Social Aspects of Small Water Systems

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The cost, safety, reliability, and flexibility of small water systems depend on the people who manage them and the socio-political-economic setting in which these individuals operate. Management is more than the technical operation of water systems. It is the governance of the community, and how water fits into the community's present and future. In small communities, the management system is ill-equipped to actively address change. Moreover, as systems built over 30 years ago begin to crumble, the old model of management is not effective.

There is a great deal of science to inform rural citizens about the state of their infrastructure, the quality of their water, and the threats to that quality. However, much to the distress of scientists, technical advisors, and federal and state public servants, data about these threats seem to be ignored. Consequently, the physical and financial viability of many small water systems continues to decline until the U.S. Environmental Protection Agency (EPA) informs citizens that their system is not in compliance. This situation produces an emergency response but not a rethinking of how to manage a water system to meet the future needs of the residents and businesses it serves.

How can multiple community capacities be built to move management from having to do something to wanting to act in the community's long-term interest? In considering this question, it is helpful to look at the pyramid of social control (Figure 1). The left-hand side of the pyramid shows the positive sanctions that encourage positive behavior, while the right side shows the negative sanctions that encourage negative behavior or which must be imposed to make sure that positive behavior takes place. In general, we all prefer positive sanctions. The left-hand base of the pyramid is where we want citizens and management to be: they want to do the right thing, and know how to do it. Much of our educational efforts are aimed at one part of those negative sanctions: those who want to do the right thing, but do not know how. This is the least intrusive form of helping management act in a way that is socially, fiscally, and environmentally responsible.

The next most effective action—in either helping or hindering good management—is social pressure. Many small towns have what Vidich and Bensman (1968) call a "low tax ideology" that is often translated into a low rates ideology. That ideology is generally reinforced by the notion, "If it ain't broke, don't fix it." The lack of capital accounting—an important part of a modern economy (Weber 1978)—by governments at all levels in the United States, means that managers and citizens have no idea of what their current infrastructure is worth or its replacement costs. Thus, depreciation of that critical community asset is not carried on the books, and there is no reserve to use for replacement or repair. And if there is a reserve, it is not invested in timely maintenance or used to help pay replacement costs for new equipment. Thus, peer pressure can lead to poor management. In communities where there is a sense of actively preparing for the future, however, the meaning of fiscal responsibility is quite different. The norms and values of these communities support asset maintenance and forward planning.

Economic sanctions are often used to encourage effective management. Grants or low-interest loans
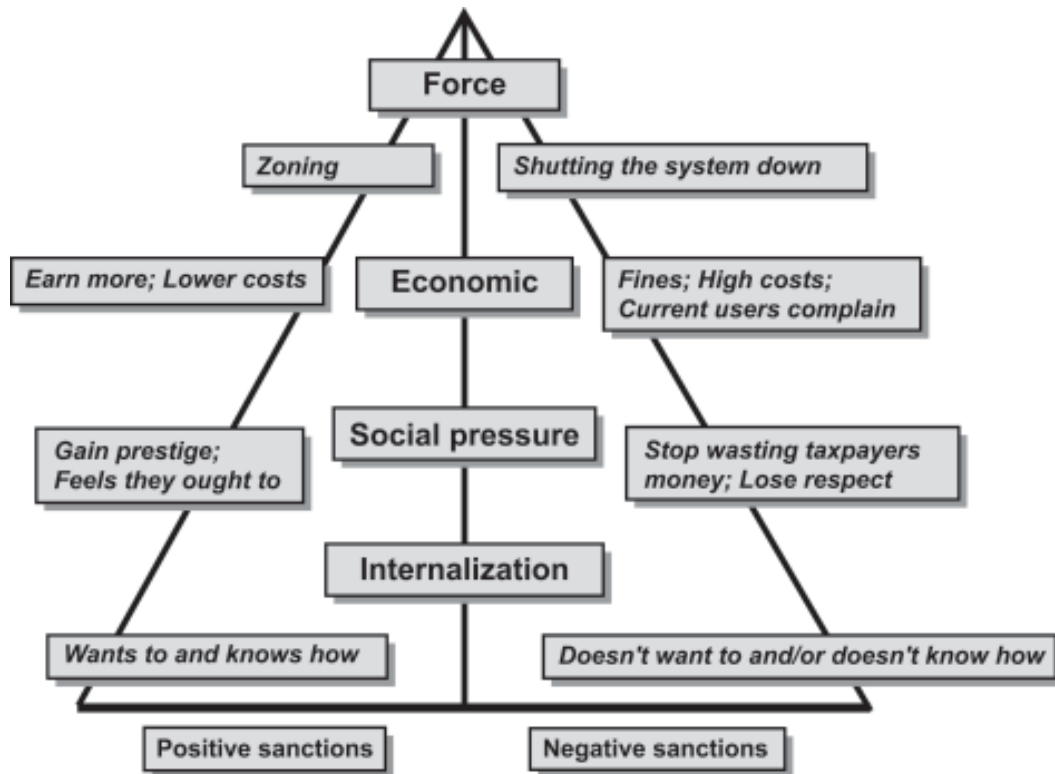
Figure 1. Pyramid of Social Control.

