

Institutional Vacuum in Sardar-Sarovar Project: Framing 'Rules-of-the-Game'

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Abstract

Few large irrigation projects in India have been as elaborately planned as the Sardar-Sarovar Project (SSP), incorporating as it did the lessons of decades of irrigation project design and management. The project was to blaze a new trail in farmer-participatory irrigation project design and management with water user associations (WUAs) building their own distribution systems. However, as it unfolds, the institutional reality of the project is seen to be vastly different from its plans. If SSP is to chart a different course from scores of earlier large irrigation projects, it must invent and put into place new rules of the irrigation management game.

Backdrop

With 30 years in planning, over 15 years in construction and some Rs 1,500 billion of investment later, the saga of SSP's vision is now ready to unfold. When fully commissioned, the project will use 5,600 km of main and branch canals and 66,000 km of distribution networks (including distributaries and minors) to deliver 9.8 km³ of irrigation water to 1.8 million hectares (Mha) of land. Besides, SSP is also expected to boost the rural and urban drinking water needs of the state and also help recharge groundwater aquifers in intensively groundwater-irrigated areas of North Gujarat and Saurashtra. If all these targets are fully or even substantially met, SSP will indeed prove to be the lifeline of Gujarat. And this will happen if its operational strategy, i.e., key assumptions made during the planning phase about its manner of operation, holds. The operational strategy of SSP was to be put to test in *rabi* (October to March) 2002. The key elements of this strategy are:

1. The project will create distribution infrastructure such that each village has one or more *pucca* (lined) minors depending upon its culturable command area (CCA); the distribution system below the minor, including lined sub-minors, delivering water to 40-60 ha *chaks* (small command areas), and field channels further down to serve 5-8 ha sub-chaks, will be created by the irrigation community; the thinking was presumably that, by involving the irrigation community in the design and creation of distribution infrastructure below the minor, the project would not only invite genuine partnership with the community but also provide an organizing logic for the WUA.

2. The irrigation community in each minor (serving a Village Service Area [VSA]) will form a WUA whose responsibility will be to: (a) mobilize community labor and resources to create the water distribution system below the minor; (b) arrange orderly distribution of irrigation water within the command; (c) ensure future maintenance and upkeep of the distribution system below the minor while the canal infrastructure up to the minor level is maintained and operated by the SSP; (d) collect water fees at Rs 157/irrigation/ha, of which Rs 7 would go back to the WUA as a subsidy to meet administrative expenses. The idea was that participatory irrigation management (PIM) in the SSP starts at the beginning, rather than come up midstream when system managers have taken all crucial design decisions.
3. The project will provide only 21 inches of irrigation requirement in five irrigations turns during rabi; no summer irrigation was envisaged, nor was it envisaged that Narmada water would be used to raise perennial, water-intensive crops like sugarcane and banana; the SSP planners' idea was to cover large areas through extensive irrigation rather than supporting a small, intensively irrigated command. The logic of rationing water was to stem at the outset the propensity for early command areas at the head of the system to form the habit of practicing water-intensive agriculture.
4. The SSP's primary responsibility was to be the upkeep of the infrastructure up to the minor level, and timely delivery of water on a volumetric basis to each VSA through the WUA which would collect and aggregate indents from individual farmers in the command. That done, it was expected that the WUAs would take over the responsibility of water distribution with the VSA. The SSP would not consider water indents by individual farmers unless these are routed through the WUA. This was expected to result in division of O&M responsibility and costs in which the project takes the responsibility of those parts of O&M that require technical and engineering competence of a high order whereas WUAs will operate and maintain local infrastructure within the VSA where the knowledge of local conditions is critical.
5. The system is planned for sophisticated, computerized water control from control rooms strewn along branches and distributaries throughout the command; while the control rooms are ready, the water control infrastructure will take a long time to install and commission. As a result, for several years, volumetric water control will be operated manually, if at all. The basic idea is to introduce volumetric delivery and charge at all levels from the very beginning

As visions and strategies go, the early years of the operation of the SSP will be critical; they will decide whether the project will run according to the original vision outlined above, or by a new evolutionary operational framework even superior to the original vision, or regress into an operational mode in which the SSP will follow in the footsteps of other major irrigation projects, where achievements on all counts have fallen far short of expectations.

