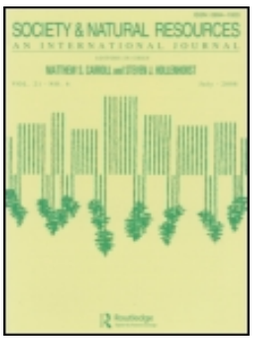

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People's Science in Action: The Politics of Protest and Knowledge Brokering in India

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After extended political protest against the Indian government's design for the Uchangi dam, nongovernmental engineers and social activists aided project-affected villagers in producing an alternative dam design that provided the same quantity of water storage without the need for village submergence. This alternative plan, which compelled the irrigation agency to redesign the dam, resulted from data gathered through a participatory resource mapping effort. Through detailed ethnographic analysis, this article explores the factors that are necessary to spur government bureaucracies into including locally generated data in technical planning. In particular, the article argues that nongovernmental engineers play an important role in hybridizing local knowledge and bureaucratic expertise.

Keywords community mapping, dams, India, irrigation management, NGOs, participatory research

Among international aid donors and nongovernmental organizations (NGOs), reforming state water infrastructure development has become an important platform for reenvisioning how natural resource agencies can promote local participation. Transnational NGO and social movement activism against "big dams" over the last two decades has demonstrably shifted public opinion away from top-down, technocratic approaches toward people-centered, bottom-up development (Khagram 2004; McCully 1996). This activist response has developed alongside, and often in association with, important efforts by social scientists to document the deleterious environmental and social impacts of irrigation projects (Cernea 1999; Singh 1998).

The reform of state irrigation development is particularly interesting to examine in the context of India. Despite heavy public mobilization and mounting empirical evidence supporting the need for broad reforms in water sector development, Indian irrigation agencies continue to proceed with conventional models and tools for project development (Vaidyanathan 1999). The official model of technocratic

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expertise often excludes local communities from direct participation in project design. Rather than embracing their experiential and contextual knowledge base, farmers are often viewed by state engineers as passive recipients of privileged bureaucratic expertise. As a result of this technical approach, irrigation projects in India more often reinforce, rather than relieve, existing patterns of inequity, inefficiency and environmental degradation (Rangachari et al. 2000).

In light of this administrative inertia, it is particularly important to better understand the instances when farmer participation has impacted the design of government irrigation projects in India. This article explores the factors that are necessary to spur state technical bureaucracies into using locally generated data in technical planning. Through a case study of the Uchangi dam in Maharashtra, the article examines the vital role played by technical NGOs in catalyzing, facilitating, and translating local research into bureaucratic planning.

This article describes how and why the government irrigation agency was compelled to redesign the Uchangi dam as a result of both collective resistance and negotiation of an alternative technical design that legitimated the value of local knowledge. While illustrating the standard government approach to project planning, this case also provides a specific example of how local knowledge and expert science can come together toward the participatory design of technology. In this case, participatory research demonstrates that valuing the ''localness'' of community knowledge does not necessarily mean embracing an ontologically different, romantic or mythical understanding of the natural world. Rather, it can be a process of rendering visible a set of processes, discourses, and narratives that are absent from conventional state technical planning. By investing in participatory research, agencies can better meet local needs and reduce the political conflicts that impede the completion of infrastructure projects.

Employing an ethnographic approach, this research is based on field visits and semistructured interviews with the governmental officials, nongovernmental engineers, activists, and village residents involved in the Uchangi dam case.[1] The first section of this article builds the theoretical connections between local knowledge and the implementation of participatory research. The second section, the case study description, explains why and how local communities organized their opposition and renegotiation of the Uchangi dam. Drawing lessons from this case, the final section argues that NGO engineers play an essential role in the process of legitimating participatory research by bridging local knowledge and bureaucratic technical expertise.

Facilitating Community Based Research

Participation in development projects is inherently a dynamic process that relies on exercises ranging from consultation at one end of the spectrum to decision-making at the other (Narayan 1995). With theoretical approaches to participatory research having significantly matured over the last 20 years, there is now a wide toolbox of techniques and institutional resources that are available to communities interested in conducting participatory research. Examples of participatory research techniques include rapid rural appraisal and community mapping (Rocheleau 1994; Chambers 1997).

