? Secondly, who constitutes stakeholders and how was this decided? For instance, the Rural Community Assistance Program "Local Decision-Makers' Guide to Groundwater and Wellhead Protection" begins its approach to participatory resource management with "demonstrate the economic incentives to water protection." Though "form a coalition of diverse stakeholders" appears in the later in the list of actions, we are left with the impression that the approach assumes that stakeholder involvement will be difficult. This may well be true, especially if it is assumed that the issues of water quality should be dealt with as a technical matter, in isolation of other concerns in the community. The theoretical approaches which we analyzed indicate that whether the stakeholder involvement happens at the issue identification stage, or later in the process will make a big difference in the authenticity of participation by citizens in the community. This, in turn, will impact the level of support for the water quality initiative and its relationship to other aspects of community development. Most of the processes, listed in Appendix 1, involve a visioning process that should eventually lead to relating water quality to broader community goals.

Indicators of Participatory Processes for Cross Site Comparisons

In the introduction to Social Indicators: An Annotated Bibliography from 1960-1997 (www.ncrcrd.iastate.edu), we noted that a new movement in social indicators has developed that better addresses issues of process. An example of this is "The Community Indicators Handbook" by Tyler Norris Associates, Redefining Progress, and Sustainable Seattle (released in 1997 from the Redefining Progress Office). This book views community indicators as a process that aims at developing a measurement tool for assessing community health. Indicators are, however, simultaneously used for expanding the number of people in the community involved in the deciding the community goals and the developing, and measuring indicators to evaluate of community action in relation to those goals. Another example is "Measuring Community Success and Sustainability," put out by Flora and collaborators through NCRCRD in 1999, (www.ncrcrd.iastate.edu). This indicator manual seeks to tie the community

development to process through focusing on the social capacity. The community should develop at the local level a vision of a desired future state, identify outcomes that will move the community toward that future state, and determine what actions will move the community toward that state. The process of community development is one of balance between human capital, social capital, built/financial capital, and natural capital. Measuring Community Success (Flora, et al., 1999) addresses this through five indicator categories:

1. Increased use of the skills, knowledge and ability of local people;
2. Strengthened relationships and communication;
3. Improved community initiative, responsibility and adaptability;
4. Sustainable, healthy ecosystems with multiple community benefits;
5. Appropriately diverse and healthy economies.

Categories two and three are directly related to process—in that they evaluate social capital (strengthened relationships) and the ability of the community to take initiative and respond to change.

Indicators of Process

From our overview of the literature and application manuals on participatory approaches, with specific emphasis on water related approaches, we have developed a list of the indicators of the process used to involve in a given water quality protection initiative. We have chosen to think about water quality projects as having four stages: diagnosis, prescription, action, and cure. Citizens may be included in the initiative at the stage of the **diagnosis** of water quality as threatened or potentially threatened, at the **prescription** phase--where it is determined what to do about the issue (both of these constitute discovery), at the **action stage**, or at the stage of the **cure,** which includes monitoring. In the action and cure stages, engagement is a key feature. The literature on participatory approaches states that the ideal is to include as much of the public as possible at the diagnosis stage, as local citizens may have a different and more holistic diagnosis of the problem than outside experts. Likewise, citizens need to be included in the prescription, action and cure stage as well. There are at least two reasons for this. First, the community is more likely to support initiatives that have been participatory from the beginning of the initiative. Second, citizens may provide important insights into the ecosystem, social, and economic interactions in that community. The process indicators listed below are intended to help in determining at what stage citizens were included in the initiative and in what ways they were included.

Based on the indicators of process mentioned above, we propose indicators of process in water quality protection that fall in the following categories.

- **Issues Identification**—The degree to which issues pertinent to water quality protection identified and framed in the broader issues of community development;

- **Building the Coalition --** Presence or absence of actions to build awareness, participation, and support for actions to support water quality in the community;

- **Implementation and Monitoring**— Degree of widespread community involvement in the actions taken to decrease risk to drinking water quality and regular reports on the impacts of those actions.

The indicators must address who, when, and how process actions are taken. Stakeholder involvement, only leads to authentic community participation when it is done early enough in the process and with adequate attention to alternative agendas that may emerge as a result. **Who** is involved in the initiative, includes the number of groups involved in the initiative, the numbers of citizens involved, and the institutions in the community in the initiative. **When** they are involved in the process: diagnosis, prescription, implementation stage, or evaluation and the continuity of the involvement have been identified as critical for effective natural resource management. Change in the numbers of individuals coming to meetings over time could be an indicator that the process utilized is limiting, rather then expanding options and interest in how to address long-range water quality protection. **How** decisions about issues, actions, and monitoring are carried out will be measured through degree of transparency and accountability of implementing agencies and institutions. Inclusion of citizens on monitoring teams, regular reports to the community on outputs and outcomes through various media, the accessibility of gatherings where water quality protection is discussed, and actions to increase citizen understanding of drinking water quality issues are potential indicator areas.

In Table 1, we demonstrate how the indicators of process (listed below) are related to the major elements of theoretical approaches. Some of the indicators are listed more than once as they indicate multiple stages of the process of community mobilization. The theory of participatory approaches would argue that the organizers initiatives must work to include members of the general public at the diagnosis, prescription, action, and cure stage of the initiative. Our indicators of process are based on the premise that a broad spectrum of community groups and residents must be included

- to identify the issue of water quality and related issues as important;
- to identify the goals, outcomes, and possible reactions to problems or threats to water quality;
- to monitor the impacts of drinking water quality protection

Plugging these data into our model will test the degree to which that premise is correct and under which circumstance.

In analyzing water quality protection initiatives in the U.S. we have determined three phases that initiatives go through[3]. We have used these phases to categorize our indicators of process. They relate to

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[3] For more depth on our analysis of U.S. cases in the literature to date please see: "Community Based Water Quality Protection: Commonalities and Differences in the Establishment, Organization, Implementation of Community Level Initiatives." source undetermined…

the four stages of process identified in the participation literature in the following ways. I—Identification of the Issues generally encompasses the Diagnosis and Prescription phases of the process; II—Building and Expanding the Coalition generally relates to the Action and the Cure stage of the process; III—Implementation and Monitoring is generally related to the Action and Cure.

The categories for our indicators have been labeled (Roman numerals I, II, and III) and each indicator has been numbered consecutively under each category. We have used this numbering system to help readers identify the indicators in Table 3. It is notable that this categorization of indicators from the theoretical literature does not capture several important elements that from the practical approaches. The first is the notion of celebrations and awards of locals for achievement. This has been shown in community based natural resources protection cases to be very important in increasing community interest and enthusiasm for the initiative. Our first attempt at comparative indicators is described more fully in Appendix 2.