are given to water systems to replace old equipment, or the federal or state government can fine non-compliant systems.

Finally, if sanctions fail, force is applied. The system may be merged into a larger rural water system, or state or federal agencies can shut it down.

When local operators and officials feel overburdened with decisions they feel too busy to make, outside entities impose more obtrusive forms of social control. Thus, instead of being leaders marshalling the resources of the community in accordance with community goals and objects, operators and officials blame the outside for decisions they did not make, thus reinforcing the victimhood of the small community. Often, they feel that if they just wait long enough, a positive economic sanction in the form of a grant will appear, saving them once again from setting priorities and making decisions. This "cargo cult"[1] mentality is not unreasonable as they observe other rural water systems, but it leads neither to collaborative community governance nor an increased ability to manage the system and the community in a fiscally and environmentally responsible way.

How do technical assistance providers help community leaders move away from the emergency response mode, where they either feel like victims of uncontrollable outside forces or that resources will arrive through political connections to solve their problems for them?

Motivation for Sustainable Management

Our research suggests that to move from reaction to action, communities need a collective vision of their future existence. Often an outside facilitator, such as a cooperative extension educator, may help them arrive at a collective vision. For the technician working with water programs, collaborating with organizations that have the expertise to help form a vision that can be the basis for considerations of infrastructure can be critical. Such collaboration does several things. First, it models inter-institutional relationships where resources, knowledge and credit are shared for a common end. Second, it builds a rationale for deciding on alternative paths to infrastructure development. Third, it helps build accountability for the results of decisions and a

mechanism for adapting management in light of the degree to which the community seems to be moving toward their goals.

Once there is some agreement on a community's desired future, which is tacitly acknowledged by local elected and appointed officials, leaders of local organizations, local business managers, and state and federal entities with which the community works, the community can assess the resources it has to move toward those desired future conditions. At the present time, federal and state income shortfalls mean that pleading great need will be less convincing than showing that a good basis for investment exists. Further, the current fiscal crisis means that collaboration to leverage resources will be required for success and sustainability.

Community Capitals

Capital includes resources used to create new resources. Small rural communities must turn resources into different forms of capitals, first by identifying them and then by investing in them. Flora et al. (2004) have identified six forms of capital that communities must identify and transform for sustainable development: natural, cultural, human, social, political, and financial/built. Figure 2 shows these capitals and how they overlap. Natural, cultural, and human forms of capital are the basic resources that can be transformed into social, political and financial/built capital.

Natural capital

Natural capital includes the environment—altitude, longitude, climate, slope and other geographic configurations that cannot be changed, although humans build structures and move earth in attempts to overcome them. Natural resources—water (ground or surface) and its quantity and quality, soils, and biodiversity (plants and animals)—are also part of natural capital. These resources can be altered by human action, generally negatively. Together, the environment and natural resources make up the base around which humans act.

Cultural capital

Cultural capital is a human construction that often arises from responses to natural capital. Generally, it is created over generations and includes ways of knowing (what is accepted as evidence), language,

ways of acting, and defining what is problematic. Cultural capital determines how we see the world, what we take for granted (as urban migrants take functioning water and sewer systems), what we value (cheap services), and what things we think possible to change (the Commissions or Town Council would never agree to a rate hike). Hegemony allows one group to impose its cultural values and reward system on others.

