The Relationship between Participation and Project Success: Evidence from Rural Water Supply Projects in India

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Abstract: There is a surprising lack of empirical evidence supporting the commonly held belief that participation in rural water supply projects leads to improved project outcomes. The few studies that have explored this question have not been explicit about their measures of participation making it difficult to understand exactly what types of participation are important to project success. This study examines data collected from 45 villages in two different water supply projects in India to evaluate: 1) whether participation in general has a relationship with project outcomes; 2) whether contribution towards up-front capital cost (typically thought to be a very low level of participation) has an impact on project outcomes; and 3) if higher levels of participation lead to improved outcomes. Based upon results of Ordinary Least Squares regression models, the study has three major conclusions. First, overall community participation is fundamentally important to project success. Second, the greater the number of households who have contributed towards capital cost in a village, the more likely households are to be satisfied and to rate the project as effective. Third, transparency of committee operations is important for project success as measured by tariff payment and overall project effectiveness.

Introduction

Despite the increased emphasis placed on the role of participation in development projects, there is little empirical evidence to support the claim that participation has a positive relationship with project outcomes (Cleaver 2001). Part of the reason for this lack of evidence is the wide range of definitions and conceptualizations of the key concept of 'participation.' Each previous study applies its own often-implicit definition of this concept, which makes it difficult to understand what is actually being measured. This article attempts to overcome this bias by carefully defining participation and exploring its relationship to project outcomes in two rural water supply projects in India.

Following a detailed discussion of the strengths and weaknesses of earlier studies, this article builds upon existing typologies of participation to develop a simple hierarchy of low versus high levels of participation. Simply, the lowest level of participation considered is passive participation (monetary contribution) while a higher level consists of more active forms of participation such as involvement in decision-making and meeting attendance. This article seeks to answer the following questions: 1) does participation in general have a relationship with project outcomes?; 2) does contribution towards up-front capital cost have an impact on project outcomes?; and 3) do higher levels of participation lead to improved outcomes?

Arguments For and Against Participation in the Water Supply Sector

For over 20 years, it has been argued that successful development projects, including water supply projects, must have a participatory component. To briefly summarize, it is argued that people's participation can contribute to the achievement of five main objectives of water supply projects: effectiveness, efficiency, empowerment, equity and coverage (Narayan 1995). Projects are more effective and sustainable when beneficiaries play a role in deciding what type of project

should be implemented as they know what they do and do not need better than any outsider (Narayan 1995; World Bank 1994). In addition, if people are involved in a project they are more likely to feel ownership, support it and work to make it succeed (Tacconi and Tisdell 1992; Water and Sanitation for Health Project 1993). Efficiency results when resources are used less wastefully by focusing only on those projects that people genuinely want and need. Thus, participatory projects are seen as being more cost-effective (Narayan 1995; Oakley 1991). Empowerment has several components; it has been suggested that participation by project beneficiaries can lead to greater self-reliance in the form of strengthened local organizations, a greater sense of pride in the village, and the successful undertaking of new projects (INSTRAW-UN 1990; Narayan 1995; Oakley 1991; Water and Sanitation for Health Project 1993; World Bank 1994; World Bank 1996b). Equity results when participation leads to less capture of the good by elites and more equitable access to the improved water supply (Narayan 1995). Finally, increased coverage occurs as more rural people are brought into water supply projects (Narayan 1995; Oakley 1991).

The above arguments in favor of participation make it sound like a win-win situation. The implementing agency can report the successful attainment of project goals in terms of water coverage and the community not only has water, but also has increased skills and capabilities. Due to this seemingly infallible solution to the dilemma of providing water, many donor agencies have jumped on the participation bandwagon. However, there can be negative outcomes from participation (Cooke and Kothari 2001). Sometimes participation can be forced upon a community against its will, taking away from the residents' valuable work or leisure time. For example, the Water and Sanitation for Health (WASH) project, which played an important role in assisting the U.S. Agency for International Development's efforts in the water sector during the 1980s and 1990s, has written that, "In rural and peri-urban communities users normally are expected to

accept a more active type of participation (1993, 61, italics added for emphasis)." This implies that participation is not always perceived as a voluntary process by implementing agencies and donors. If the community does not desire the end product and / or does not truly get to participate at all stages of the project, participation may not be desirable. A simple example of this would be an agency that goes into a village, and, waving the participation banner, has the community digging trenches for pipes in pre-determined locations that will bring water to pre-determined homes or locations. Oakley writes:

> "It could be argued that strategies of participation which place the burden for development on rural people are shouldering them with unfair burdens. All argument for more participation in development must be scrutinised in terms of the tangible results and should be examined, not merely from the perspective of the agency involved, but in terms of the interests of the rural people themselves (1991, 18)."

It has been suggested that for participation to lead to sustainable outcomes, people need to be involved in higher levels of decision-making; not just in manual work (Schouten and Moriarty 2003).

Levels of Participation

Several hierarchies of participation have been developed for different disciplines; these frequently involve terms such as 'passive participation' or 'tokenism' at the low-end of the scale (Agarwal 2001; Arnstein 1969; Pretty 1995; World Health Organization 1988). Contribution of either money, labor or materials towards a predetermined project can be considered to be a very low form of participation – or even non-participation – as 'participants' are seldom given a choice and may not even know what their resources are being used for.

In the middle of the hierarchy, participants are involved in decision-making about largely pre-determined questions. In water supply projects, this involvement for the average household can take the form of attending meetings, speaking out at meetings, being involved in decisions such as the location of key facilities and the timing of water supply, and supervising construction.

At the upper end of this hierarchy, participants undertake their own initiatives, develop strong leadership roles and are in full control of their project. Individuals who are members of local-user committees can often have more power to influence the course of the project than average citizens; however, this power is often limited by external constraints such as deadlines, budgets, and pre-determined ideas about technology type.

As we will see in the next section, there is a tendency within the literature addressing the relationship between participation and project effectiveness to ignore this hierarchy of participation. Most of the studies in this area have not clearly identified what type of participation they are measuring. Given the range of activities that can be classified as 'participatory,' researchers need to state their measures more explicitly in order to better guide future policy development.