Conclusion

The indicators and measures are chosen to provide a sense of the level and type of involvement by the community in the initiative. These process indicators will be used in the model that we have developed to better understand how communities organize and sustain initiatives to protect water quality. Clearly, the availability of financial resources at the community level and the economic and ecological variables will play a role in the success of these initiatives in the long run. We hypothesize that issues of community participation, the process by which the leaders of the initiative try to organize community members to protect water quality, will be the more important variables in success or failure of community based water quality protection. Our model will test that hypothesis.

As has been demonstrated above, there are a plethora of approaches available to community organizers to guide them in developing an inclusive process that will build the long term civic capacity in drinking water protection. Guiding principles from the literature above are that the participatory process ought attempt to include a wide range of stakeholders and address issues from multiple perspectives. Ultimately, while the impetus for the initiative may be the protection of drinking water, the issues that will need to be addressed should be multi-objective in scope—as water is central to quality of life, issues of community development, growth, agriculture and natural resources and all of these issues will come into the fray of decision making about how to protect water. It will be the challenge of organizers to move projects forward while addressing these linkages. At the same time, water quality is ultimately an issue that forces a recognition of connections and interactions. The initiative will have to be nested in the local context, but capable of making connections across political boundaries to ensure good management. It is our hope the indicators above address these distinctions, and provide a widely applicable guide for

understanding the process of community organization around water quality protection.

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Table 1: Core Elements of Participation and Theoretical Approaches

	Theoretical Approach				
Core Element	**Participatory Rural Appraisal** (Chambers 1983, Hinchcliff, et al. 1999)	**Institutional Analysis and Development** (Ostrom 1986, 1992, 1999)	**Adaptive Environmental Management** (Walters 1986)	**Cooperative Ecosystem Management** (Yaffee 1996)	**Integrated System for Knowledge Management** (Bosch and Allen 1996)
Seeks diverse perspective	Yes—through system rewards for risk taking—encouraging multi-stake-holder input	No—focus on civic institution functioning	Yes—primary goal to model diverse sectoral and stakeholder perspectives	Yes-seeks to develop management systems based on stakeholders	Yes—seeks to use dialogue to search for alternatives
Systematic learning approach	Yes—through development of local monitoring systems	Yes—at institution level	Yes—indicators and monitoring are essential in modeling and management	Yes-monitoring adjustment, dialogue among agencies, ngos, public	Yes—dvlpt of local indicators as a form of constant feedback
Context specific	Yes—through basing projects on local knowledge	Yes-focus on developing local capacity	Yes—looks at each site as having diverse impacts, issues	Yes-assessment of management strategies based on econ, soc., Bio context	Yes—based on local context—producer as expert
Group inquiry	Yes—locals as teachers of experts and other locals	Yes-group based decision making	Yes—process draws in econ, social, biological perspectives	Yes-community partnerships-science and locals	Yes—dialogue among group and scientists
Facilitating external agents	Yes—technical experts to help locals imple-ment projects	Yes-analysis of role of outside agents in cmty. Org. And resource mgt.	Yes-external agents are considered the drivers of process-modeling observations	Yes-scientists are important partners	Yes—external agents as technical guides
Sustained Learning and action	Yes—ongoing monitoring as part of project at local level	Yes-social organization as linked to monitoring and adaptation	Not clear—process should lead to co-learning,	Yes-monitoring and adjustment key to the process	Yes—through monitoring and collective decision making
Outcomes	Yes—developed locally/locally relevant	Yes-both social and technical	Yes-goals and desired outcomes drive the modeling process	Not mentioned-talks about importance of stakeholder goals only	Yes-assumed commonly agreed upon goals and outcomes
Monitoring	Yes-relates directly to actions/	Yes-of social organization effectiveness	Yes-model fac-ilitates indicators to model feedback	Yes-to measure progress based on goals	Yes-development of indicators
Evaluation	Yes-both implementing organization. & community/make successes measurable	Yes-role of external institution—social scientist	Not mentioned	Yes-one of scientist/expert Roles	Not mentioned
Participatory contract	Yes- clearly defined roles	Not mentioned	Not mentioned	Not mentioned	Not mentioned

Core Element	Holistic Management (Savory 1989)	Environmental Management (Röling 1992)	Rapid Appraisal of Agriculture Knowledge Systems (Engel 1997)	Environmental Dispute Resolution (Smith et al. 1997)
Seeks diverse perspective	Yes-aims to move beyond sectoral, reductionist research and problem solving	Yes-"soft system approach" combines perspective of social actor, economist, and natural scientists	Yes-multi-stake-holder perspective (at multiple actor levels-govt, private, ngo, local level)	Yes- multi-stakehloder perspective (should be broadly representative)
Systematic learning approach	Yes-emphasis on understanding the ecosystem/ human/ Economic interaction	Yes-constant learning by stakeholders at different levels as essential component of soft system	Yes-each phase of mgmt builds on monitoring results of last-all refer back to desired future state	Not specifically mentioned
Context specific	Yes-emphasis on deriving solutions from local ecosystem, community	Yes-ecological feedback key to mgt.; Mgt. Based on social, econ., Ecosyst context; different 'platforms' (levels) of action frame res. Mgmt.	Yes-flexible system to adapt to local economic, social, ecological context	Yes- local level participation should be broadly representative
Group inquiry	Yes-human interaction, collective research, decision making part of process	Yes-mgt. System developed through stakeholder dialogue	Yes-meetings among actors at different levels to decide on goals, activities, indicators, agenda	Yes- stress on space for compromise & accommodation of each stakeholder's interests
Facilitating external agents	Not mentioned-external agent role minimized in importance	Not mentioned-external agents assumed present, seen as part of problem	Yes-facilitators help get process started, then yield control to community	Not specifically mentioned
Sustained Learning and action	Yes-development of long term interaction, monitoring, adaptation	Yes-development of systems for ongoing learning	Yes-actors use the process to address wide range of issues (social, economic, resource mgmt.) On ongoing basis.	Yes- development of long term interaction for effective dispute resolution & empowerment
Outcomes	Yes-based on development and measurement of desirable outcomes at community level	No-sustainable mgmt. Assumed the desired outcome	Yes-system guides community to identify outcomes, bottlenecks and opportunities, key actors	Yes- solution through compromise & accommodation
Monitoring	Yes-mostly based on locally developed indicators	Yes-both science and local information as monitoring how actions lead to system integrity	Yes-by researchers and community, related to outcomes and agreements among stakeholders / researchers	Not specifically mentioned
Evaluation	Yes	Not mentioned	Yes-by researchers and community	Not mentioned
Participatory contract	Yes-documented ground-rules for group interaction laid out at beginning of process	Not specifically mentioned	Yes-among locals and between locals and researchers at different levels (national, regional, local)	Not mentioned