In a society as mobile as that of the United States, people bring cultural expectations about natural capital that cause it to further deteriorate. For example, migrants to Phoenix, who often moved to avoid the allergies that were a part of the natural capital of the humid eastern United States, immediately planted lawns and flowerbeds requiring huge amounts of water. Through evapotransporation, the humidity of the area then increased, allowing allergenic species to thrive and causing the migrants to have the same allergies they had moved to escape.
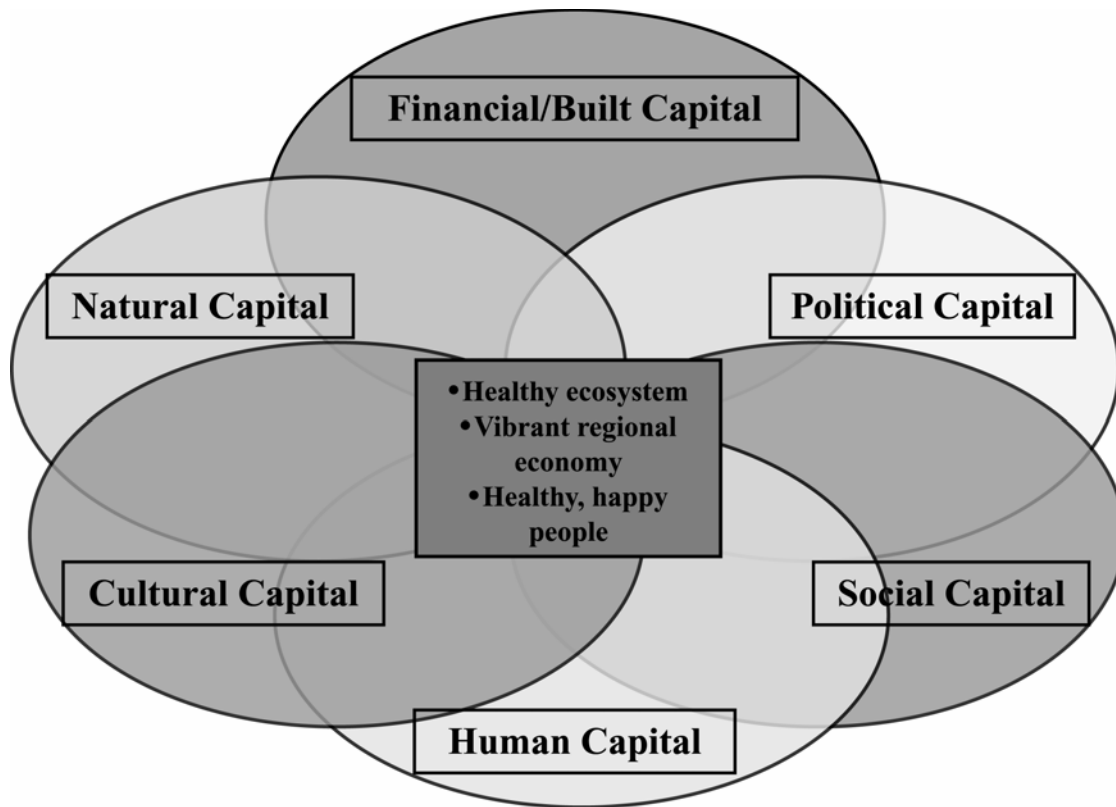
Human capital

Human capital is the native intelligence, skills, abilities, education, and health of individuals within a community. Many assume that small communities lack human capital. But this perception is more a result of the community's size than its native intelligence or lack of specific skills. Because of the small community's size, there is not the diversity of skills, education, and training that exists in larger places. Public officials and citizens must take on as volunteers (or volunteered) multiple responsibilities that are carried out by complete departments in cities. When they struggle to fulfill these responsibilities, outsiders often attribute those struggles to lack of native intelligence, rather than task overload.

These three forms of capitals make up the base of any community. When working with local people to resolve the issues surrounding water, wastewater, and other environmental issues, a technical service provider needs to be aware of these bases.

Social capital

Social capital is a community characteristic based on the interactions among individuals and groups. It includes mutual trust, reciprocity, collective identity, cooperation and a sense of a shared future. Bonding social capital consists of interactions within specific interactions among social groups.

Financial/Built Capital

Natural Capital

Political Capital

- Healthy ecosystem
- Vibrant regional economy
- Healthy, happy people

Cultural Capital

Social Capital

Human Capital

Figure 2. Intersections of forms of community capitals for successful water system management.