Though the practice of conducting participatory research has gained popularity, the results of such research have rarely been valued in actual policymaking and

project design. While participatory research often yields rich data and reveals locally relevant needs, the process is debunked by bureaucrats because it is highly variable, reflexive, and hard to replicate (van de Fliert and Braun 2002). Yet it is these very characteristics of participatory research that render it a radical and necessary departure from conventional development administration. Participatory research suggests shifting the initiative, responsibility, and action to rural people themselves with an emphasis on development as "process" (Mosse, Farrington, and Rew 1998). By recognizing the importance of "localness," this alternative approach views development projects as flexible, iterative, and contingent exercises.

Mainstreaming community-based research is difficult in practicality. Natural resource agencies, such as irrigation bureaucracies, may not be in a position to perform participatory research given their lack of sociologically trained staff and the general sense of mistrust between government officers and local residents (Kolavalli and Kerr 2002, 227). In contrast, intermediate NGOs have an important role to play in catalyzing and facilitating participatory research. Recognizing this need, the Indian government issued watershed development guidelines in 1994 that devolved a significant level of authority over project implementation to NGOs (Government of India 1994). Yet this process of decentralization has produced its own pitfalls. Within the NGO sector, there is great disparity in professional skills, development priorities, and financial capacities (Farrington, Turton, and James 1999, 3). While some NGOs have a sound record of public accountability and well-trained technical core staffs, others are shoestring operations that are as incapable of participatory research as government agencies. In addition, recent research has indicated that even NGOs known for "best practices" in the water sector are unable to scale up their development efforts beyond one or two village sites (Kolavalli and Kerr, 2002).[2] When a single NGO is charged with overseeing the implementation of multiple projects, its approach can become as model-driven as that of government agencies by losing focus on the importance of context and demand driven development.

While NGOs have an important role to play in facilitating local participation, the onus must remain on the state to implement infrastructure development. NGOs can play an effective intermediary role in the process by translating local knowledge into bureaucratic planning. Herein, the goal is not to make government irrigation expertise obsolete, but rather to create dynamic and iterative opportunities for exchange between farmers and engineering experts. The following case study provides an example of how farmers, NGOs engineers and government officials negotiated the boundaries between local knowledge and technical expertise.

Building the Uchangi Dam

Amidst a landscape of cashew nut trees and lush sugarcane crops, the Uchangi dam site is located in Kohlapur district in southwestern Maharashtra. While Maharashtra is one of the most economically advanced states in India with a comparatively high per capita income, 37% of the population was listed below the poverty line in a 1993–1994 national government statistical survey (Kurian 2000). The rural poverty that exists in Kolhapur district is inextricably linked to a lack of access to water. Kohlapur district actually receives a large volume of water, averaging 1138 mm/year (IMD 1999, 409). The problem is that this rain falls in the form of monsoonal deluges over just 3 months. With only 15% of total cultivable area irrigated, the

majority of villages in the district face water scarcity 6 months out of the year (Census of India, 1991).

To address the lack of irrigation infrastructure in Kohlapur district, the regional irrigation agency, the Maharashtra Krishna Valley Development Corporation (MKVDC), designed the Uchangi dam near the small city of Ajra (see Figure 1).[3] The Uchangi dam site is located on the banks of the Taor stream, near the villages of Chafawade and Jeur. The project was initially proposed to store 617 million cubic feet (mcft) of water to irrigate 1797 ha of land (MKVDC 2000).

According to the dam design, 222 ha of residential and farm land from the villages of Chafawade, Jeur, Chitale, and Bhavevadi were to be submerged to build the main reservoir. The two main affected villages, Chafawade and Jeur, have a combined population of roughly 2000 people. Water from the Uchangi dam was proposed to benefit 10 small villages downstream of the dam.[4] When completed, the dam was intended to produce electricity using one 500-kW generator.

Though it was first approved by the government in 1985, due to fierce local opposition construction of the Uchangi dam was stalled for over 14 years. The main opponents of the project have been the villagers who were to have been displaced by construction of the reservoir. These project-affected peoples (PAPs) argued that the irrigation agency failed to involve them in the planning process.