Theoretical Approach

Core Element	Asset Mapping (Kretzman & McKnight 1993)	Environmental Dispute Resolution (Smith et al. 1997)	Communicative planning (Innes 1996, 1999)	Community Sustainability Audit (Walters, et al. 1998)
Seeks diverse perspective	Yes –to implement open participatory interaction among multiple stakeholder	Yes- multi-stakehloder perspective (should be broadly representative)	Yes-inclusive, participatory, decision and monitoring approach	No-seeks to catalogue existing system information in scorecard.
Systematic learning approach	Yes-emphasis on mobilization of peoples' capacities for successful community involvement	Not specifically mentioned	Yes-local, constant, feedback mechanism	Yes-information compiled to measure current state and change—to measure progress toward sustainability
Context specific	Yes- strong emphasis on asset-based locally defined development	Yes- local level participation should be broadly representative	Yes-local feedback mechanism	Yes-information gathered for a specific location and fed into the existing analysis system
Group inquiry	Yes –dialogic interface among broadly representative groups facilitating systems integrity.	Yes- stress on space for compromise & accommodation of each stakeholder's interests	Yes-development of indicators for feedback	Not clear-indicators inform community decision making, but no clear indicator dvlpt process
Facilitating external agents	Yes- but only to fill the knowledge gaps in the community	Not specifically mentioned	Not clear-experts may advise on indicators	Not mentioned-assume experts will tabulate and present indicators
Sustained Learning and action	Yes-facilitate training among community members—knowledge used in longterm problem solving.	Yes- development of long term interaction for effective dispute resolution & empowerment	Yes-ongoing feedback through indicators	Yes-information drives ongoing monitoring and action to improve community sustainability
Outcomes	Yes-system guides community to regenerate its resources	Yes- solution through compromise & accommodation	Yes-indicators must be based on consensual goals and outcomes	Not mentioned-assume 'environmental sustainability' as outcome
Monitoring	Not specifically mentioned	Not specifically mentioned	Yes-ongoing monitoring system	Yes-information leads to monitoring community actions in reference to sustainability
Evaluation	Yes- by community as the primary force	Not mentioned	Not mentioned	Not mentioned-but assume someone might evaluate indicator effectiveness
Participatory contract	Yes- among social actors at the community level.	Not mentioned	Not mentioned	Not mentioned

Table 2. Manuals and Practical Participatory Approaches and the Core Elements of Participatory Approaches

Applied Participatory Approach

Core Element	Rural Community Development: Ohio Rural Enterprise Project (WSOS 1999)	Give water A Hand-USDA-CREES (Cairn, Cairn, Row, Andrews 1996)	Integrated Social Science w/ Ecosystem Management (Cordell & Bergstrom 1999)
Seeks Diverse Perspective	Yes-stresses a flexible systems approach involving diverse perspectives of social actors w/ technocrats Economists as external agents	Yes-aims to move beyond mere problem solving & involve children in the process	Yes-flexible systems approach. Combines perspective of social actors, sociologists and natural scientists.
Systematic Learning Approach	Yes- constant learning by a diverse team of community stakeholder	Yes- advocates education through action involving multi- stakeholder	Yes- holistic under standing of ecosystem, social system & human interaction
Context Specific	Yes- strong emphasis on deriving solutions from local ecosystem.	Yes-community based with occasional outside support	Yes –community based but involves interaction between public & specialists
Group Inquiry	Yes-interaction among social actors, common platform for dialogue, flexibility for dialogue.	Not specifically stated	Yes- dialogue among actors at various system levels to decide on system function
Facilitating External Agents	Yes- facilitators help to get process started-then yield control to community	Yes Involvement at the advisory level.	Yes-Holistic approach where both community and researcher complement each other
Sustained Learning & Action	Yes- long term interaction ,need for feedback systems	Not specifically mentioned	Not mentioned specifically
Outcomes	Yes- system help sought to prioritize outcomes	No-Assume watershed protection as outcome	Yes- environmental sustainability assumed
Monitoring	Yes- mostly by local indicators With external agents acting as the reference group.	Yes-monitoring progress at all system levels to stay on track	Not specified
Evaluation	Yes – jointly by researchers & community	Yes-by community /also to celebrate success	Yes-by researcher(scientist)& community together
Participatory contract	Yes- within locals who assume greater responsibility for project with occasional help from researcher	Yes- at the community level specially involving children with occasional outside feedback	Yes at all levels of the system by a network of stakeholder

Applied Participatory Approach

Core Element	Voices Of The Watershed (Cohn 1998)	Pennsylvania Groundwater Policy Ed. Project (Marshall, Stevens, Abdallah, Drohan, 1997)	Integrated Social Science w/ Ecosystem Management (Cordell and Bergstrom, eds 1999)
Seeks Diverse Perspective	Yes-multi-stakeholders (seeks a broadly representative body)	Yes-by organizing various participatory programs involving Public	Yes-flexible systems approach Combines perspective of social actor, sociologist and natural scientists.
Systematic Learning Approach	Yes- each step built on earlier results	Yes-provides a space for dialogue between biocentric & anthropocentric perspectives	Yes- holistic under standing of ecosystem, social system and human interaction
Context Specific	Yes- flexible system to adapt to local level economic/social/ Environmental contexts	Yes-strategy is to make the program locally relevant	Yes –involves interaction between public and technical experts at the community level
Group Inquiry	Yes interface between & among different levels	Yes- involve citizens in decision-making process, stress on human interaction	Yes- dialogue among actors at various level in the system to decide on functioning of the system
Facilitating External Agents	Yes- only in cases of difficult conflict.	Yes- use media to popularize programs, take officials on tour	Yes-Holistic approach where both community and researcher complement each other
Sustained Learning & Action	Yes-development of systems for ongoing learning.	Yes- to promote sustained education	Not mentioned specifically
Outcomes	Not specified assumed to produce 'environmental sustainability'	Not mentioned	Yes- environmental sustainability assumed
Monitoring	Yes- structural level information should lead to monitoring community actions in reference to sustainability	Not specifically mentioned	Not specified
Evaluation	Not mentioned–might involve a community interface	Yes-to assess & evaluate project impact	Yes-by researcher(scientist)& community together
Participatory Contract	Yes-	Yes-	Yes-at all levels of the system by a network of stakeholder