Often small communities have very strong bonding social capital that makes them suspicious of outsiders there to "help" them. However, strong bonding social capital does not mean that everyone in town gets along. When there is strong bonding social capital, there are often strong divisions and cliques that keep the community from effectively organizing in its own behalf. Research by Hernandez (2003) and others suggests that bridging social capital must be present to overcome local "boss politics," where one individual controls access to the outside and hands out favors to those who serve his (or very occasionally, her) interests. When only bridging social capital exists, the community does not work together. While there are many connections to the outside, the efforts of community residents and groups go toward outside interests and causes. Outside programs or agencies determine what is done locally, so there are often diverse projects that are not integrated and sometimes contradict each other. For example, the county economic development director attempts to bring in a manufacturer that uses a huge amount of water at the same time construction begins on a water plant that cannot accommodate

the waste products or the water demands of the new industry. There are different ways that the two types of social capital can be balanced—or brought out of balance—in small rural communities. Conditions are best when both bonding and bridging social capital are moderately high. Citizens have a collective vision of the future of the community and can mobilize resources both internally and externally to move toward that future. When both are low, communities are highly disorganized and mechanisms of social control are practically non-existent. These rural places often have high crime rates. There is no collective decision making that is cumulative, and governing bodies change often and undo the work of the previous administration. When bonding social capital is high and bridging social capital is low, the community rejects actions and ideas from "outsiders"—which includes anyone whose grandfather is not buried there. There is often factionalism within the community. When bridging social capital is high and bonding social capital is low, the community changes in response to outside initiatives without the local ownership necessary for maintenance or effective utilization.

Political capital

Political capital is the ability of a community to influence the distribution of resources and to determine which resources are made available. Political capital includes voice, organization, connections and power. In small communities, there is a tendency to rely on political connections—the representative, senator, or legislator—to mobilize resources, rather than building the ability of the community to plan and to follow the rules and regulations that determine rational governmental resource distribution. There is evidence that such "pork" is increasing, ultimately defeating the democratic processes that can determine universal decisions about the distribution of public resources.

Financial/Built capital

Those that use only political connections see financial capital as the major goal; they give little thought to how to utilize and maintain the built capital that it is designed to construct. Financial capital includes debt capital (e.g., bond issue or a low-interest loan from a governmental entity), investment capital (e.g., when an industry pays for a portion of sewer system expansion to make possible that expansion), savings (e.g., when water rates setting allows for repair and replacement), tax revenue (e.g., to support water and sewer systems or repay a bond), tax abatements (e.g., to support new industries), and grants, which are not only the favorite source of funding, but also a primary contributor to the cargo cult mentality and to victimization (e.g., when a grant is not awarded).

Community Participation

While infrastructure can be built without participation, it is necessary to achieve development of all the capitals (Gasteyer et al., 2002). By carrying out a meta-analysis of participatory practice, we identified nine elements of participation. We then sampled from U.S. water systems, stratified by size, region, and ground/surface water source. We gathered secondary data and conducted interviews with key informants in each water system to determine the state of the six capitals before and after the implementation of the latest change in the water system and to learn which elements of participation were used in its implementation. We found that the more elements of participation employed, the higher the impact on a greater number of capitals.

Elements of Participation

Context Specificity (Uniqueness of place)

Each community's unique array of capitals determines the possibilities and limits of infrastructure installation and maintenance. While the tendency is to focus primarily on natural capital, better system design and implementation often result from working with the community to identify and acknowledge the presence and impact of the other capitals. Often a community development professional can partner with a technician who feels uncomfortable with issues surrounding cultural, human, social, and political capital.

Collective Vision (Sense of place is made explicit)

Once a community's capitals are acknowledged, it has a sense of the current conditions and thus a way to begin making decisions about desired future conditions. This step is critical because it moves the community from passive emergency response to strategic readiness.

Diverse Perspectives

The old model of getting things done was to get to the decision maker, tell that person what to do, and help them do it. But if diverse perspectives are not present in decision making, all the technical expertise in the world will not create a sustainable water system. Thus, decisions around the specifics of a water system should include people drawn from business, education, health care, real estate, youth, and civic organizations. Often those diverse perspectives can help link a system to place and the people who will use it and pay for it.

Facilitating Impartial Agents

While making decisions about water systems—rates, expansion, repairs, etc.—may seem purely technical, these questions are often quite contested. Someone, either from within the community or outside, who is trusted by various factions within the community, can greatly help in reaching sound decisions that will actually be implemented or supported.