There is a particular need to further examine the value of low levels of participation such as monetary contribution in light of recent assertions by the anti-globalization movement that water should be free and people cannot afford to pay for it (Peet 2003). Despite over a decade of research affirming villagers' willingness-to-pay for water (see e.g. Whittington 2002; Whittington, Lauria, and Mu 1991; World Bank Water Demand Research Team 1993), the belief that people should not pay is not confined to green lobbyists and the anti-globalization movement. Politicians, likely out of both the desire to be re-elected and a true belief that the poor cannot pay, also advocate against charging for water (see e.g. Roy 2002). Some scholars argue that willingness to

pay does not equate to ability to pay and we should not assume poor villagers have the ability to pay (Schouten and Moriarty 2003). However, the reality is that even in rural areas many water and sanitation projects (following the lead of the World Bank and other donors) now expect households to contribute to both capital costs and the cost of maintenance. While there is no doubt that water is a fundamental human right, the question has to be asked: is providing a *free* system that will fall apart in a few years really in the poor's best interest? Or would they be better off paying for a system which will provide a safe, reliable water source for several years? Does payment lead to an increased sense of ownership and a more effective and sustainable project? This question has not been empirically addressed; the literature suggests that the link between capital cost payment and increasing ownership may not exist and that requiring contribution may be just another barrier preventing safe water supplies from reaching the poorest (Schouten and Moriarty 2003).

Previous Literature

The majority of the available evidence regarding participation is in the form of case studies which are isolated and not sufficiently detailed (van Wijk-Sijbesma 1985). Very few quantitative studies have been undertaken to examine the role of participation and other institutional features in development in general (Cleaver 2001) and the water supply sector in particular. As one study notes, "there is a surprising lack of empirical studies that test the basic determinants of performance of community-based water services (Isham and Kahkonen 1999: 46).

[Table 1 about here]

There have been six important empirical studies that have attempted to evaluate the impact of participation on the outcomes of water supply projects (see table 1). Two early studies examined the role of participation and water supply projects and are discussed briefly by Van-Wijk Sijbesma (van Wijk-Sijbesma 1998).[1] The first study conducted by Imboden in 1977 looked at 11

projects in seven countries in Africa and found that repairs took less time in schemes with high community participation. However, no correlation was found between the degree of participation and the total percentage of facilities out of order (Imboden's data were analyzed by Miller in 1978 and Bennell in 1979). The second study was conducted by Barra in 1978 and examined 137 rural water supply schemes in Mexico. It found a correlation between participation and facilities in working order. Also, in schemes where users contributed to capital cost in cash, there was a high rate of timely tariff payment; whereas in schemes where users had not contributed, no one paid their tariff on time.

A couple of other studies on the effects of participation in development in general were undertaken in the 1980s. While these studies did not specifically examine the effects of participation on water supply schemes they are worth mentioning as they have influenced subsequent work. Esman and Uphoff (1984) attempted to explain why some local organizations made a greater contribution to rural development than others. By examining 150 rural local organizations throughout the developing world, the authors found relatively high correlations between participatory orientation of organizations and effective task performance (Esman and Uphoff 1984). Narayan, however, points out that several of their measurements for participation were highly subjective and were based upon reports not written for the purposes of evaluating participation (Narayan 1995). In a study published in 1987, Finsterbusch and Van Wicklin found only moderate correlations between participation and project effectiveness, but this was not a sector-specific study and many different types of projects were included in their sample (Finsterbusch and Van Wicklin 1987).

The most influential study pertaining to participation in the water sector was published in 1995 by Narayan who studied 121 rural water supply projects in 48 countries. The data for this

study were collected from project evaluation reports, and a multivariate regression model was used to attempt to understand the effects of beneficiary participation on overall project effectiveness. In this study, participation was scored on a one to seven point scale, with a score of one indicating no participation, and a score of seven indicating high levels of participation. From the report, it is not clear what each of these levels captures. The study also looked at when participation occurred in the project cycle – during the planning, construction or operation and maintenance stage. Using factor analysis, the statisticians determined that 'overall beneficiary participation' could be used as the main measure of participation. A measure of 'overall project effectiveness' was also generated using factor analysis on 20 performance outcomes.

This study found beneficiary participation to be a significant indicator of overall project success; however, there are several problems with this study. First, each project had a different type of participation, ranging from when participation occurred to how participation occurred and who participated (Narayan 1995). Second, the information was gleaned from project evaluation reports, suggesting that in some cases actual participation, or quality of participation, may not have been adequately captured (Rietbergen-McCracken 1996). While the statisticians address concerns about coder subjectivity (Isham, Narayan, and Pritchett 1995), they never adequately address problems with the reports themselves. The reports were based on three to five week impact assessments made by teams of experienced evaluators, and were only supplemented by anthropological research and socio-economic surveys in some cases. Third, the range of cultures that this study covered cannot be taken lightly in view of the different pre-existing power and social relations and geographical constraints that may have impacted the efficacy of participation.

Building on Narayan's work, Sara and Katz of the UNDP-World Bank Water and Sanitation Program looked at the impact of project rules on the sustainability of water supply

systems in 1997/1998. The focus of this study was on the demand responsiveness of projects, and it was hypothesized that demand-responsiveness had a positive relationship with sustainable service delivery. The study included ten projects in six countries, and a total of 125 communities were surveyed. It should be noted at the outset that the projects surveyed have been in operation for three to five years; this means that all the data collected are merely *indicative* of long-term project sustainability. The study defines a project as being more or less demand responsive "to the degree that users make choices and commit resources in support of these choices (Sara and Katz 1998, 30)." Demand responsiveness requires community participation in terms of both getting a project and in terms of selecting project type and level of service options.

Sara and Katz estimate a multivariate ordinary least squares regression model using the data they collect. The dependent variable is a pre-defined index composed of 59 indicators of sustainability, including physical condition, consumer satisfaction, operations and maintenance practices, financial management, and willingness to sustain the system. The relevant findings of the study are as follows: 1) sustainability is higher in communities which followed a demand-responsive approach, 2) project rules are applied inconsistently between communities, 3) demand-responsiveness is more effective when expressed directly by household members and not through representatives, and 4) communities which relied on a local leader versus establishing a committee were often ineffective.