Applied Participatory Approach

Core Element	River Network, People Protecting Rivers (River Network 1994)	National Round Table on Environment & Economy (NRTEE Program 199-)	Save our Streams- handbook for Wetlands Conservation & Sustainability (Williams, et al. 199-)
Seeks diverse perspective	No-focus on key issue – stronger constituency at the Grassroots level to protect Riverlands.	Yes- identifying key issues with both environmental & economic implications	Yes- involve diverse stakeholders & understand their perspectives
Systematic Learning Approach	Yes-stress is on monitoring programs-prioritization of projects based on economic feasibility	Yes- involves constant interaction & learning by stakeholders who define key issues.	Yes- networks formed to measure Education & Community action
Context-Specific	Yes- make projects locally relevant, Involve the local gov. in decision making, Also involve the local business class	Not really- involves stakeholders from business, gov., & NGOs	Yes-involves local active community groups & public agencies.
Group Inquiry	Yes- involve the public agencies, Involve all interested parties, build citizen groups	Yes-neutrality in defining issues & decision making procedures- Round table approach	Yes- to set up a team with a leader & hold educational/ informative meetings
Facilitating external Agents	Minimized role- not to generate a 'top- down' Approach	Yes- stakeholders mainly from business sections	Yes- help sought from technical ,media experts- control passed later to community
Sustained Learning & Action	Not mentioned specifically	Not specifically mentioned	Yes- development of long term interaction & monitoring
Outcomes	Yes- conservation of riverlands by building citizen groups & working with private land owners & public agencies	Yes- outcome emphasize broad policy development & provide specific recommenda-tions for action	Educate community about water quality issues & encourage community ownership & pride in project
Monitoring	Yes-involve citizen moniters & deputize charges.	Yes- activities overseen by a task force.	Monitoring of sites mentioned
Evaluation	Yes- by rewarding successful projects	Not specifically mentioned	yes- continuous evaluation stressed to keep project in track
Participatory Contract	Yes –by forming coalition	Yes-stakeholders define environment/economy interface, determine areas of consensus & identity, & identify reasons for disagreement in other areas	Yes- form volunteer network, interaction between locals, & also with the external agencies

Applied Participatory Approach

Core Element	Rural Community Assistance Program	The Groundwater Foundation	League of Women Voters Protect Your Groundwater
Seeks Diverse Perspectives	Yes- stress is on formation of a coalition of multi-stake holder forums at structural levels.	Yes- seeks to move beyond sectoral research & involve a comprehensive participation of diverse stakeholders	Not really- basically involves community/local level participation.
Systemic Learning Approach	Yes- constant learning by stakeholders for a holistic community action program.	Yes- help generate awareness through constant networking	Yes-developed citizens' models-to measure progress toward sustainability
Context Specific	Not very specific though seems to imply local level actions	Yes- evolve a structure with broad based community support & technical assistance(though at a superficial level)	Yes-aim is to percolate to the grassroots/ community level to generate a comprehensive community participation.
Group Inquiry	Not specifically mentioned	Yes- human interaction, collective research &decision making involving all the levels of the structure	Yes- informal meeting among actors to at various levels of the structure to decide on goals, activities, indicators, agenda.
Facilitating External Agents	Involve the Media/diverse stakeholders	Yes- technical assistance asked for but control is at the community level.	Not specifically mentioned-however, media involvement is stated(opinion polls etc.)
Sustained Learning and Action	Not very specific	Not specifically stated.	Yes- long term goals to measure the development of systems for ongoing learning.
Outcomes	Yes- demonstrates the correlation between economic incentives & water quality protection.	Yes- system guides community to value groundwater resources& Understand the key factors influencing decision-making process	Yes- to facilitate a dialogue at the local/state/national level to protect groundwater.
Monitoring	Not specifically mentioned	Yes- both scientific & indigenous information for monitoring how action leads to system integrity.	Dissemination of information that should lead to monitoring community actions in reference to sustainability
Evaluation	Not very specific	Yes-by disseminating information on project to the community & encouraging participation in decision-making	Not clear- but stress on effective measurement of both long term & short term indicators.
Participatory Contract	Yes-stress on generating awareness among stakeholders to inspire community actions.	Not specifically mentioned.	Yes- by creating a 'space ' for dialogue at the system level need for diverse coalitions are stressed

Applied Participatory Approach

Core Elements	Stakeholder Alliance Process—American Waterworks Association	Take Charge (Ayres 1996, NCRCRD)	Grassroots Planning (Farnsworth 1999, University of IL Community Extension)
Seeks Diverse Perspectives	Yes-identify various stakeholders & their positions/prepare stakeholder profile for community interest groups	Yes-human interaction for economic development of small communities	Yes- multi stakeholder perspective (both local resources & technical expertise)
Systemic Learning Approach	No	Yes-workshops to study ecosystem/ human interaction	Yes- comprehensive approach to measure progress towards sustainability
Context Specific	Yes-clarify issue & frame problem in context of local community/assess incentives, capabilities, & constraints of local utility	Yes-stress is on deriving solutions from local small communities	Yes- emphasis on deriving solutions from local community/ ecosystem
Group Inquiry	Yes-meetings to promote consensus building & to prioritize issues	Yes-workshops to derive strategies & interface between diverse interest.	Yes- meeting among stakeholders at different levels to evolve a Holistic approach.
Facilitating External Agents	Yes-select facilitator to ensure ongoing and positive dialogue	Not specifically mentioned	Yes- media exposure/technical expertise to derive a comprehensive understanding
Sustained Learning and Action	Yes-create & implement action plan,/define timetables & roles/maintain consensus over time	Yes-developing action plans	Yes- deriving a structural link between water quality project & other resource problems.
Outcomes	Yes-define outcomes/identify project milestones	Yes-identify who will benefit in ecological development.	Yes- comprehensive/all around improvement of both human & biotic community
Monitoring	Yes-monitor work/identify & describe decision steps & project milestones	Yes-monitoring based on locally developed indicators.	Not specifically stated
Evaluation	Yes-develop issue overview statement to serve as Evaluation benchmark/continuously evaluate constraints	Not specifically mentioned	Not specified
Participatory Contract	Yes-develop utility position paper/define statement of purpose, roles, & outcomes	Yes-	Yes-community-level meetings at various levels to encourage percolation of resource-base at grassroots level.