Running-in

The SSP is now poised at that crucial juncture. Like a new engine being run in, the SSP too is getting ready to be 'run in.' Starting in rabi 2002, SSP has begun to release irrigation to some 80,000 ha of its command in Narmada, Bharuch and Vadodara districts where canal

and distribution infrastructure up to the minor level is fully or partially ready. While the full reservoir capacity is likely to be created once the dam height is raised to 135 m, it will take 10-15 years before the canal network gets constructed to cover the entire command area of the project. Until then, SSP will gradually evolve, adding new areas in its irrigated command every year. In this process of evolution, the experience of these formative years will prove decisive in three ways: (a) system managers as well as users' behavior and practices in the first years will take the shape of habits, which will be difficult and painful to change later; (b) the behavior, practices and habits allowed to form in the early parts of the command will define the norms, rules, behavior and habits in new areas being brought under the command as the project evolves; and (c) early years will decide whether the actual operational framework of the project is faithful to the original vision or whether it is superior to, comparable with or inferior to it.

Members of the SSP field staff have already done some amount of WUA organizing work in the 800 villages encompassing the first year command of 80,000 ha. Typically, a group of 11 leading, forward-looking farmers, generally representing all or most of the chaks constituting the command area in each minor (sometimes, more than one minor) are formed into a management committee of the WUA who also act as promoters, with one of the members nominated as (often cajoled to become) the president. Over 800 WUAs have been registered as cooperatives under the Co-operative Act. However, registering WUAs as cooperatives is quite different from catalyzing functional WUAs that begin to undertake all the tasks they are expected to perform. The critical challenge facing the SSP is to activate and energize the 800 odd minor-level WUAs so that they begin to play the role envisaged for them by the SSP vision.

Impressions from Fieldwork

During late 2002, IWMI-Tata researchers worked together with the field staff and engineers of the SSP to develop a firsthand assessment of the preparedness of the irrigation communities to receive and utilize Narmada water for irrigation. Some 40 villages in different parts of the command were covered. Subsequently, IWMI-Tata Program continued with field surveys and studies in these villages. The objectives of this field research were:

1. To develop a quick situation analysis of the conditions in each village covered including the size of the farmlands, number of irrigators, socioeconomic structure, cropping pattern, existing irrigation sources, farm productivity, etc.
2. To assess the preparedness of the irrigation groups to receive Narmada water and arrange for their orderly distribution.
3. To assess the level of user comfort with the SSP water pricing (which is higher compared to government water pricing in all other surface irrigation systems) and the mode of collection of water fees and their reimbursement to the SSP.
4. To understand the general state of the WUA, its internal dynamics, public awareness about its existence, functions and future role.
5. To develop an assessment of the likelihood of the role of the SSP vision, outlined earlier, being played out in reality; and to develop a prognosis of what might happen if it does not.

The general situation in the 40 villages covered by our fieldwork was highly variable. Some villages near the Kevadia Colony, near the head of the system, have had a small area irrigated by Narmada water on a trial basis; some more area in the Bharuch District too received some surface irrigation from small and medium irrigation projects, such as the Deo project. Barring these small patches, the entire area commanded in this first phase has never seen canal irrigation before. However, we found that even villages which had some canal irrigation experience had no experience of farmer management of water distribution. In Devalia and Madhodar minors, where the sub-minors too were constructed by the SSP Nigam under a pilot project, WUAs were formed some 3 years back and were supposed to manage water distribution and water fee collection. However, in reality, the water rotation roster is given to them by the Nigam officials and the WUA has done little of its own rule-making work. Moreover, whereas in Mahi and Ukai-Kakrapar commands we found vibrant farmer organizations (FOs) like dairy and sugar cooperatives, the villages we visited in the SSP command had virtually no experience in successful FOs at the local level. If anything, people had bitter memories of all manner of cooperatives that had either swindled them or become defunct.