In this study, participation is subsumed under demand responsiveness of the project. The authors look to see if project initiation came from individual households and from the community, and whether households and the community were able to make an informed choice about the project. The study does examine outcome differences based upon whether or not projects were

implemented by a water committee, but does not look at on-going participation through the construction and operation and maintenance stages of the project.

Another study builds upon these earlier sectoral studies. This study is a global initiative between the IRC, the International Water and Sanitation Center in The Hague and the World Bank's Water and Sanitation program. A participatory methodology for assessing demand responsiveness and participation in communities was developed specifically for this work. One of the objectives of this study is to assess whether demand-responsiveness and gender and poverty sensitive participation is positively associated with sustained water and sanitation services (Gross, van Wijk, and Mukherjee 2001). The methodology collects data at the village level and at higher levels in order to understand the policy environment in which projects take place. While the methodology developed for this study is a very useful alternative to traditional household surveys, the methods used to analyze the collected data are rudimentary. The methodology has been applied in many locations ((Mukherjee and van Wijk 2003)) and one large-scale analysis has been conducted on data from 88 communities in 15 countries. However, this analysis did not attempt to show a causal relationship between demand-responsiveness, participation and project outcomes. Rather it relied on simple correlations (Gross, van Wijk, and Mukherjee 2001)

Caveats aside, the authors broadly conclude that higher levels of participation are associated with a better-sustained service. Higher levels of initial payments for capital cost are found to have a negative correlation with service sustainability. Good governance, measured by having a local organization, women's participation, transparency and training, is associated with sustained water supply. Finally, higher demand-responsiveness is associated with better access to and use of the service (Dayal, van Wijk, and Mukherjee 2000; Gross, van Wijk, and Mukherjee 2001).

The final study of interest (Isham and Kahkonen 1999; Isham and Kahkonen 2002) was written by a team hired to manage data collection and data analysis for two World Bank Impact Evaluation Reports in the South Asia region (World Bank 1998a; World Bank 1998b). Interestingly, the project studied in Karnataka is the same studied in this article and some of the randomly selected villages for each study are the same. The objective of the study was to analyze the impact of certain institutional determinants, such as service rules and social capital, on the performance of the projects.

The authors conclude that community design satisfaction is a significant predictor of improved health in all three locations. They also find that 'design participation' and 'local decision-making' are significant predictors of 'satisfaction with service design'. Unfortunately, these results are misleading, because 1) they do not clearly define 'design participation' stating only that it "indicates that the household participated in service design (page 676, 2002);" Did households attend meetings, contribute funds or labor, or participate in decision-making? 2) They show a lack of understanding of the Karnataka project as evidenced by the following statement: "'Local decision-making' reflects that community members, as opposed to government officials or other outsiders, made the final decision about what type of system to build (677, 2002)." However, as discussed below, no villages in Karnataka were allowed to make this decision which makes this a meaningless variable (and therefore troublesome in its significance). As another example, they state that households in Karnataka did not have to contribute towards construction costs, which is not true. Yes, households did not have to contribute towards the water portion of the project, but they had to contribute towards sanitation – and projects were not supposed to commence on any portion of the project until these funds had been raised.

Gaps in Knowledge

From the above studies, there is limited evidence that some form of participation in water supply projects leads to more effective projects. However, it is not clear from the literature what level of participation makes a difference to what elements of project outcomes. Despite questions as to whether monetary contribution should even be considered a form of participation, no one has critically examined its effectiveness vis à vis project outcomes. Only Narayan's study developed different levels of participation, but these are not clearly specified and are lost in the final analysis where only one measure of participation is used. From a policy perspective, it is much more useful to actually know at what level participation starts to make a difference.

Background Information about Projects

This study examined the role of participation in World Bank assisted rural water and sanitation projects in two states in India. There are important differences and similarities between project implementation in the two states. Important characteristics of the two projects are outlined in table 2. The Karnataka Rural Water Supply and Environmental Sanitation Project was initiated in 1994 with the intent to cover 1200 villages in selected districts all over the state. More often than not, the schemes built under the auspices of this project were augmentation schemes; that is they simply added on to existing schemes. The technology employed in the World Bank assisted villages is no different from in other government schemes in the area. The specific type of scheme is determined based upon village size – the villages have no input.

[Table 2 about here]

The Uttar Pradesh (UP) Rural Water Supply and Environmental Sanitation Project (referred to popularly as Swajal) was initiated in 1996 with the intention of covering 1000 villages

in two distinct regions of the state.[2] Within reason, villages in UP were given a choice over technology type.

Both projects mandated the creation of Village Water and Sanitation Committees (VWSC's) in every village. A key distinction between the two projects in this regard is the relationship of the committee to the local government body, the *Gram Panchayat.* In both states, the VWSCs are ostensibly sub-committees of the *Gram Panchayat;* however, in UP, this relationship is lax while in Karnataka every member of the GP is a member of the VWSC and the relationship is very formalized. The role of the committee is similar in the two states. One of the primary responsibilities revolves around finances – first collecting capital cost contribution and then setting and collecting a tariff to ensure effective operation and maintenance of the completed system. While project rules pertaining to capital cost contribution are technically different in the two states – in Karnataka, the contribution is considered to be only towards the environmental sanitation components of the project – in both states, villages were expected to come up with approximately ten percent of the overall water and sanitation costs. Similarly in both states, the villages are fully responsible for all costs associated with operation and maintenance. In Karnataka, tariffs for private house connections range from Rs. 5-50 per household per month (US$ 0.11-1.14) and for public standposts they range from Rs. 0-25 per household per month (US$ 0-0.57). In UP, tariffs range from Rs. 3-50 per household per month (US$ 0.07-1.14) with the upper end tariffs reserved for private house connections. In neither state are tariffs in any way based upon the amount of water actually used.

Beyond the differences in project rules, there are also fundamental cultural and geological differences between different regions within each state. In Uttar Pradesh, the project functions in

two distinct geographical areas; the Himalayan region (the Hills) and Bundelkhand (the plains). In Karnataka, the three key geographical regions are the North, the South and the coastal region.