Applied Participatory Approach

Core elements	EPA Watershed Approach (Top 10 Watershed Lessons Learned 1997)	RCRA Public Participation Manual
Seeks Diverse Perspectives	Yes-people most affected involved in process to shape decisions	Yes-conduct dialogue with diverse stakeholders/give them voice
Systemic Learning Approach	Yes-education and involvement drive action/measure & communicate	Not Mentioned
Context Specific	Yes-activities directed within specific geographic areas & stakeholders most affected involved/coordinate at watershed level	Yes-strengthen link between facilities & their host facilities/do community assessment to find needs of community
Group Inquiry	Yes-decisions shaped by stakeholders most affected	Yes-dialogue with stakeholders & encourage input & feedback/assimilate public views & preferences
Facilitating External Agents	Yes-formation of partnerships important/use available tools & resources	Yes-use of civic groups to foster effective information sharing
Sustained Learning and Action	Yes-committed leaders empower others/build on small successes	Yes-encourage feedback/provide access to decision-makers/good information flows
Outcomes	Yes-set priorities, measure progress, build on successes	Yes-assimilate pubic views and preferences/demonstrate that vies & preferences have been considered by decision makers
Monitoring	Yes-measure communicate and account for progress	Not specified
Evaluation	Yes-evaluation & revision of action plan as needed	Yes-feedback encouraged
Participatory Contract	Yes-actions based on shared information & common understanding of roles, priorities & responsibilities of all involved parties	Yes-compose public participation plan

Table 3: Indicators of Process and the Theoretical Elements of Participation

Stage of Project

Core Element	Diagnosis	Prescription	Action	Cure
Seeks Diverse Perspective	I.1&2) Number of groups/individuals in the community involved in identifying water quality as a community issue; I.7) Number of contacts made with neighboring or similar communities involved in water monitoring/protection	I.3) Number of groups involved in initiative decision making ; I.7) Number of contacts made with neighboring or similar communities involved in water monitoring/protection; III.2) Number of groups/individuals involved in proposing actions to protect water quality;	II.4) Number of efforts made to solicit involvement of disadvantaged and minority grps; II.5) Number of languages in which water initiative information are distributed; II.6) Number of locations/times where meetings are held; III.5) Number of groups/inst./ indiv. involved in carrying out research activities;	III.4) Number of groups/institutions/ individuals involved in monitoring impacts; III.3) Number of partnerships with outside organizations
Systematic Learning Approach	I.5) Number of community members in skills bank; I.6) Number of citizens, inst. involved in water monitoring	II.1) Number of training programs about water quality protection available to community members;	II.3) Number and type of sources of information available to citizens about water issues	III.4) Number of groups involved in monitoring
Context Specific	I.6) Number of citizens/local institutions involved in water monitoring	I.2) Number of individuals involved in meetings to identify the issues in water quality protection	III.1) Number of sectors of society identified as having an impact on water quality	III.4) Number of groups/institutions/indivi duals involved in monitoring the impacts of initiative actions

Core Element	Stage of Project			
Group Inquiry	I.1&2) Number of groups/individuals in the community involved in identifying water quality as a community issue;	I.3) Number of groups involved in initiative decision making ; I.4) Number of groups/individuals involved in initiative decision, communities, and actions?	III.2) Number of groups/individuals involved in proposing actions to protect water quality;	III.2) Number of groups/individuals involved in proposing actions to protect water quality;
Facilitating External Agents	I.8) Number of contacts with government agencies or other organizations regarding water quality.	I.7) Number of contacts made with neighboring or similar communities involved in water monitoring/protection ;	II.8) Number of government agencies or other organizational partnerships	III.6) Number of government agency, university, or other organizations assisting with funding, monitoring, technical assistance
Sustained Learning And Action	I.5) Number of community members in skills bank; I.6) Number of citizens, inst. involved in water monitoring	I.4) Number of groups/individuals involved in initiative decision, communities, and actions?	II.1) Number of training programs about water quality protection available to community members;	III.4) Number of groups/institutions/individuals involved in monitoring the impacts of initiative actions
Outcomes	I.1&2) Number of groups/individuals in the community involved in identifying water quality as a community issue;	I.3) Number of groups involved in initiative decision making ; I.4) Number of groups/individuals involved in initiative decision, communities, and actions? I.6) Number of citizens, inst. involved in water monitoring	III.1) Number of sectors of society identified as having an impact on water quality	III.4) Number of groups/institutions/individuals involved in monitoring the impacts of initiative actions

Core Element	Stage of Project			
Monitoring	I.6) Number of citizens/institutions involved in water monitoring	II.3) Number and type of sources of information available to citizens about water issues	III.4) Number of groups/institutions/individuals involved in monitoring the impacts of initiative actions	III.4) Number of groups/institutions/individuals involved in monitoring the impacts of initiative actions; III.6) Number of government agency, university, or other organizations assisting with funding, monitoring, and technical assistance.
Evaluation	I.4) Number of groups/individuals involved in initiative decision, communities, and actions?	I.9) Number of efforts made to involve community in evaluation of proposed issue	III.4) Number of groups/institutions/individuals involved in monitoring the impacts of initiative actions	III.7) Number of efforts made to elicit community feedback on actions.
Participatory Contract			III.5) Number of groups/individuals involved in carrying out initiative activities	III.8) Number of groups that have officially endorsed initiative activities

Appendix 1

Summarizing the Applied Approaches

The approaches that we have summarized fall into categories that are described above. Some are more inclusive of citizens in decision-making, some less.

Pennsylvania Groundwater Policy Education Project *("Lessons from Successful Project Leaders," 1996 Conference summary compiled by U of Wisconsin Cooperative Extension-Env. Resources Center in 1998 for EPA and USDA, p11.)*

Method: Educate community to increase awareness and interesting water quality protection. By forming local coalitions, they hope to promote sustained education.

> 12 local coalitions around state gathered data, sponsored seminars, made pamphlets and videos

> Keys to success:
> -define audience
> -make program locally relevant
> -start small
> -use media to share info
> -train educators
> -develop education plan
> -take officials on tour of area
> -go to citizens or provide service that brings them to you
> -assess and evaluate project impacts

River Network *(www.rivernetwork.org/ 8/29/00, website *** Wallin, Phillip and Rita Haberman. 1992. People Protecting Rivers: A Collection of Lessons from Successful Grassroots Activists….Summary compiled by U of Wisconsin Cooperative Extension-Env. Resources Center in 1998 for EPA and USDA, p11.) ***Boling David M. How to Save a River: A Handbook for Citizen Action Island Press, Washington D.C 1994*

-Method:

> "They (solutions) must be created by **citizen activists**, valley by valley and stream by stream. We saw even then that the"top-down" approach could only go so far, that rivers needed a **stronger constituency at the grassroots level**. We dedicated ourselves to the mission of **building citizen groups** to speak out for rivers in every watershed across the country. We also believe that sometimes the only way to protect a river is to protect the land along it. We work with **private land owners and public agencies** to acquire and conserve critical riverlands"

> Keys to Success:
> -Form a coalition
> -Focus on key issue
> -Find positive solution
> -From an organization
> -Raise funds/hire director
> -Survey resources to create conservation plan
> -Work cooperative with public agencies
> -Recruit people with tech experience
> -Advertise economic value of project