While villagers accused the agency of such neglect, in fact, the MKVDC followed standard agency protocol in designing the Uchangi dam. Under agency norms, PAPs are not required to be informed about project details until the final stages of dam implementation. An MKVDC dam is designed by a team of civil engineers based on topographical, geological, and hydrological assessments. There is no requirement that local people be systematically involved or consulted in gathering

Figure 1. The Uchangi dam site in Maharashtra state.

data, or producing accounts, about water needs, availability, or use patterns. After a project has been designed by the engineers and contractors have been hired, the executive engineer responsible for the project approaches the district revenue department to begin acquiring land to construct the reservoir. It is during this final step, the land acquisition process, that farmers in the submergence zone officially receive their first notification about the project. Once PAPs are given this notice, it is illegal for them to sell or subdivide their lands. The main reason for providing this official notice is to prevent farmers from subdividing their properties so that they can claim greater compensation.[5]

Political Protest and Alternative Designs

Major opposition to the Uchangi project began in 1997, when irrigation officials began plotting markers for the submergence zone of the reservoir. In this same year, leaders from PAP villages approached a local political organization known as the *Shramik Mukti Dal* (SMD: Workers' Liberation League) for organizing support.[6] With the help of the SMD, the villagers of Jeur and Chafawade waged a long battle against the dam. During the height of their struggle, opponents occupied the dam site for 50 days and nights, preventing even a single government vehicle from entering the project area. In June 1998, government officials tried to inaugurate dam construction at Uchangi. One thousand people, including women and children with their cattle, arrived in peaceful protest at the dam site to block the opening ceremony. While protests had effectively halted all work on the Uchangi project, SMD activists encouraged villagers to submit an integrated plan for watershed development to the agency. Given their perception of the agency's bias against local participation, SMD activists approached prominent regional technical NGOs to help villagers design a hydrologically sophisticated alternative. In 1999, two NGOs with watershed development experience, the Society for Promoting Participative Ecosystem Management (SOPPECOM) and the *Bharat Gyan Vigyan Samithi* (BGVS: India Science Knowledge Association), came to the assistance of Chafawade and Jeur residents. SOPPECOM is a small NGO based in the city of Pune with a core staff comprised of social workers, economists, and a cadre of retired high-ranking government irrigation engineers. Its funding comes principally from membership fees and research-related project grants from international and national agencies. In contrast, the BGVS is an out growth of the All India People's Science Network. This national organization, which receives government support, works at the grass roots through local chapters at the state and district levels.

Prior to their involvement in the Uchangi case, activists from SOPPECOM and BGVS had published the *Watershed Sourcebook* to guide activist organizations in conducting participatory watershed mapping (Paranjape et al. 1998). Participatory resource mapping (PRM) has been widely used throughout the developing world as a tool for community-based research (Chambers 1997). The PRM process involves training a group of community volunteers to conduct a plot-by-plot mapping of an area to take inventory of resource endowments, list resource constraints, and propose development projects. Though there are a range of participatory research tools available for assessing local development needs, Datta Desai of the BGVS argues that PRM is one of the most flexible research methods because it brings together experts and publics toward capacity building.[7]

To work out an alternative proposal in the Uchangi case, SOPPECOM and the BGVS orchestrated a PRM exercise in the villages of Chafawade and Jeur to gather missing information about local ecosystem characteristics and land use patterns. Fifty village youth were trained by SOPPECOM and BGVS staff to conduct the mapping exercise. In April 1999, these volunteers surveyed 150 plots in Chafawade and 100 plots in Jeur over a month period.

The PRM exercise was conducted over four phases. In the first phase, a household survey and land and water mapping exercise were performed. The socio-economic survey assessed household income, property, access to health care, sanitation, and electricity. During the land and water mapping exercise, volunteer surveyors produced hand-drawn maps and data sheets that identified terrain features and land use patterns. Each farmer was asked about the direction of water flows on their plots, drainage problems and soil depth, color, and water holding capacity. Surveyors also noted the location of canals and lift-irrigation facilities. Last, they carefully studied groundwater use by identifying where wells were located, their size, and water fluctuation levels.