Groundwater irrigation was fairly well developed in some parts but absent in other areas, such as in Bharuch. Tank irrigation—by gravity flow and through lift irrigation with diesel pumps and rubber pipes—however was found to be common. Near Jambusar, where large tracts suffer from primary salinity, agriculture has been underdeveloped and careful application of surface irrigation can boost the economy. Unlike the command areas of Ukai-Kakrapar, Mahi and other canal systems, where the *Patidaar* cast population dominates the farming population, in the 40 villages we visited, the *Kshatriya* cast dominates the farming, and these are not as well known as Patidaars for their agrarian entrepreneurship. While we found stray cases of Saurashtra Patel cast population having acquired land and settled in the command area, there seemed no evidence of large-scale “strategic” land acquisition by enterprising farmers from outside the command as yet. In general, we found Kshatriya (*Jadejas*, *Darbars*, etc.), *Parmars* and *Prajapati* cast populations and a spattering of Harijans and tribals in most of the villages. Some of the villages in the Bharuch District have mixed Hindu and Muslim populations. Compared to the Mahi command area in the Kheda District, for instance, the villages we visited were agriculturally far more backward; and onset of irrigation will no doubt perk up the rural economy of this region in 3-5 years. Our surmise was that each of the 80,000 ha would produce at least Rs 8-10,000 in incremental value-added, thanks to Narmada irrigation (direct irrigation plus more productive well irrigation); and the cost of Narmada irrigation will be less than 10% of this increased value-added from farmland.

All the villages visited had taken some action to form WUAs under prompting from SSP field staff. However, almost everywhere, what we found were only Management Committees (MCs) with a president-designate. A few MCs had already had a general body meeting but none had actually begun enrolling irrigators as formal members of WUAs. A subsequent IWMI-Tata study (Talati and Liebrand 2003) showed that less than 3% of the farmers benefiting from Narmada water had paid their WUA membership fees. The study which surveyed farmers in 12 villages of the SSP command also found that while most farmers know the MC members, 62.5% did not know “the purpose of forming a WUA;” 50% did not know “about the meeting in which a WUA was formed;” 82% know nothing about the bylaws of the WUA and none

know about the rules and regulations of the WUA. Expectedly, no WUA performed any of the three essential tasks they are expected to perform: indenting collation and water allocation, orderly distribution of water and collection of water charges.

The SSP's pricing and other policies too have been evolving only recently; and these had not been fully communicated to all the MCs as yet. There was also some confusion amongst MCs about the bylaws and specific clauses contained in them. Within the SSP staff too, there was a lack of clarity about how the report of the Government of Gujarat's Taskforce on PIM would affect the SSP WUAs. All in all, at the time of our fieldwork, there were great confusion and ambiguity about the design of WUAs, the bylaws, specific role of WUAs, and the pattern of interaction between irrigators and WUAs and between WUAs and the SSP. Later field studies suggest there has not been any major improvement in this condition since then.

We had expected to find some work initiated at the village level on creating the water distribution system below the minor by irrigation communities. However, in none of the 40 villages was there any move in this direction. On the contrary, we found significant resistance to the idea; in many villages, MC members categorically told us that sub-minors and field channels will never get built unless the government does it. There was some ambiguity about what the government/SSP will do to help; engineers accompanying us had told MCs that the government had recently taken the decision to acquire land for building sub-minors. Some MCs felt this would be welcome. The general impression the field staff gave farmers was that sub-minors to the chak level must be lined; and farmers seemed daunted by the cost of lining.

In any case, from our interaction with 40 village communities, we understood it is very unlikely that irrigation communities will construct sub-minors and field channels in a hurry, if at all. Half-hearted statements and rumors that the government might after all take over the responsibility of building distribution systems within VSAs have further reduced the chances that irrigation communities would take any initiative in this direction (Thomas 2004). A detailed case study of social dynamics in two chaks of the SSP command suggested that farmers do engage in primitive forms of fragmented collective action in building watercourses within small portions of the chaks; but conflicts amongst subgroups hinder or frustrate such efforts. It also does not help when this informal fragmented private and collective action results in the design of watercourses which are very different from the standardized design evolved by the SSP planners who are therefore not sympathetic to such uncoordinated attempts by groups of irrigators trying to secure access to Narmada irrigation (Thomas 2004). But the SSP-designed distribution systems are unlikely to get implemented for a long time to come, if ever.