-Build support with public events
-Provide regular newsletter
-Start network of citizen monitors/deputize them so in charge
-Position yourself well for negotiations
-Choose right forum for action
-Look to state and local gov. for land-use control
-Land acquisition may be best option
-reward good/successful projects
-get support of local business
-use existing laws to protect resources
-provide incentives to bring polluters to table
-involve all interested parties/identify all concerns
-prioritize actions based on economic feasibility

National Round Table on Environment and Economy (NRTEE Programs) (Summary *compiled by U of Wisconsin Cooperative Extension-Env. Resources Center in 1998 for EPA and USDA,p 5-10 **** http://www.nrtee-trnee.ca/eng/programs/programs_e.htm *9/29/00)*

Method:
They desire to serve as a catalyst in **identifying**, **explaining** and **promoting** the principles and practices of sustainable development.   This is accomplished through a **Round Table Approach** which is a unique form **of stakeholder consultation**, permitting progress on diverse issues with an environmental/economic interface. The process itself is of value in **overcoming entrenched differences**. At the same time, the outcomes for each program emphasize broad policy development and provide **specific recommendations for action**

Stategies:
-identifying key issues with both environmental and economic
implications
-fully exploring these implications
-suggesting action designed to balance economic prosperity with
environmental preservation
-activities organized/ overseen by a task force
-multistakeholder approach/ committees made up of one or
more reps from business, gov, & non-profit organizations
-impartiality and neutrality/create atmosphere in which all points
of view can be expressed freely and debated openly
- stakeholders themselves define the environment/economy
interface within issues, determine areas of consensus and identify
reasons for disagreement in other areas.
-identify key issues
-timetables w/ short and medium goals
-pressing issues selected
-analyze the environmental and economic facts and trends;
-actively seek input from key stakeholders;
-drawing together the results of research and consultation,
-clarifying the state of the debate; and
-pinpointing the consequences of action and inaction and
-public education
-making recommendations.

Save Our Streams: Handbook for Wetlands Conservation and Sustainability
(Firehock, Karen, Christy Williams and Julie Vincentz, 1996. Izaak Walton League of America *** Summary compiled by U of Wisconsin Cooperative Extension-Environmental Resources Center in 1998 for EPA and USDA, p. 9)

This organization provides a process for brining together diverse stakeholders who have an interest in conserving community wetlands, determining wetland values, and monitoring biological functions of wetlands. Their handbook is intended to help people become wetland stewards, providing basic knowledge and encouraging people to consult experts in the field. They contend that becoming involved with protection requires a biological understanding of how wetlands function and an awareness of the values society places on them.

The emphasis of this process is on education to spur community action. Action is coordinated by a plan composed from the input of diverse stakeholders and active community groups who form a volunteer network. The plan defines long and short-term goals, leadership, ways to monitor and evaluate the condition of the wetland, and identifies sources of funding. To encourage community interest and pride in the project the book recommends educational meetings, community walks through the site, and fun, social events.

Take Charge –Economic Development in Small Communities
(Ayres, Janet, et al. NCRCRD, 1987)

This educational program is intended to help participants examine the current trends and characteristics of their community to assess opportunities for economic growth and to promote community teamwork. It is designed to assist leaders in analyzing their community, think about alternatives and plan an action strategy for community economic development. It will help rural residents discover their community's strengths and weaknesses, and help them take charge of their community's destiny.

Initial workshops should be conducted to develop strategies to bring diverse interests together and identify who will benefit from the community action. It is important to develop a communications network, and keep communication open at local, state, and federal levels. This program advocates a community action plan that has timetables, develops leadership, identifies resources required and money sources, and has provisions for monitoring the situation and evaluating and revising the plan. When composing a plan it may be helpful to research what other communities have done. Rewarding participants contributes to interest and sustained action.

Grassroots Planning: Local Solutions for Global Issues
 (Farnsworth, Richard et.al. USDA NRCS, 1998)

    Method: Locally led planning efforts to solve environmental problems. Strive for comprehensive approaches for improving the well-being of human and natural communities.

        Strategies:
- involve diverse stakeholders
- find technical expertise and funding
- prioritize
- get community interested in a holistic approach (rather than solving one problem and moving on)
- tour site/inventory resources
- inform community about watershed and activities (meetings, tours, demonstrations, media, newsletters)
- link water quality with other resource problems to solve many problems and hold interest of man
- action plan
- attract private/public $

The Local Decision-Makers' Guide to Groundwater and Wellhead Protection *(Rural Community Assistance Program, Inc.)*

    Goal: Education to inspire community action

    Strategies:
- demonstrate economic incentives to water protection (avoid costs of   clean-up, rate increases, property devaluation, etc)
- start educational campaign (school, media, fliers, etc)
- form coalition of diverse stakeholders

The Groundwater Foundation
(Kreifels, Cindy, ed. 1997 A Community Guide to Groundwater Guardian Lincoln, NE)

The approach of the Groundwater Foundation is to support broad -based community teams that take active, voluntary steps to protect groundwater. This typically takes the form of a Wellhead Protection Program (WHP), which restricts or reduces practices and land use that threaten the quality of groundwater supplies. It is believed that through involvement and decision making, the community will feel a sense of ownership and take pride in their water source.

The most important feature, education, is necessary to spur action, focus efforts, and to sustain action. In addition to community education, the authors cite the following key strategies key of the process: identify community's goals, form a coalition of interested and diligent people, set realistic goals with measurable outcomes, develop action plan for the present and future, obtain partners (inside and outside community) and technical assistance, evaluate successes or failures.

League of Women Voters Protect Your Groundwater: Educating for Action
(Washington, DC: League of Women Voters, 1994)

The League of Women Voter's objective is to promote dialogue between state and local public officials charged with source water assessment planning and citizens who use the water. This organization has created a variety of citizen education models for groundwater protection, which are intended to help state agencies, utilities, local governments, and others to plan and implement effective public involvement programs. Some steps the League promotes are: identify issues and frame them to respond to citizens' concerns, form diverse partnerships and coalitions, foster dialogue at local, state, and federal levels, make short and long-term goals that are realistic and measurable, choose education formats that work best, have a leader and clear lines of responsibility, set up a budget, find funding, keep records, and have frequent communication to update all involved.

Voices of the Watershed
(Cohn Naomi J. Funded by US EPA)

This publication advocates meaningful public involvement in watershed protection. Involvement is meaningful if diverse stakeholders have input in the process and ownership of the outcomes. The goal is to reconnect citizens to their watershed through education and outreach. The manual emphasizes multi-objective planning, which is a planing process that incorporates multiple concerns rather than attempting to address only one isolated issue. Multi-objective planning ensures broad support and interest in the protection effort.