After generating the maps and compiling and classifying the data, this information was sent to SOPPECOM in Pune for secondary analysis. In the second phase of the PRM, SOPPECOM engineers used the information from the hand-drawn maps to determine macro soil, land, and water use patterns for the two villages. They then created derivative maps that located micro watersheds and indicated potential sites for irrigation and storage structures. The cost of these analyses was borne by SOPPECOM.

In the third stage of the PRM exercise, SOPPECOM officials sponsored village meetings in Chafawade and Jeur to discuss the picture that emerged from the data that had been collected by the communities. In particular, the micro-watershed derivative maps were used to discuss irrigation options. After these meetings, villagers and SMD activists worked with SOPPECOM engineers to develop a set of technical alternatives that could be submitted to the MKVDC to redesign the Uchangi dam.

In addition to helping generate specific alternatives, the PRM activity was important for building local technical capacity. In Jeur, college students were trained for the PRM. One of these students stated that through the PRM process ''we learned that locals can do better surveys than the government surveyors. We get more information out of it.'' Farmers whose plots had been mapped suggested that through the PRM effort they were also instructed in basic soil conservation strategies, including learning about which crops were best adapted to specific soil types.[8]

In the fourth, and final, phase of the PRM, SOPPECOM engineers combined the locally generated data with the limited information they were given by the government agency to propose an alternative plan.[9] SOPPECOM's goals were to determine water storage sites that would limit land loss while increasing the beneficiary area. Local data about soil conditions, water flow, and water availability were used to gauge the best water storage sites in the valley. In the ''Alternative Proposal to the Uchangi Dam'' that was submitted to the agency, SOPPECOM argued that the standard cost-benefit approach does not study alternatives that limit land and homes lost. Furthermore, the authors stated that the ''value of villagers emotional bond with their lands and houses cannot be quantified in rupees'' (Maharashtra Rajya Dharangrasth et al. 1999, 3).

The ''Alternative Proposal'' recommended constructing three supplementary storage dams instead of one large reservoir at Uchangi. The SOPPECOM plan also

suggested building 11 additional weirs. SOPPECOM engineers drafted two different scenarios. Option 1, listed in Table 1, provided 85% of the storage proposed for the Uchangi reservoir and significantly reduced the amount of land to be submerged (148 ha vs. 222 ha). The land that was to be submerged was either inferior rocky land or wasteland. While Option 1 was the preferred alternative, Option 2 provided for as much water storage as the proposed Uchangi dam with much less land displacement than the original plan (164 ha vs. 222 ha) (Maharashtra Rajya Dharangrasth et al. 1999, 6). SOPPECOM specified that the project should have phased construction and rehabilitation to allow affected and beneficiary groups to better participate in the process.

Negotiating an Alternative

After submitting the alternative proposal, there were a few rounds of negotiations with the agency. In addition to SOPPECOM, representatives from SMD and farmers from Chafawade and Jeur were present at these meetings. According to K. J. Joy, it was important for SOPPECOM officials to be present at these meetings because they were able to buttress the technical claims made by villagers through their irrigation expertise.[10]

In their negotiations with NGO and village leaders, MKVDC officials argued that they could not fully accept the alternatives that had been offered. The Deputy Engineer of the Uchangi project also argued that one large dam could not equal three smaller dams because they would lose electricity generation potential. However, the agency did concede to lower the height of the dam by 2 m. This reduction in scale meant that significantly less land would be submerged and not a single home would be lost. According to the final plan, the people of Jeur and Chafawade will have to shift some of their inferior farm lands. Farmers are currently in the process of selecting these new sites. By March 2001, 50% of these lands had been acquired.[11]

Table 1. Comparing the alternatives

Name of site	Height (m)	Storage (million cubic feet)	Submergence area (ha)
Original design Uchangi	38	617	222
SOPPECOM option 1			
Khetoba	23.5	180.08	51.78
Dhamanshet	40.1	119.15	23.14
Cherlakatta	36.3	227.32	74.82
Total		526.55	148.74
SOPPECOM option 2			
Khetoba	23.5	180.08	50.78
Dhamanshet	40.1	119.15	23.14
Cherlakatta	39.3	314.74	90.10
Total		613.97	164.02

Note. The data in this table were extracted from the 1999 report by the Maharashtra Rajya Dharangrasth va Prakalpagrasth Shetkari Parishad et al. (1999, 6).