What seems far more likely is that tiny areas adjoining the minors will be flow-irrigated, but a lot more area will be irrigated by lifting water from canals through diesel pumps and rubber pipes. Even farmers who can irrigate by gravity flow often prefer lifting water and conveying it through rubber pipes to avoid conflict with upstream farmers and to better control the flow (Thomas 2004). This mode of irrigation from canals, drains and tanks is already quite popular in many parts. Almost every village we visited had 10-20 diesel pump renters who also provide up to 1,000-1,500 feet of rubber pipes. Conveying lifted water 1-1.5 km using rubber pipes is quite common in the area. Therefore, rather than investing money and labor in building field channels and sub-minors, farmers will very likely use lift irrigation on a large scale. In many villages we covered, we found that farmers were already preparing to invest in diesel pump sets and pipes. Once they see water in the minors, very likely 5-10,000 new diesel

pumps and some 4-5 thousand km of flexible pipes will come into the command area. The going rental rate for 5-7.5 hp diesel pumps was Rs 50-60/hour; but with the growing density of pumps, these rates will fall. In any case, pump irrigation markets will show a huge presence in the 80,000 ha command.

This was confirmed by a study we carried out during November 2002-March 2003. The Talati-Liebrand survey (2003) of 543 irrigators in 12 villages of the SSP command during rabi 2002-03 showed that of the 1,150 ha irrigated with Narmada water in the 12 villages surveyed, 727 ha were irrigated by lifting water, and the remainder by gravity flow or using siphons. It also showed that for every rupee they paid to the SSP Nigam for water charges, irrigators spent Rs 2.25 on lifting it from minors. Pump irrigation markets were booming with farmers lifting and transporting water up to 2,500 feet. Farmers in 10 of the 12 villages surveyed invested in 40 diesel pump sets with 5 to 8 hp capacity and 14,024 meter delivery pipes of various makes and materials, such as rubber, HDPE, fertilizer bag and PVC, to operate on the newly catalyzed water markets. A pump dealer whose business was on the upbeat and interviewed by Talati and Liebrand said he had already sold 30 pump sets in rabi 2002-03 itself, and expected to sell 350 the following year.

Providing SSP's water allocation of 5,200 m³/ha will require an average of 150-200 hours of pump irrigation. At 150 hours/ha, the total value of water lifted to irrigate 80,000 ha will be around Rs 600 million. In some villages, farmers did complain that compared to other government sources, SSP is proposing a higher water fee and that they intend to levy the same fee for lift irrigation while the normal government policy is to charge half-rate for lift irrigation from canals and tanks. But our overall impression was that farmers will easily accept the higher water fees proposed. The SSP official water rate at Rs 150/ha for five irrigation turns for 80,000 ha should be just Rs 600 million, around 10% of the value they place on water. Thus, the SSP water fees are just a small fraction of the actual value farmers place on that water, and should not be difficult to collect at all; this however does not mean that SSP will be able to collect its Rs 600 million/season easily.

Some aspects we found in our interactions with farming groups which may have serious implications for the way the situation will evolve have to do with farmers' perceptions of SSP as an organization:

- (a) While farmers were elated with the real prospects of getting Narmada water, they were also angered by repeated promises from SSP about when water would be available which remained unkept; farmers we met understood the constraints the project faced but felt that what SSP and its field staff say cannot be relied upon.
- (b) This was further complicated by the fact that different members of the field staff had given different messages to the irrigation communities; in one village, for instance, the staff accompanying us explained that WUAs would have to collect water fees from flow irrigators as well as lift irrigators at the same rate; in the same village, another group of SSP staff had told farmers the same morning that the government's problem was of maximizing the use of water; so farmers can pump at will without worrying about water charges; such conflicting messages from SSP staff resulted in the erosion of credibility of the organization amongst farmers; this could only be resolved by having a clear and aggressive communication strategy for SSP.