The three regions in Karnataka are characterized by different soil types and different levels of water availability. Generally, the South of Karnataka has richer groundwater resources than the North which is a very, dry rocky area. The coastal districts have hilly terrain and poor groundwater resources. In the South and along the coast, women's status is generally quite good with girls receiving almost equal levels of education and women being relatively mobile and confident. In the North, girls' education levels fall well below boys', and women are less mobile. Social capital, in general, is lower in the North where there are higher inequities and more caste conflicts.

The two regions covered by the World Bank project in UP both have poor natural water availability. In the Hills, water is available from springs. In Bundelkhand, there are sand, limestone and granite formations with very poor groundwater resources (World Bank 1996a). Beyond the scarcity of water in the two regions, few similarities can be found. The Hills of UP consist of primarily small, homogeneous, isolated villages where gravity schemes are frequently appropriate. Social capital is generally quite high in this area with several villages having active forest committees (*van panchayats)*. Women's status is quite high within the villages, although mobility is not necessarily high due to fears of walking through forests to get to nearby markets. Conversely, in Bundelkhand, women's status is very low with many upper-caste households practicing a form of *purdah* in which women are discouraged from interacting with men in public. The villages are quite large in this area, although the studied Swajal villages are smaller than the average villages with a mean of less than 200 households. There are many different castes in the villages and as a result several caste conflicts, and high inequity between villagers.

Research Design and Methodology

The sampling frame for this study consisted of all project villages that had been in the operation and maintenance stage for at least six months.[3] To study project outcomes, a longer operation period would be ideal; however, given the recentness of the projects, this was not possible. One advantage to visiting villages so close to their completion date is that people still remember their involvement during the project planning stage. In Karnataka 25 villages were randomly selected from the sampling frame by region, and in UP, 20 villages were randomly selected by region. To collect the data, four research assistants hired, each with a minimum of ten years experience in the water supply and sanitation sector in India. Additionally eight household interviewers (half male and half female) were contracted in each state. After pre-testing the surveys, the data were collected at the end of 1999 / beginning of 2000.

Data were collected from numerous sources within each village, including households, committee members, project records and the system operator. Approximately 40 households per village were randomly selected and asked to answer a detailed questionnaire about their participation in the project, their previous and current water usage and attitudes, their awareness of the village water committee, and their socio-economic status (a total of 1523 household interviews were completed in the 45 villages).[4] In addition to holding a committee meeting and asking questions about the project, separate interviews were conducted with randomly selected individual committee members; both male and female. Project records were carefully reviewed to better understand how the community made decisions and raised money. In villages with a system operator, that individual was interviewed about the current operation of the facilities. Additionally, the project team observed facilities first-hand and collectively recorded observations after each village.

Descriptive Statistics

While household survey data were corroborated by data collected from other sources, except where otherwise noted, only data collected directly from households are used in this article. Table 3 presents an overview of the descriptive statistics related to participation in the projects in the two states.

[Table 3 about here]

As can be seen in table 3, participation levels are much higher overall in UP than in Karnataka. From awareness of the project through to monetary contributions to meeting attendance and involvement in key decisions, the households in UP were very active.

One weakness of this study was that while households did not seem to have a problem recalling whether they had contributed some amount towards capital costs; they could frequently not recall the *specific* amount. From reported information, in Karnataka contributions ranged from 0-25,000 Rupees (Rs.) per household with a mean of Rs. 168. Several villages in Karnataka collected funds from one or two village leaders or from sale of public land. In UP the highest reported contribution was a more modest Rs. 2400 with a mean of Rs. 193.

Table 4 presents select descriptive statistics of project outcomes. In addition to statistics presented in the table, both average time spent daily on collecting water, and average distance to the nearest source, decreased after the new scheme in both states. In the household survey, respondents were asked to rate each water source in terms of color, taste and smell. These responses were then combined with principal components analysis to form an overall indicator for water quality. Quality was rated slightly worse in UP than in Karnataka. Similarly, water service was noted to be more unreliable in UP than in Karnakata; although even in the latter case the previous schemes were, on average, less than reliable.[5] While reliability improved in UP with the

new scheme, it did not improve in Karnataka. The respondents' perception of water quality improved marginally in both states.

[Table 4 about here]

Overall households in both states report being satisfied with the new scheme, and a majority of households are using water from the new scheme. There is a marked difference in private house connections between Karnataka where 43% of households have them and UP where only 17% of households have them. This is due in part to different technologies and different expectations. In UP, some villages received handpumps, and in others which had never before had piped water, private house connections were not even offered.

Concept Measurement

In order to assess the relationship between participation and project effectiveness, the data that are analyzed in this article are aggregated to the village level. To ensure parsimonious models, variables for certain concepts have been created using the method of principal components analysis. The first of these measures is transparency. The index variable is intended to capture the level of transparency in committee operations. It is hypothesized that the more households are aware of committee actions, the better the project outcomes will be. Specifically, the index variable, 'transparency' is comprised of the following:

1) Percent of households aware before construction started that village would be responsible for Operation and Maintenance costs once project was completed;
2) Percent of households that know how the tariff is set;
3) Percent of households that know whether other households pay tariff;
4) Percent of households that know what happens at committee meeting;
5) Percent of households that know someone on the committee; and

6) Whether or not committee shares accounts with community (information provided by VWSC).

The first component explains 51.1% of the variation in the original data.

The next set of index variables capture the level of community participation in the project. The first variable includes measures of both low and middle levels of participation; specifically, 'overall participation' is a function of:

1) Percent of households involved in more than one decision;

2) Percent of households who attended a meeting during the planning stage of the project;

3) Percent of households who supervised construction; and

4) Percent of households who contributed towards the upfront capital costs.

The first component captures 69% of the variation in these data.

The second measure of participation *excludes* capital cost contribution so that the effects of this nominal type of participation can be isolated. This component captures 71% of the variation in the original data. This measure of 'higher levels of participation' consists of only:

1) Percent of households involved in more than one decision;

2) Percent of households who attended a meeting during the planning stage of the project; and

3) Percent of households who supervised construction.