Because some storage potential was lost by lowering the height of the dam, the agency did agree to investigate the storage site suggested in the "Alternative Proposal" at Khetoba. This site is located 8 km upstream from the Uchangi dam. The small Khetoba dam will submerge an additional 47 ha of land, of which 20 ha are forest area.

As Table 2 indicates, as a result of the project re-design, villagers from Chafawade and Jeur are now included as project beneficiaries. The MKVDC has agreed to subsidize a lift-irrigation scheme for these two villages at 85% of the total cost. The provision of lift-irrigation for PAPs marks a precedent for the MKVDC. Under this new policy, the agency has pledged that 6% of the total irrigation potential of any dam it constructs will go to PAPs upstream of the storage. In the Uchangi case, this translates to 98 ha of irrigation.

The provision of lift-irrigation for these two villages has been the most profound outcome of the re-design of the Uchangi dam. In India, it is exceptional to see PAPs shift their status from development victims, those who are ousted from their land, to project beneficiaries. After 15 years of protest, it is an extraordinary result that the majority of Chafawade and Jeur villagers will now be able to apply water to their fields from the same dam that had threatened to erase their material and cultural ties to their traditional lands.

Drawing Lessons in Participatory Technology Development

For over a decade, the role of local participation in government irrigation development has been actively researched and debated in international fora. Through field research and pilot programs, institutions like the World Bank, the International Water Management Institute, and the International Network for Participatory Irrigation Management have demonstrated that farmer participation in project design and management is central to improving the economic efficiency and social equity of water delivery (Narayan 1995).[12] Despite these long-standing efforts, irrigation agencies in India continue to pursue a standard top-down model of technocratic expertise. This is particularly the case in Maharashtra, where irrigation agencies are currently constructing hundreds of irrigation projects without the direct participation of affected communities.

Table 2. The final design

Project specifics	Original design	Final design
Water storage	617 mcft	624 mcft
Dam sites	Uchangi (38 m height)	New Uchangi (at 36 m height) and Khetoba
Submergence	222 ha (with full submergence of all homes in two villages)	75–100 ha (only farm land lost)
Beneficiaries	10 Villages	12 Villages (including Chafawade and Jeur)

This article has described how one rural social movement, which emerged in response to the construction of the Uchangi dam, induced the regional irrigation agency to renegotiate their approach to project design through both steadfast political opposition and articulation of alternative technical options. In light of the divisive water politics that dominate infrastructure development in India, it is important to understand why this social movement was successful in meeting its goals. In particular, what can this case teach us about the factors that compel agencies toward making use of locally generated data in the process of technical design?

The Uchangi case illustrates that agencies like the MKVDC are driven by a "blueprint" approach to project design. Rather than depending on locally determined needs or generations of farmer-based experience in water storage and distribution, the location and scale of the Uchangi dam were based on an idealized landscape represented by contours on a topographical map. By relying on a design process where technical decisions are made in the absence of local knowledge and participation, MKVDC projects have routinely lacked support from local stakeholders and have been mired in years of delays. According to SOPPECOM activist K. J. Joy, "no MKVDC project has been able to complete construction and water distribution on schedule because of protests from affected peoples."[13] This groundswell of organized opposition has drawn attention to the conceptual inadequacy of the MKVDC's modeling and technical design approach.

The successful redesign of the Uchangi project was the result of both collective resistance and community articulation of a technically sophisticated alternative plan. At the village level, SMD activists reported that where the dam displacees' oppositional efforts have been strong, they have been able to force agency officers to become more cooperative. SMD activist Sampath Desai stated that "Projects run smoothly when there is public cooperation. In places where there is opposition, officers can't even enter to do their surveys."[14] When asked about this suggestion, the MKVDC engineer responsible for the project reported in agreement. He stated that when villagers are well organized and can clearly articulate their demands, the agency is more amenable to negotiation.[15] In the Uchangi case, the agency had sunk significant funds into the construction of the dam. This project was also linked to overall district-level water storage targets. It was clear that the agency needed to complete the Uchangi project and was vulnerable to social movement activism.