- (c) Often in good faith and almost casually, SSP field staff had liberally made commitments to irrigation communities to fix their specific local problems; in some villages, farmers came with complaints that some of their lands were waterlogged; in one village, the community wanted the bed of the minor raised so they could use siphons; in several, they wanted the SSP Nigam to provide water to fill their tanks; in some villages, where the paddy crop was burning because of moisture stress, farmers wanted Narmada water released immediately to save the paddy crop. Field staff accompanying us agreed to solve all their problems or at least to look into them. However, irrigators as well as SSP staff were certain that most of these commitments would not be kept, often because it is very difficult, or even impossible, to solve each individual farmer's problem in such a large system. Yet, farmers will not forget these commitments and will use them as a stick to beat the SSP with.
- (d) One idea that was deeply ingrained in the minds of farmers is that SSP's need to release water into the system is greater and stronger than farmers' need to use the water; allowing this impression to continue must further erode SSP's capability to establish an orderly institutional arrangement for irrigation.
- (e) Similarly, farmers and MCs we met assigned no seriousness or urgency to SSP's insistence on the operating practices it intends to pursue; for example, most farmers did not believe that water indents will not be honored unless they are made through WUAs; that WUAs which do not make an indent will not get water; that WUAs which do not pay their dues will be refused water for the next irrigation; that lift irrigation will actually be charged at the same rate as flow irrigation. It seemed to us that farmers take the SSP and the government so lightly that they were totally nonchalant about SSP's new water policy, which they did believe would be vigorously implemented.

Assessment

Overall, based on a brief stint of fieldwork during 2003 and follow-up studies later, our assessment is that it is unlikely the overall vision of the SSP for irrigation management will be played out for several seasons to come. Farmers are certainly not ready; but we think that even the SSP is not quite ready to implement its strategy. For example, even now, neither farmers nor field staff know where to obtain forms for indenting water. Field staff have not thought about what course of action is to be adopted in villages which have minors but which have not submitted their water indents, or if farmers begin to lift water en masse without submitting the indent.

It is unlikely that even in the long run, irrigation communities and WUAs will build below-the-minor distribution systems of the kind the SSP expects them to build.¹ Most villages will prefer instead to use lift irrigation and rubber pipes to distribute water. This means that there will be no planned, orderly water distribution by the WUAs. Instead, pump irrigation markets will proliferate. From the viewpoint of both water use efficiency and economical use

¹In building distribution systems within Village Service Areas, one problem farmers face is of high capital cost of pucca sub-minors; but the other is of acquiring land for sub-minors, which they feel only the government can do. There is some thinking in the government now about Sardar-Sarovar Narmada Nigam Limited acquiring the land for sub-minors and farmers contributing funds to build the distribution system. However, there is no clarity on the issue; in the meanwhile, lift irrigation from SSP canals has been going apace

of water, this arrangement would in some ways be even superior to the sub-minors and field channels envisaged by the SSP. Pipes will minimize seepage; and farmers paying Rs 50-60/hour for lift irrigation will strive to minimize wasteful use of water. Therefore, in our judgment, a distribution system based on private pump irrigation markets may not be necessarily bad and may even result in better use of the 21-inch irrigation requirement under SSP plans of provision.

Two bothersome issues about this are the use of energy and equitable distribution of water. Pump-irrigation-based distribution will mean avoidable use of 150-200 liters of fuel/ha; and it will be useful to examine if improved water use efficiency justifies this substantial incremental cost. A detailed and proper analysis of private, community and social-cost benefit issues involved in choosing between lift-based and gravity-based distribution systems is strongly indicated. The key gain from the former is that it will not require setting aside farmland for sub-minors and field channels which may cost Rs 0.4-0.5 million per minor, especially if land is acquired after irrigation arrives as will be the case in these parts of the Narmada command. The SSP has already been estimating the cost of a fairly good distribution system at around Rs 1-1.2 million/village, and a good part of it will require regular, annual maintenance. Contrast this with 50 7.5 hp pumps and 50 km of flexi pipes with a total capital investment of around Rs 1-1.25 million to distribute water over 500 ha. The annual fuel cost at 150 liters/ha would be Rs 1.5 million. So in opting for lift-based pump irrigation markets over constructing a gravity-flow distribution system, a village irrigation community is paying around Rs 1.5 million/year (plus the annual wear and tear, and replacement costs of pumps and pipes) to save two costs: (a) farmland, labor and other material needed to build channels and (b) transaction cost of organizing to build a common-property distribution system.