Earlier in this article, I discussed three distinct levels of participation: low, middle and high. However, the above measures only address the low and middle levels. High levels of participation can only occur in situations where villages are truly given a choice about what type of project they want, when they want it, and how they want it. It could be argued that villages in UP were given

this choice; especially in the later phases of the project not included in this study sample. However, villages in Karnataka were not given any control over whether they wanted a project and subsequently what type of technology they preferred. Even in UP, villages were not given any control over committee structure, type of community meetings and other indicators of high levels of participation. Therefore, the highest level of participation that can be examined using the available data is the middle level.

Defining Project Effectiveness

Defining project effectiveness is no small task; does it mean consumers are satisfied? Does it mean the infrastructure is in good condition? Does it mean time savings? Does it mean people are paying tariff? Does it mean health has improved?, etc. At the outset of this section, it is important to remind the reader that some of these projects had only been operating for four months at the time of data collection, which makes it too soon to say anything about long-term sustainability. Only current project operation can be discussed, and the reader can draw his or her own conclusions about what this may or may not mean for long-term success.

Reviewing table 1 sheds light on how earlier studies have addressed the question of project success. A common approach, used by both Narayan (1995) and Sara and Katz (1998), is to create an overall index based upon a number of factors (Narayan through factor analysis; Sara and Katz with a pre-defined scale). Others, such as Isham, et al. (2002) and Gross, et al. (2001) have defined project effectiveness with one or two measures. In this article, I use both approaches, and use four different measures of the level of project success:

1) Consumer Satisfaction: Percentage of households in a village that report being either ‘satisfied’ or ‘very satisfied’ with the new scheme. Consumer satisfaction ranges from 16% to 98% in Karnataka and from 31% to 100% in UP.

2) Tariff Payment: Percentage of households who use the system in a village which report having paid the water tariff. In both states tariff payment ranges from 0-100%; i.e. in some villages no one is paying tariff and in other villages every household is paying tariff. In three villages in UP and one village in Karnataka, every household is paying tariff.
3) A measure of 'overall project effectiveness' generated using principal components analysis. This measure consists of: 1) percentage of households reporting equal access, 2) percentage of satisfied consumers, 3) percentage of households reporting the water is adequate for their needs, 4) percentage reporting time savings with the new scheme, 5) percentage who think the village can sustain the system for at least 10 years, 6) percentage of users who think the pressure has decreased since the first days of operation, and 7) percentage of users who have paid the tariff. The first component captures 57.4 percent of the variation in these data.
4) A measure of 'improvements in water characteristics' generated using principal components analysis: This measure consists of 1) percentage of households reporting equal access, 2) percentage of households reporting the water is adequate for their needs, 3) percentage reporting time savings with the new scheme, 4) percentage of users who think the pressure has decreased since the first days of operation, 5) average improvement in scheme reliability, 6) average improvement in perceived water quality, and 7) aggregate change in the distance to the nearest source. The first component captures 45.8 percent of the variation.

These four unique measures can be used to address whether and how participation is important to project outcomes. The key distinction between the two index variables is that the measure of

'improvement in water characteristics,' in contrast to 'overall project effectiveness,' strives to capture only objective, verifiable measures of project outcomes. While all these data come from the household surveys, they are less likely to be influenced by an individual respondent's sense of ownership or pride in the project. Conversely, it can be argued that some of the measures in 'overall project effectiveness,' such as consumer satisfaction and opinions as to whether the community has the ability to sustain the system, are highly subjective and can be influenced by the individual's sense of ownership over the system regardless of how good it actually is on-the-ground. The reader can determine which measures they believe are the more valid indicators of project success.

Results

These four dependent variables have each been modeled separately using ordinary least squares regression. Due to the small sample size every effort has been made to keep these models small while including sufficient control variables to tell an accurate story. The addition of other control variables not presented here do not change the overall model conclusions. Table 5 illustrates the effects of 'overall participation' on the four different measures of project outcomes. As can be seen, 'overall participation' is a significant determinant of success for all outcome measures *except* 'tariff payment.' This indicates that consistent with earlier literature, the more people in a village are involved in a project the more likely they are to be both satisfied with the results and to have more concrete improvements in their water supply situation. However, participation appears to have no bearing on success as measured by an indicator of financial management, tariff payment.

[Table 5 about here]

The other variables in the model are less consistent across the different outcome measures. We see that transparency of committee operations is a significant determinant of both 'overall

project effectiveness' and 'tariff payment'. However, transparency is not a determinant of concrete on-the-ground success as illustrated by the final outcome measure: 'improvement in water characteristics.' Village size is an important control variable but does not have any significant relationship with project outcomes. The regional control variables capture a great deal of noise. After controlling for the other variables, Northern Karnataka is significantly more likely to have positive project outcomes than the other regions.

The results presented in table 5 are neither surprising nor new; however, through careful conceptualization, they do confirm the findings of earlier literature. Because the measures of both participation and project outcomes are clearly defined, these results should be more useful to policy makers than earlier studies that have buried their precise measures in vague language. Table 6 takes this approach one step further by isolating the effects of capital cost contribution from more active levels of participation.

[Table 6 about here]

Using the same four outcome measures defined earlier, we now see that higher levels of participation and capital cost contribution are unique and significant determinants of both 'satisfaction' and 'overall project effectiveness.' However, neither measure of participation is significant for either 'tariff payment' or 'improvement in water characteristics.' Once again, transparency is only significant for 'tariff payment' and 'overall project effectiveness'.

These findings about capital cost contribution and higher levels of participation are extremely important. When a household contributes money towards a project, there is no notion that they have any say in what the final project will look like, so *a priori*, we have no reason to suspect that they will have an increased sense of ownership over the project. Conversely, when households participate at higher levels, we expect them to have an increased sense of ownership

and we expect the project to be measurably better in terms of concrete outcomes such as improvement in water characteristics. What we can conclude from the models presented here is that both capital cost contribution and higher levels of participation are independently important for certain types of project outcomes. That is not to say that a project with only higher levels of participation will not be an improvement over an entirely non-participatory project, but it does indicate that we can gain more if we insist upon both capital cost contribution *and* a more active voice for rural residents.