While political opposition played a pivotal role in compelling the agency to negotiate, the manner in which the alternative was framed was perhaps as important. Toward producing and promoting an alternative design, villagers made an important decision to ally themselves with NGO technical experts. As intermediary support organizations, SOPPECOM and BGVS played key roles in catalyzing participatory research and translating local concerns into technical options. The retired government engineers from SOPPECOM who prepared the alternative design not only spoke a common language with government experts, but they also shared a professional culture. SOPPECOM activist K. J. Joy believes that the MKVDC was in the position to negotiate with villagers because the alternative proposal was written to fit neatly within agency analytical frameworks for water storage.

The ability of NGO engineers to translate the data that emerged from a local mapping project into a technical alternative that complied with agency norms was critical. Other alternatives could have been premised on radically different lines. For example, rather than focus on designing irrigation dams, a ban on water-intensive cropping could have been proposed in the valley. This would also have

resulted in the need for a lesser volume of water storage. Yet it was a strategic choice to design an alternative that stored a comparable supply of water using medium-sized dams. The MKVDC was more likely to accept this alternative because of its institutional commitment and expertise in building large-scale infrastructure.

The use of technical norms as tools for negotiation did not undermine the value of local knowledge. In the Uchangi case, local knowledge was not ontologically distinct from technoscience. Rather, working with communities to understand their resource constraints and priorities was a way of privileging a different set of epistemological resources and material interests. The community mapping exercise asked a set of research questions that were very distinct from the agency's approach. Rather than simply investigating where water was located and how much of it could be stored, the PRM project explored how water was locally used, by whom, and at what social and ecological costs. The concerns and knowledge base of local farmers became the data sets from which NGO engineers drafted technical options.

The Uchangi case also sheds light on how local knowledge and engineering expertise can be hybridized. This includes distinguishing between the kinds of technical decisions that can be made by local residents and those that require expert intervention. While the demand for development projects should emanate from communities, there are specific aspects of technical design that must be handled by trained engineers. R. K. Patil, an agricultural economist with SOPPECOM, has suggested that local farmers are often the best people to consult about where a dam or canal should be sited because they intimately understand the vagaries of water flows and the nature of the local geological system. Yet he also argues that while small-scale water conservation structures can be built by volunteers, a "major dam cannot be designed by villagers."[16] The exact size and scale of a large dam, in terms of its volumetric storage capacity, is dependent on water availability calculations that are best made by irrigation engineers. During the technical design process, engineers will ideally consult villagers and create iterative opportunities for feedback.

The Uchangi case suggests that participatory resource mapping can be a valuable research tool. Yet government agencies may not be the best institutions to carry out such initiatives. In addition to lacking staff trained in sociological methods, villagers often view government "participation" programs with suspicion. While in theory participatory development involves cooperative and shared decision-making authority between research professionals and villagers, government efforts at implementing "participation" have entailed superficial, and at times even coercive, consultations with villagers (Pretty and Shah 1997; Cooke and Kothari 2002). In contrast, intermediary technical NGOs, like SOPPECOM and BGVS, are staffed by professionally trained social workers and engineers who can help carry out PRM-like exercises. Agencies such as the MKVDC can mainstream participatory research by using technical NGOs to help catalyze the collection and analysis of primary local data. By embracing more "contextualized" knowledge and design approaches, the MKVDC could improve its efficiency at delivering water by reducing the delays and cost-overruns that are caused by local political opposition. In addition, the incorporation of local priorities into dam design significantly improves the long-term sustainability of the project.

Conclusion

This article has sought to examine the factors that induce government agencies to include local knowledge and participation in the design of technical projects.