Gravity irrigation systems have their own equity issues between head- and tail-reach farmers. In a lift-irrigation-based water distribution system that may soon dominate the SSP command, equity issues will take a different spin in which topography will play an important part. Depending on the location of their farms in relation to the minor, and the topography of the area, different farmers will have differential access to canal irrigation. Lands adjoining the minor will get plentiful gravity flow; their owners will be the most privileged class.² Owners of lands who can get canal water by using siphons too will be privileged because they will not have to spend on lifting. Owners of fields further away and/or higher than the minor will be forced to lift; and those who are too resource-poor to own their own pumps and pipes will spend the most for irrigation. Since the lift involved is low, perhaps, it would be useful to promote low-lift diesel-operated and even manual and bullock-operated pumps for water distribution.

What might be the role of WUAs and PIM in the Narmada context, if distribution of water below the minor will be done by private lift irrigation suppliers? In our view, it would be considerably more limited than would be the case under gravity flow distribution. Indeed, the principal role the WUA would now be expected to play is collecting water fees from irrigators and indenting water on behalf of them from the SSP.

²However, a deeper probe suggests that lowlands near minors may also face the problem of unwanted leakages, flooding and waterlogging, and their owners may not always and necessarily be better-off compared to owners of distant lands and uplands that require lift irrigation (Thomas 2004).

Immediate Priorities

In the immediate future, SSP can do little either to strengthen WUAs by capacity-building work or to encourage irrigation communities to build distribution infrastructure since there is no time to do either. In the medium to the long run, however, it should keep making efforts to do both. What it can do now, however, is important and can profoundly affect the way the project's O&M evolve over the coming years. Some of these are listed below:

1. *Indents for irrigation water:* The best and quickest way of energizing WUAs into functional bodies is for the SSP to ensure water indents are accepted only through WUAs; and that no farmer who has not submitted an indent through a WUA is allowed to use irrigation from the minor, either by gravity or by lift. In order that this happens, prior to each irrigation season, SSP needs to move fast, make indent forms available to WUA MCs and get them to complete these forms and submit them in a campaign mode.
2. *Advance collection of water fees:* This can be another measure that will energize WUAs. Although a widely used practice in Gujarat and elsewhere is to collect irrigation fees after irrigation is over, we believe that is the prime reason behind the low collection ratio. The SSP's current policy offers WUAs a 10% discount for advance payment. However, in our view, this gives irrigation communities scope to avoid having to organize now; MCs will take a pro-active attitude because they can wait until after the season is over to approach members for dues. This opportunity should not be given. Instead, the SSP should ask all those WUAs which want irrigation water to pay their water fees in advance. Doing this will mean that MCs will have to call the general body meeting, and will have to ask irrigators to pay up the water fees, which is the first step to catalyzing effective WUAs.
3. *Announce an irrigation schedule and adhere to it strictly and at all cost:* At present there is so much uncertainty and fluidity in the thinking of farmers as well as SSP field staff that nobody can say for sure when the first irrigation will be released, and how water will move around the system. In this situation, WUAs would find it difficult to even complete their indents. The SSP should finalize an irrigation schedule as soon as possible and widely disseminate it. It should clearly state which minors will be run at full supply during which weeks, the total number of weeks when water would be provided and so on so that farmers can plan their cropping patterns and schedules. Once these schedules are announced, they should be adhered to strictly. Doing this will enable MCs to call general body meetings and start collecting water fees in advance.
4. *Establish rules of the game:* The key task to be performed at this stage is to establish the rules of the game by which SSP will operate. Farmers now see SSP as a government body that would look after everything. SSP needs to break out of this mould and establish a fair *business* relationship with the users. This requires that its organization treats farmers as customers, like all good businesses and utilities do; at the same time, it needs to ensure that basic rules of the game of the business are adhered to by both parties. So SSP should provide a specified quantity of water along a specified schedule to irrigation communities which have indented water and paid for it in advance; but those communities that have not indented or not paid must be prevented from using Narmada water, no matter what. If this rule is not enforced in the first year, chances are that it will never be.

5. *Mechanisms for rule enforcement:* This is easier said than done. If minors in a certain distributary are running at full capacity for 7 days, how do WUAs catch defaulting farmers who lift water? How does SSP field staff ensure that WUAs which have not filed their indent or paid their advance do not encourage their farmers to lift water straight from the distributary or breach a nearby minor? Enforcing these rules of the game will be the biggest challenge for SSP. Catching all cases of unauthorized use will be impossible; but a functional level of rule compliance can, and must, be achieved. If SSP meets this challenge well in the first years by catching a significant proportion of cases of unauthorized irrigation and meting out exemplary penalty, rule-violation will decline in the future; but if numerous cases of unauthorized irrigation remain undetected and unchecked, anarchy will prevail, and it will become progressively more difficult to check it in the future.