Conclusions

This study makes an important contribution to the literature on community participation in rural water and sanitation projects with three main conclusions:

1) Overall community participation; as measured by households' capital cost contribution, involvement in decision making, meeting attendance, and construction supervision; is fundamentally important to project success as measured by consumer satisfaction and overall project effectiveness. Participation is not an important determinant of the percentage of households paying water tariff. However, given that the systems function better and consumers are more satisfied if they have participated, this indicates that participation is a necessary component of a successful project. By looking within one country, and studying 45 villages with similar project rules, this is clearly a supportive argument for encouraging participation.

2) Breaking participation into two components and separating out capital cost contribution, we find that the percentage of households who contributed towards capital cost is very important to project success as measured by 'consumer satisfaction' and 'overall project effectiveness.' Villages with only a low percentage of households contributing money, or where money was raised without going to households, do not perform well. This is a very important finding; one that supports the

World Bank's original supposition in designing these projects and one that addresses the concerns of the anti-globalization movement. This study underlines the importance of making people pay – even a relatively token amount as in these projects.

3) Transparency is very important for 'tariff payment' and 'overall project effectiveness,' but not as important for other measures of project success. The village-level analyses present evidence that a greater percentage of households are likely to pay tariff as the village's transparency score increases. In situations where water systems can only keep functioning if the community generates the funds to ensure their operation, this critical finding can help design more effective committees.

In order to continue to advance our understanding of the relationship between participation and project success, future studies should all strive to clearly articulate how they are defining and measuring both of these important concepts. There is a need to further break apart the levels of participation, e.g. is meeting attendance important or only being given input into important decisions? This type of analysis will only be possible with a very large sample size of villages. Finally, this study was only able to separate out low from mid levels of participation; there is also a need to study villages that have the highest levels of participation to see what impact this has on success.

Table 1: Summary of Literature on Effects of Participation in Water Supply Projects

Study: Author, date, area	Measure of Participation	Measure of Project Outcomes	Findings	Limitations
Imboden 1977 Africa	Not enough information available	- Length of time to make repairs - Percentage of facilities out of order	Repairs took less time when high levels of community participation	Limited information available on this study
Barra 1978 Mexico	Not enough information available	- Tariff payment - Facilities in working order	- Correlation between participation and facilities in working order - Where users contributed cash towards capital cost, high rate of tariff payment	Limited information available on this study
Narayan 1995 Global	Through factor analysis, develops measure of "overall beneficiary participation"	Overall project effectiveness: results of factor analysis on twenty performance outcomes.	Participation is a significant indicator of overall project success	- Desk study - Projects all defined participation differently
Sara and Katz 1998 Global	Subsumed under measures for demand-responsiveness: - source of project initiation - informed choice	<u>Sustainability Index:</u> 1) physical condition 2) consumer satisfaction 3) O&M practices 4) financial management 5) willingness to sustain the system	- Sustainability higher where communities had demand-responsive approach - Committees effective compared to local leaders	- Does not measure ongoing participation or participation by different sectors of community - Focus on demand-responsiveness vs. participation
(Dayal, van Wijk, and Mukherjee 2000; Gross, van Wijk, and Mukherjee 2001) Global	- Participation in service establishment and operation - Demand-responsive service	<u>Sustainability:</u> 1) system quality 2) effective functioning 3) effective financing 4) effective management <u>Effective Use</u> - hygienic and environmental use	Links between participation, demand-responsive approach and sustainability exist	- Evidence only supported by simple correlation analysis
Isham and Kahkonen 1999, 2002 India	Design participation: "dummy variable for households that participated in the design process" (1999)	- Quality of construction - Satisfaction with service design - Health impacts	- Social capital significant determinant of participation - Community design satisfaction leads to improved health outcomes	- Poor construct measurement - Models not well specified - Lack of understanding of projects - Potential sample selectivity bias

Table 2: Comparison of the Two Projects

Project Features	Karnataka	Uttar Pradesh*
Project start date	1994	1996
Process of village selection	Selected by the government (*zilla panchayats)* on the basis of water shortage and water-related health problems.	Selected by NGOs based upon three criteria: need, demand and technical feasibility.
Technology choice	Village does not get to make a choice. Based upon village size, technology is piped water supply from an overhead tank or open well, mini water supply, or handpumps.	Village is given options; these include gravity schemes, rainwater tanks, handpumps and piped schemes from overhead tanks. Options are dependent upon feasibility and cost.
Possible voice for community during planning stage	Location of facilities, deciding who should be on committee, decisions regarding habitat improvements (type, number, location)	Decisions regarding technology choice, location of facilities, who should be on committee, decisions regarding habitat improvements
Role of Village Water and Sanitation Committee (VWSC)	During the planning and implementation stages: collect capital cost contribution and facilitate discussion regarding the location and number of different types of facilities. During O&M: fix and collect tariff and ensure the maintenance and operation of the system	During the planning and implementation stages: collect capital cost contribution and facilitate discussion regarding the location and number of different types of facilities, including water supply. Oversee the construction, including purchasing materials and ensuring labor contribution by the community. During O&M: fix and collect tariff and ensure the maintenance and operation of the system
Formal relationship between VWSC and Gram Panchayat	VWSC is a subcommittee of the Gram Panchayat. The Gram Pradhan is Chair of the VWSC (unless the Pradhan is based in another village). Every member of the Panchayat (from the project village) is automatically a member of the VWSC. Some additional community members are also selected for the committee.	VWSC is a subcommittee of the Gram Panchayat; however, in practice it usually operates in isolation. There are no requirements that Gram Panchayat members be on the committee, and usually very few members of the GP are on the committee. The VWSC chair is selected by the community.
Rules for community contribution towards capital cost	Villages are to contribute 30% of the cost for drainage schemes; however, 50% of this contribution is required upfront for construction on the water supply schemes to start.	Villages contribute approximately 10% of the capital cost of both water and sanitation components in cash and / or labor.
Role of NGO	The NGO facilitates participation, operates as a liaison between the village and the government. After project handing over, the NGO is no longer officially involved.**	The NGO is involved in both hardware and software components of the scheme. The NGO selects villages, facilitates participation and assists the village in procurement of goods and construction organization. After the project is taken up by the village, the NGO is no longer officially involved.**
Role of government	The Public Health Engineering Department (PHED) is responsible for the design and construction of the water systems; while the Project Planning and Monitoring Unit (PPMU), along with its district level offices (DPMUs), is responsible for procurement monitoring, planning support, technical guidance, and independent monitoring of project implementation.	Project Management Unit (PMU), along with its district level offices (DPMUs) is responsible for overseeing the project, subcontracting service delivery responsibilities to NGOs and communities, ensuring that NGOs and schemes meet criteria, providing funding and monitoring performance.