Group Inquiry (Negotiate evidence)

One of the real issues in rural water systems relates to what constitutes an adequate, safe water system. Generally, the standards come from outside the community, most often the federal government. For many small communities, especially those with a strong sense of victimhood, federal regulations make no sense. They are viewed as something that a bureaucrat thought up at her or his desk with little or no understanding of local context. Thus, it is critical that federal agency representatives are part of the process in determining the indicators of system success. The regulator's tendency to say, "That part per million is the regulation; thus you are not in compliance" is strong. Yet it is important to link the standards derived on the basis of scientific generalization to the local sense of what is good water. As monitoring and reporting are critical parts of system compliance, the more widespread the responsibility of monitoring and more regularly it is reported (not only to the government but also to local citizens) the better. And the more it is reported in a way that is meaningful, the greater the legitimacy such regulation and the regulator will have. Surface water monitoring efforts involving youth have proven successful. Involving high school science classes in monitoring and reporting could be one way to increase community understanding about the importance of system maintenance and human health.

Participatory Contract (Who is accountable for what to whom, including funders)

In participatory management of any complex system, it is critical to be clear about who is responsible for what and when. It is also important to spell out the contingencies of performance. For example, USDA/RD will initiate a new program in which you can participate WHEN Congress passes the appropriations bill and IF the administration's funding request is met. Likewise, local water systems may be able to act only if local citizens agree to pass a revenue bond to fund improvements or expansions. Just because there are contingencies does not mean that no one is responsible. It also suggests that more time should be spent on dealing with contingencies and less on blaming the other parties as projects stall.

Monitoring, with attention to outputs & outcomes

Once the evidence has been negotiated, monitoring is relatively easy. Water systems impact all community capitals, and good monitoring systems look at all capitals, linking them to the aspects of development over which the community and its collaborators have some degree of control. Monitoring allows all parties to see if the multiple benefits of a water system are being achieved and at what cost.

Sustained Systematic Learning (Measure, reflect, act, measure, reflect . . .)

Monitoring can be ritualized into reporting numbers, with no reflection on what those numbers mean in terms of future action. That is the danger of having only one person doing the monitoring and reporting to outside agencies. Unless there is reflection on the meaning of the change in indicators over time (by both the community actors and government agencies), there is little chance that future actions will improve performance. Often, when local, state, or federal agencies fail to give feedback on the monitoring, it becomes lax. As a result, there is no learning occuring at any of the levels of responsibility and supposed accountability.

Evaluation in the context of the whole community

It is not enough to report back to the city council that the system is now in compliance. While that information can yield a sigh of relief—"The Feds are off our backs" or "We'll get the next grant"—it does not tell us whether the community is moving toward or away from its desired future conditions as a result of infrastructure investment. This type of evaluation can only be carried out if the community has a collective vision of its future with respect to all six kinds of capital. Otherwise, the focus will be linear, of interest to only a few citizens, and unlikely to maintain the type of participation necessary for small communities to thrive.

Conclusions

Although sustainable water systems often seem entirely dependent on technical expertise and funding, community participation has an impact not only on the system's sustainability but on community sustainability as well. We have found that the larger

the numbers of elements of participation that are in place, the more likely water systems are associated with multiple community benefits. While the technician may not be skilled in putting these elements in practice, the extra collaborative effort necessary to involve those with skills in the planning and implementation process has long-term positive pay-offs. While the transaction costs might appear high at first to an individual who is most interested in getting the engineering right and who must share credit for a successful project, the long-term community sustainability of such actions are worth the investment.

However, it is not just a matter of the individual technician. The supporting agency—whether for profit, not-for-profit, or governmental—must support and encourage such action through its reward structure. Otherwise, those on the ground who do collaborate get burned out, not only in building effective coalitions, but in defending the time invested in them to their employers.

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Notes

[1] Cargo cults were observed by anthropologists on Melanesian Islands accompanying colonists, missionaries and military. Huge objects came out of the sky or from the water, disgorging all sorts of wonderful things that were used by the military or the colonists–and sometimes shared with the local people. The appearance of the cargo was unexplainable. Nothing in their past experience could explain it. Thus the "silver birds"–and their contents–became objects of hopes and rituals, often keeping people from their ordinary productive work as they sought to somehow appease the gods so that they would receive more cargo (Wilson 1973).