Institutional Alternatives

The chaos currently prevailing in the SSP command is symptomatic of most canal irrigation projects in India. Although researchers still hark back to the philosophy of Command Area Development programs (Upadhyaya 2004) it is by now evident that these have done little to improve and sustain the performance of surface irrigation projects. Recent studies of major, medium and minor irrigation projects in six Indian states brought into bold relief how irrigation commands of all surface irrigation systems are shrinking (Joy and Paranjape 2003; Meher 2003; Rajagopal 2003; Shah 2003; Patil and Doraiswamy 2003; Vashishtha et al. 2003). These underscore the fact that while we have learnt to design and build irrigation systems, we have a long way to go in managing them for achieving their full potential for sustainable performance. Canal irrigation in India is at crossroads; and as a new large project, SSP can offer institutional answers with implications far beyond its own command area.

A default option for SSP is to *tighten the administration* within its existing operating framework by gearing up the SSP and government machinery to ensure tight rule enforcement. But the logistics of doing this presents a frightening prospect. It would imply intensive, round the clock campaigns to monitor water use at all levels of the system. Based on our assessment of how far the Sardar-Sarovar Narmada Nigam Limited is willing to go—and how long it can sustain that way—rule enforcement in this situation requires a level of effort that is unlikely in the governmental mode on a sustainable basis.

An alternative is to explore the Chinese approach to energize its local bureaucracy by restructuring its incentives. Facing much the same problems as Indian irrigation management has faced, the Chinese have responded differently (Shah et al. 2004). As in SSP, in many Chinese irrigation systems, while the state built the main canals and branches, village collectives were required to build the local distribution system. As in the SSP command, most village collectives did not build their distribution systems. As a result, many canal systems release water into a medium-sized reservoir from where water is conveyed by canals into ditches from which irrigators lift water. Besides the lifting costs, farmers have to pay for water too, as is envisaged in the SSP. But collecting water fee is difficult there as it is here; and so is enforcing the rule that user pays, and nonpayer does not use water. We found that in China's volumetric pricing system, constant measurement is not done, yet some benefits from volumetric charge are reaped. The engineer in charge of a reservoir with, say, 25 million m³ of water capable of serving an irrigation area of, say, 8,000 ha is given an incentive on the performance of his fee collection. In small systems we saw in Hebei and Hanan provinces in North China, a

standard loss allowance at 25% was provided to cover seepage and conveyance losses. So the incentive available to the official—over and above his salary—is 10% of the excess of total water fee collected less the base value of 75% of the dynamic storage in the reservoir costed at government-fixed water rate per m³. Rough calculations showed that the total incentive earned is no more than 30-35% of the regular pay; yet, it generates accountability and efficiency we normally do not find in bureaucratic systems. There is growing evidence that this system has been working quite well in China.

Another alternative is to institute private franchises. Dr. Y. K. Alagh, Former Minister of Power, Science, Technology and Planning, India, has for long talked about a corporation for each of the Narmada branches. But a simpler idea is to invite private local entrepreneurs—as concessionaires or franchise holders—to bid for water transmission and fee collection from WUAs. If this is to work well, franchise operators will need to have medium- to long-term stakes; however, contracts can be suitably designed to protect the interests of the SSP, franchise holders as well as farmers.

In our view, what is critical at this stage of SSP is not the total amount of revenue the project generates or collects, or the total area it covers but to firmly establish the basic rules of the game which in our opinion should number five: (a) SSP will provide assured irrigation in specified quantities at preannounced schedules; (b) it will receive indents for irrigation only from WUAs and not from individual members; (c) it will not supply water to any WUA unless it has deposited the water fee in advance; (d) once the irrigation starts, nobody who has not indented or paid for water will be permitted to use water, no matter what; and (e) SSP or its staff will not make commitments to farmers that it cannot keep, and if commitments are made, they should be kept at any cost. If these basic rules of the game are not established now, the SSP will most likely go the way other irrigation projects have.

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