*There were significant changes between different phases of the UP project. The rules presented here pertain to the first two phases from which all the surveyed villages come.

**In both of the projects, the NGO's contract ends a short time after the project is officially taken up by the community. In some cases NGO's continue to perform follow-up visits; in others they do not.

Table 3: Measures of Participation

	Karnataka		Uttar Pradesh		Total	
Measure	**Percent**	**N**	**Percent**	**N**	**Percent**	**N**
Households that contributed towards project	48%	935	81%	473	59%	1408
Households aware of project prior to construction	50%	1033	87%	490	62%	1523
Households attended planning meeting	22%	1019	80%	489	41%	1508
Households participated in more than one decision*	52%	1031	58%	490	54%	1521
Households supervised construction work	26%	998	55%	485	36%	1483
Households attended meetings post construction	14%	929	36%	420	21%	1349

*Households were asked about a variety of decisions including number and location of different facilities such as standposts or handpumps, and whether or not they voiced concerns in a meeting.

Table 4: Measures of Project Outcomes

	Karnataka		Uttar Pradesh		Total	
Measure	**Percent**	**N**	**Percent**	**N**	**Percent**	**N**
Households reporting satisfaction with new scheme	68%	1033	73%	490	70%	1523
Households with equal access to water	75%	994	81%	457	77%	1451
Households with adequate water	89%	865	89%	389	89%	1260
Households who think village can sustain system for 10 years	44%	1001	49%	489	46%	1490
Households who think pressure has decreased since first days of operation	17%	913	11%	423	15%	1342
Households who have paid tariff	47%	973	46%	482	46%	1455

Table 5: Effects of Overall Participation on Project Outcomes

	DV: Satisfaction	DV: Tariff Payment	DV: Overall Project Effectiveness	DV: Improvement in Water
Variable	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**	**Coefficient (t-statistic)**
constant	73.0 (13.6)***	11.2 (.993)	-2.16 (-2.11)**	156 (5.18)***
number of households	.00451 (754)	.00159 (1.26)	.00124 (1.09)	-.00170 (-.505)
transparency	1.39 (1.21)	11.6 (4.80)***	.468 (2.14)**	9.16 (1.42)
overall participation	5.14 (3.64)***	.992 (.333)	1.22 (4.54)***	18.4 (2.31)**
UP Hills	-4.49 (-.759)	9.06 (.726)	-.832 (-.737)	20.9 (.628)
Southern Karnataka	10.2 (1.44)	46.6 (3.14)***	3.08 (2.30)**	69.4 (1.75)*
Northern Karnataka	19.5 (2.63)**	47.8 (3.07)***	4.78 (3.39)***	142 (3.40)***
Coastal Karnataka	-5.20 (-.611)	49.9 (2.78)***	.608 (.374)	23.2 (.483)
N	45	45	45	45
R^2	.678	.623	.766	.605
Adjusted R^2	.617	.551	.722	.530

* significant at less than .10; ** significant at less than .05; *** significant at less than .01

Table 6: Effects of Capital Cost Contribution and Higher Levels of Participation on Project Outcomes

Variable	DV: Satisfaction Coefficient (t-statistic)	DV: Tariff Payment Coefficient (t-statistic)	DV: Overall Project Effectiveness Coefficient (t-statistic)	DV: Improvement in Water Coefficient (t-statistic)
constant	63.0 (8.01)***	-4.86 (-.303)	-4.24 (-2.82)***	122 (2.76)***
number of households	.00539 (.839)	.00230 (1.76)*	.00131 (1.07)	-.00148 (-.407)
transparency	1.49 (1.25)	12.4 (5.14)***	.476 (2.09)**	9.39 (1.40)
higher levels of participation	4.40 (2.13)**	-4.06 (-.963)	1.15 (2.90)***	16.4 (1.41)
capital cost contribution	.161 (1.99)*	.264 (1.60)	.00334 (2.16)**	.544 (1.19)
UP Hills	-4.21 (-.699)	11.2 (.912)	-.808 (-.701)	21.7 (.638)
Southern Karnataka	9.32 (1.26)	39.9 (2.65)**	3.01 (2.13)**	67.4 (1.62)
Northern Karnataka	18.4 (2.32)**	39.2 (2.42)**	4.69 (3.10)***	139 (3.10)***
Coastal Karnataka	-6.28 (-.697)	41.3 (2.45)**	.524 (.304)	20.6 (.405)
N	45	45	45	45
R^2	.679	.648	.766	.605
Adjusted R^2	.608	.570	.714	.517

* significant at less than .10; ** significant at less than .05; *** significant at less than .01

Works Cited

Agarwal, Bina. "Participatory Exclusions, Community Forestry, and Gender: An Analysis for South Asia and a Conceptual Framework." *World Development* 29, no. 10 (2001): 1623-1648.

Arnstein, Sherry R. "A Ladder of Citizen Participation." *Journal of the American Institute of Planners* 35, no. 4 (1969): 216-224.

Barra Rowland, Francisco de la. "Analysis of Experiences of Self-Help and Public Participation in Rural Water Supplies: The Case of Mexico." Paris, France: OECD Development Centre, 1978 in Van-Wijk Sijbesma, 1998.

Bennell, T. "Planning and Design of Rural Drinking Water Projects: Results from Pilot Runs." Paris, France: OECD Development Centre, 1979 in Van-Wijk Sijbesma, 1998.

Cleaver, Frances. "Institutions, Agency and the Limitations of Participatory Approaches to Development." In *Participation: The New Tyranny*, edited by Bill Cooke and Uma Kothari. New York: Zed Books, 2001.

Cooke, Bill, and Uma Kothari, eds. *Participation: The New Tyranny*. New York: Zed Books, 2001.

Dayal, Rekha, Christine van Wijk, and Nilanjana Mukherjee. *Methodology for Participatory Assessments with Communities, Institutions and Policy Makers: Linking Sustainability with Demand, Gender and Poverty*. New Delhi, India: Water and Sanitation Program, 2000.