The Uchangi case illustrates the importance of both organized political opposition and the construction of development alternatives. In the process of facilitating local research, intermediary NGOs played an important role in translating local needs and priorities into the technical language and cultural norms of bureaucratic agencies. Employing NGOs in this capacity does not relieve government of its responsibility to provide infrastructure development. Rather, it broadens the conceptual models that planners use to investigate technical options. By making the boundaries between local knowledge and expert science more porous, NGO-led community research can value add project design so that local priorities are reflected in project development. By reducing the need for locals to routinely oppose and delay the construction of water projects, this form of collaborative technology development can go a long way toward actually delivering water to where and when it is needed.

Beyond the villages described in this case study, the outcome of the Uchangi project has helped spur grass roots struggles throughout the state of Maharashtra. In August 2002, over 10,000 farmers gathered at a *Pani Parishad* (Water Meeting) in the city of Atpadi to challenge the MKVDC's approach to irrigation development. Calling on farmers to blend political opposition with the reconstruction of technical alternatives, this broader social movement has demanded that the agency invest in farmer participation and promote more equitable access to water. Within Kohlapur district, efforts are currently underway to redesign an MKVDC dam project that impacts over 50 villages in the Chikotra Valley.

As members of this broader movement, SOPPECOM and BGVS engineers and activists have championed an approach to agricultural knowledge and information sharing where multiple stakeholders mutually engage in a "collective learning process" toward problem identification and resolution (Roling and Wagemakers 1998, 17). Such approaches neutralize the expert/lay knowledge binary and demystify the role of local and traditional knowledge. What becomes relevant, instead, is how "individuals, groups, or institutions are able to make their particular definitions or situations authoritative, and in doing this to redirect material benefits in their direction" (Mosse et al. 1998, 27).

Notes

1. Fieldwork was performed between November 2000 and May 2001 in the cities of Pune, Kohlapur, and Ajra. Semistructured interviews with residents of Chafawade and Jeur villages and government project officers were conducted in March 2001. One focus group with the farmers, youth and NGO activists involved in the community mapping project was held in Chafawade village center in March 2001. In addition to interviews and site visits, content analysis included government project documents, newspaper articles, NGO pamphlets, and press releases.
2. "Scaling up" refers to extending the cumulative impact of institutional change so that it moves beyond the micro project level toward regional and national policy dimensions.
3. The MKVDC was established in 1996 to develop the water resources of the Krishna River where it flows through the state of Maharashtra. The agency is financed through both private commercial bonds and government contribution.

4. These villages are Shringarwadi, Yemekond, Shirsangi, Watangi (the major village), Kine, Posvatrwadi, Handewadi, Kolingdre, Uchangi, and Reddiwadi.
5. Interview with MKVDC official A. Surve, February 27, 2001.
6. The Shramik Mukti Dal (SMD) has been a major player in organizing the *Maharashtra Rajya Dharangrasth va Prakalpagrasth Shetkari Parishad* (Maharashtra State Dam and Project Oustees Association). As part of this association, SMD activists fight for the rights of dam displacees throughout Maharashtra. Recently, they have succeeded not only in halting construction of key dam projects but also in getting monetary compensation for displaced families, as well irrigated land in command areas (Phadke 2000).
7. Interview with BGVS activist Datta Desai, March 27, 2001.
8. Focus group at Chafawade village center, March 9, 2001.
9. The agency did not provide SOPPECOM some important details about the main dam, spillway, irrigation sluices or dam foundation. For these reasons, SOPPECOM argued that they could not complete cost comparisons and that this should be done by the agency when reviewing the alternatives.
10. Interview with K. J. Joy, February 20, 2001.
11. Interview with MKVDC official R. Kagalkar, March 6, 2001.
12. In the state of Maharashtra, important contributions to this area of research have been made by NGOs, including the Hind Swaraj Trust, Gram Guarav Pratistan, and Watershed Organization Trust (WOTR).
13. Interview with SOPPECOM activist K. J. Joy, February 20, 2001.
14. Interview with SMD activist S. Desai, March 8, 2001.
15. Interview with MKVDC official R. Kagalkar, March 15, 2001.
16. Interview with SOPPECOM economist R. K. Patil, April 7, 2001.

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