After developing a mission statement and finding common goals, the manual suggests that citizens create an effective management plan that addresses responsibilities, expectations, priorities, timetables, funding, and technical assistance. Studying examples from other communities may be useful when forming this plan, which should be regularly evaluated and updated. There should be an organizational structure with leadership to keep the process on track, as well as useful partnerships made to support the process. Because decision making is by consensus, it may be necessary to have facilitator if difficult conflicts arise. Progress should be measured and reported to stakeholders, who ought to be given credit and rewarded for their efforts. Fun, cooperative activities such as tours, trips, restoration projects, etc., are important to the process because they serve an educational purpose and sustain interest.

12. Rural Community Development: Ohio Rural Enterprise Project (*A Guide for Comprehensive Rural Community Development, Ward, Julie and Alice Martinez eds. 1996 W.S.O.S. Community Action Commission, Inc.*)

Method: The Good Start Process is designed to mobilize and position small communities to best attack what they identify as their highest priorities regarding economic development.. An outside community based consulting organization intervenes for a limited time advancing the process and the community gradually assumes greater ownership of the project while moving into planning and implementation. Outside

organization steps back, and serves as a reference or facilitator, and checks occasionally to ensure process is on track.

Strategies:
-diverse team of community stakeholders
-bring team to ownership of process
-develop measurable goals
-monitor process
-gather info/input/concerns from variety of community sources
-prioritize issues
-meetings with agendas
-acknowledge members' efforts and celebrate success
-evaluate process
-form partnerships in and outside community
-share info with community and have feedback system
-develop action plan with timetable
-have leadership at community level

Integrating Social Science with Ecosystem Management
(Cordell, H. Ken, and John C. Bergstrom, eds. Sagamore Pub., Champaign, IL 1999)

The authors of this book describe ecosystem management as a holistic approach to studying ecosystems and resource management that includes humans as but one member of the system. This approach seeks to break the barrier between the integration of the social and biological sciences, because for environmental management programs to be successful, they must consider and work within the social situation and social framework of the community.

A network of local stakeholders and officials at the local, state, and federal levels should identify conflicts in the community around resource management. Especially important is the involvement of groups that take an active interest in any particular uses of the resource. The planning process should be open, and make use of the informal knowledge of the public. To achieve this, the process must be interactive, and scientists and officials should accept public input. To ensure effectiveness, there should be clearly defined roles and expectations for each group involved. Finally, ground rules for good science should be established, as well as a measure of success.

14. Give Water a Hand (*Summary compiled by U of Wisconsin Cooperative Extension-Environmental Resources Center in 1998 for EPA and USDA, p. 7 ***Cairn, R. S. Cairn, K Row, and E. Andrews, 1996 A USDA CSREES, A U of Wisconsin and privately funded project. **** http://www.uwex.edu/erc/, *8/31/00).*

Method: Advocate education through action. Particular focus on education of children and their potential to make a difference in the protection of local watersheds. Provide handbook for implementing a program as well as a leadership guide.
Strategies:
-chose project
-form partnerships w/ those who can help
-get expert advice/assistance
-set timeline
-action plan

-define roles, responsibilities and leadership
                    -develop way to manage success
                    -monitor progress, stay on track
                    -sponsor community events (festivals)/ get message to public
               (posters, flyers, etc)
                    -involve media
                    -celebrate success

15.   National Civic League (www.ncl.org/ncl/index.htm, 9/5/00)

Method: Community decisions should be inclusive, participatory, and equitable, emerging out of open dialogue among those who are ultimately affected by the decisions being made.

          Strategies:
          -networks of people and organizations
          -inclusiveness of diverse stakeholders/cross-sector collaboration
          -local leadership
          -consensus-based decision making
          -technical, governmental, and local assistance
          -learn form successes and failures of others
          -conflict mediation
          -reward success
          -provide tools for community empowerment

The Stakeholder Alliance Process

        This process, implemented by the American Water Works Association (AWWA), was developed from case studies and a comprehensive survey of utility experiences. This process is operative when no single stakeholder has sufficient authority, resources or knowledge to effectively address key management issues. Feedback is inherent in the process which asserts that formal and informal relationships between the utility and the stakeholders should involve two-way communication. The utility, however, has the role of deciding the appropriate level of community involvement for a given situation, and in this sense the approach is less holistic and more oriented to addressing specific issues.

        After clarifying the issue or contextually framing the water quality problem, stakeholders are identified and invited to share their positions on the issue. Similarly, the utility composes a position paper, offering its assessment of the situation and assessing its incentives, capabilities, and constraints. With the aid of a facilitator and through consensus building dialogue, a plan of action is created that includes priorities, defined outcomes, roles and timetables, as well as an overview statement which serves as an evaluation benchmark.   Monitoring of the plan and project milestones is also important to the process as is the identification of steps taken in the decision making process.

        This process is similar to the Cummunicative Planning approach which also emphasizes dialogue and feedback with and among diverse stakeholders. In addition, both approaches involve consensus based decision making and stress the significance of decision making as process in itself.

RCRA Pubic Participation Manual

        This manual described a participation process designed to improve cooperation and communication so that the public has an *early* and meaningful role in the process. The goal of the process is to strengthen the link between facilities and their host communities. This link has been eroded by the lack of information sharing and inclusion of stakeholders that are affected by the facilities in their communities. Great emphasis is placed on early stakeholder inclusion, as it is a powerful demonstration of a facility's honesty and commitment to the process. It enables stakeholders to trust, and trust, of course, is the foundation of any meaningful and successful relationship.

        A primary feature of this process is agencies that are open and honest with the public. Once this is achieved, there is room to conduct a dialogue with diverse stakeholders to understand their viewpoints and preferences. A community assessment is used to gain a more complete understanding of the community and to define its needs.

        Information sharing is the basis of this process, which encourages input, feedback, information flows, and the use of civic groups to foster such sharing. Providing community members at all socioeconomic levels equal access to decision makers is another way of giving voice to the public and therefore power in the process.

        This process recognizes that words are not enough. Therefore agencies must demonstrate that public input has been considered by decision makers. To ensure an efficient process, and movement from words to actions, a public participation plan is composed to serve as a contract between the facility and community.

        Like the process detailed in the RCRA manual, Environmental Dispute Resolution includes a wide range of stakeholders whose inclusion in the process is seen as a way to resolve conflict and tension, which in the case of RCRA is tension created when a community is distrustful of the facility operating within it.. Empowerment of the public through information sharing and access to decision makers is common to both processes.