Esman, Milton J., and Norman T. Uphoff. *Local Organizations: Intermediaries in Rural Development*. Ithaca: Cornell University Press, 1984.

Finsterbusch, Kurt, and Warren A. Van Wicklin, III. "The Contribution of Beneficiary Participation to Development Project Effectiveness." *Public Administration and Development* 7 (1987): 1-23.

Gross, Bruce, Christine van Wijk, and Nilanjana Mukherjee. "Linking Sustainability with Demand, Gender and Poverty." Washington, DC: Water and Sanitation Program, 2001.

INSTRAW-UN. "Women, Water and Sanitation." In *Women and the Environment: A Reader*, edited by Sally Sontheimer, 119-132. New York: Monthly Review Press, 1990.

Isham, Jonathan, and Satu Kahkonen. "Institutional Determinants of the Impact of Community-Based Water Services: Evidence from Sri Lanka and India." College Park, MD: Center for Institional Reform and the Informal Sector, University of Maryland, 1999.

———. "Institutional Determinants of the Impact of Community-Based Water Services: Evidence from Sri Lanka and India." *Economic Development and Cultural Change* 50, no. 3 (2002): 667-691.

Isham, Jonathon, Deepa Narayan, and Lant Pritchett. "Does Participation Improve Performance? Establishing Causality with Subjective Data." *The World Bank Economic Review* 9, no. 2 (1995): 175-200.

Miller, Duncan. "A Self-Help Paradigm for Rural Water Supply." Paris, France: OECD, 1978 in Van-Wijk Sijbesma, 1998.

Mukherjee, Nilanjana, and Christine van Wijk, eds. *Sustainability Planning and Monitoring in Community Water Supply and Sanitation*. Washington, D.C.: Water and Sanitation Program, 2003.

Narayan, Deepa. "The Contribution of People's Participation: Evidence from 121 Rural Water Supply Projects." Washington, D.C.: The World Bank, 1995.

Oakley, Peter. *Projects with People: The Practice of Participation in Rural Development*. Geneva: International Labour Office, 1991.

Peet, John. "Priceless: A Survey of Water." *The Economist* (2003): 3-5.

Pretty, J.N. "Participatory Learning for Sustainable Agriculture." *World Development* 23, no. 8 (1995): 1247-1263.

Rietbergen-McCracken, Jennifer. "Introduction and Overview." In *Participation in Practice: The Experience of the World Bank and Other Stakeholders*, edited by Jennifer Rietbergen-McCracken. Washington, DC: World Bank, 1996.

Roy, Biswajit. "Villagers Dump Role in Water Supply." *The Times of India*, September 2, 2002 2002.

Sara, Jennifer, and Travis Katz. "Making Rural Water Supply Sustainable: Report on the Impact of Project Rules." Washington, D.C.: The World Bank, 1998.

Schouten, Ton, and Patrick Moriarty. *Community Water, Community Management: From System to Service in Rural Areas*. London: ITDG Publishing, 2003.

Tacconi, Luca, and Clem Tisdell. "Rural Development Projects in LDC's: Appraisal, Participation and Sustainability." *Public Administration and Development* 12 (1992): 267-278.

van Wijk-Sijbesma, Christine. *Gender in Water Resources Management, Water Supply and Sanitation: Roles and Realities Revisited.* The Hague: International Water and Sanitation Centre, 1998.

———. "Participation of Women in Water Supply and Sanitation: Roles and Realities." The Hague The Netherlands: International Reference Centre for Community Water Supply and Sanitation, 1985.

Water and Sanitation for Health Project. "Lessons Learned in Water, Sanitation and Health: Thirteen Years of Experience in Developing Countries." Washington, D.C.: United States Agency for International Development, 1993.

Whittington, Dale. "Behavioural Studies of the Domestic Demand for Water Services in Africa: A Reply to Stephen Merrett." *Water Policy* 4 (2002): 83-88.

Whittington, Dale, Donald T. Lauria, and Xinming Mu. "A Study of Water Vending and Willingness to Pay for Water in Onitsha, Nigeria." *World Development* 19, no. 2/3 (1991): 179-198.

World Bank. "India Impact Evaluation Report: Comparative Review of Rural Water Systems Experience." Washington, D.C.: Operations Evaluation Department, World Bank, 1998.

———. "Sir Lanka Impact Evaluation Report: Community Water Supply and Sanitation Project." Washington, DC: Operations Evaluation Department, World Bank, 1998.

———. "Staff Appraisal Report: India: Uttar Pradesh Rural Water Supply and Environmental Sanitation Project." Delhi: The World Bank, Agriculture and Water Operations Division, South Asia Country Department, 1996.

———. "The World Bank and Participation." Washington, D.C.: The World Bank Operations Policy Department, 1994.

———. "The World Bank Participation Sourcebook." Washington, D.C.: The World Bank, 1996.

World Bank Water Demand Research Team. "The Demand for Water in Rural Areas: Determinants and Policy Implications." *The World Bank Research Observer* 8, no. 1 (1993): 47-70.

World Health Organization. "Final Review of Case-Studies of Women's Participaiton in Community Water Supply and Sanitation." Paper presented at the Workshop, Kupang, Indonesia, 23-27 May 1988.

[1] All of the information about the Imboden and Barra studies comes from Van-Wijk Sijbesma's book. This many years after publication it was not possible to track down the original studies and they are only mentioned here as background. Further details on the research design or conclusions of these studies is not available.

[2] After these data were collected, the state of Uttar Pradesh was divided into two states: Uttar Pradesh and Uttaranchal. The studied project is in both of these areas.

[3] The only exception to this sampling frame was in the Plains of UP where only one village had been in the operation and maintenance stage for six months; the sampling frame in this region was changed to include all villages which had been operating for at least four months.

[4] Some of the villages in UP had fewer than 40 households; in these cases a census of all available households was conducted.

[5] Households were asked how reliable the water service was. In neither state was there ever an expectation of 24 hour service (except for the UP Hills where water comes from springs), and reliability in this case means whether or not they can depend on it coming at the same time each day.