The Watershed Approach

        This approach, outlined in *EPA: Top 10 Watershed Lessons Learned,* is a coordinating framework for environmental management that focuses public and private sector efforts to address the highest priority problems within hydrologically-defined geographic areas. The approach affirms that environmental, economic and social values are compatible. One of the approach's guiding principles is the creation of partnerships to ensure that people most affected by management decisions are involved throughout the process and shape key decisions. Because stakeholders work together, actions are based

on shared information and a common understanding of the roles, priorities, and responsibilities of all involved parties. Local leaders serve to empower others and ensure commitment to the process

Involvement in the process is organized by an action plan that defines objectives and includes an assessment of natural resources and the communities that depend on them.. Monitoring and evaluation are important to the process. Progress is measured and acknowledged, and revisions are made as needed.

Appendix 2. Process measures from participatory research analysis

I) Issues Identification

I.1) Number of groups in the community involved in identifying water quality as a community issue
> Groups means-Government Agencies, Municipal Offices, local Civic Groups, local chapters of regional or national Non-governmental Organizations
> Method—Look at press release about the initiative and early initiative descriptions; query key informant

The initiative may begin as a small effort and expand, or may lose groups if it is too narrow in scope. Tracking the number of groups involved and how that changes over time is one way to evaluate whether the process was inclusive or exclusive in nature.

I.2) Number of individuals involved in meetings to identify the issues in water quality protection
> Method—Look at initiative press release, early initiative description, query key informant,

Likewise, getting individuals involved is an important part of the process. A good process should have a growing number individuals involved in it.

I.3) Number of groups/individuals involved in developing vision, goals, or outcome of initiative
> Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,

Relates to the first two indicators. A participatory initiative should involve the maximum number of groups and individuals possible in the decision making process. Over time, this should lead to a system that allows active groups to participate in ongoing dialogue and decision making, monitoring, and actions relating to the various aspects of the project.

> I.3a) Has this number grown, stayed the same, or shrunk over time?

I.4) Number of groups/individuals involved in initiative, decision, committees, and actions?
> Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,

I.5) Number of community members/community groups listed in a skills bank related to drinking water quality?
> Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,

Successful initiatives should develop a system for knowing what skills exist locally and drawing on those skills before using outside technical experts.

I.6) Number of citizens/local institutions involved in water monitoring?
> Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,

Water monitoring is one of the widely utilized processes for getting community members involved in water quality issues.

I.7) Number of contacts made with neighboring or similar communities involved in water monitoring protection?
> Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,

The literature on water quality protection cases demonstrates the importance of communities drawing on the experiences and exchanging ideas with other communities in developing the water quality protection

initiative.

I.8) Number of contacts with government agencies or other organizations regarding water quality.

I.9) Number of efforts made to involve community in evaluation of proposed issue

II) Expanding the Coalition—Education and Awareness

II.1),   Number of training programs about water quality protection available to community members?
        Method—Look at initiative press release, newspaper reports, initiative description, web-page,
        initiative reports, query key informant.
Even if community members are not aware of water quality issues at the beginning of the initiative,
training in how to better manage, monitor, and spot potential sources of contamination of water may be a
good way to increase the community capacity to organize around water resources protection.

II.2),   Number of local community members who speak to local groups on water quality protection?
        Method—Look at initiative press release, newspaper reports, initiative description, web-page,
        initiative reports, query key informant,
Part of mobilizing the community around water quality protection will involve utilizing local experts in
the issue of water quality, its management, its history in the area, and lifestyle and development issues
around water quality. It can be a useful way of recognizing potential local leaders and also a way of
encouraging a local sense of place around water issues.

II.3),   Number of type of sources of information available to citizens about pertinent water issues?
        Method—Look at initiative press release, newspaper reports, initiative description, web-page,
        initiative reports, query key informant,
Members of the community are reached through different types of information. Communities using
multiple media to provide information are more likely to have information about water quality reach
citizens.

II.4),   Number of efforts made to solicit involvement of disadvantaged or minority groups?
        Method—Look at initiative press release, newspaper reports, initiative description, web-page,
        initiative reports, query key informant,
Often disadvantaged and minority groups in the community need to be explicitly invited to join
community initiatives. A number of efforts can be made to make sure that they are able to participate,
such as providing child care, transportation, meals at meetings. Especially in cases like water quality
protection, these disadvantaged groups are important as they often work in marginal jobs, such as
informal auto mechanics, who will be difficult to catch and may need assistance in not polluting the water
system.

II.5),   Number of languages in which water initiative information is distributed.
        Method—Look at initiative press release, newspaper reports, initiative description, web-page,
        initiative reports, query key informant,
Often the migrant, or non-English speaking minority groups are among those who are underrepresented.
Offering meetings and information in a language other than English is a good way to reach these groups.

II.6),   Number of locations where water initiative meetings are held?
        Method—Look at initiative press release, newspaper reports, initiative description, web-page,
        initiative reports, query key informant,
A central location for meetings may be an impediment to some in the community coming to meetings.
By varying the time and place of initiative meetings it may be possible to solicit input and involvement

from multiple community members.

II.7),   Number of events held each year to recognize volunteer involvement and/or successes?
Method-media analysis, project documents, newsletter, key informant query
Celebrations are important in building support for initiatives. This measures the extent to which the initiative has utilized celebrations in its strategy.

II.8)   Number of government agency or other organizational partnerships.

III) Implementation and Monitoring

III.1)   Number of sectors of society identified as having an impact on water quality
Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,
Water quality is an issue that should impact the whole community. Actions and recommended practices should reflect that. When the responsibility for changing practices is placed on one part of the community to protect water quality this generally leads to conflict or loss of interest. This indicator will measure the extent to which the initiative is multiple objective.

III.2)   Number of groups/individuals involved in proposing actions to protect water quality
Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,
Measures the extent to which the process is participatory or top down—the extent to which the community really contributes to the process.

III.3)   Number of partnerships between the initiative and outside organizations/institutions?
Method—Look at initiative press release, newspaper reports, initiative description, web-page, initiative reports, query key informant,
Indicates the ability of the community initiative to develop networks outside of the local context (bridging capital). Who those networks are with will also be important.

III.4)   Number of groups/institutions/individuals involved in monitoring the impacts of initiative actions?
Method—analysis of project reports, query key informant
Will indicate the extent to which the local community has ownership over and interest in the project. Monitoring initiatives are useful in involving groups and building local interest through distribution of results.

III.5)   Number of groups/individuals involved in carrying out initiative activities?
Method—Newsletter, project documents, web site, key informant query
Measures community involvement in the initiative.

III.6)   Number of government agency, university, or other organizations assisting with funding, monitoring, and technical assistance.

III.7)   Number of efforts made to elicit community feedback on actions.

III.8)   Number of groups that have officially endorsed initiative activities.