

HOW FARMER MANAGED IRRIGATION SYSTEMS BUILD SOCIAL CAPITAL TO OUTPERFORM AGENCY MANAGED SYSTEMS THAT RELY PRIMARILY ON PHYSICAL CAPITAL

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Let me share with you some of the experiences I have had in studying irrigation systems in Nepal since 1989.²

Some of you may not know how it is that I came to be a scholar with a deep interest in Nepal in general and Nepal irrigation and forestry in particular. The USAID program on decentralization funded a seven-year cooperative project between Syracuse University, Indiana University, and Associates in Rural Development in Burlington, Vermont. That program was asked to evaluate the decentralization program then established in Nepal. Professor Larry Schroeder, Dr. James Thomson, and I were sent to Nepal to do the evaluation.

Before I left Bloomington, I called Dr. Norman Uphoff and asked whom I should be sure to meet on my very first trip to Kathmandu. He indicated that the two most important people for me to meet were Dr. Prachanda Pradhan and Dr. Robert Yoder. What a fortuitous recommendation. And, what a great honor for me to share this program organized by Prachanda Pradhan with both Norman Uphoff and Robert Yoder.

I well remember my first discussion with Prachanda (Bob was not in Kathmandu at that time). I told Prachanda about some of our earlier research on irrigation, inshore fisheries, forest resources, and groundwater basins and he was quite interested in what we had done. I indicated I had read some of his work with Yoder and others on irrigation in Nepal and was quite interested in learning more. At that point, he gave me a very thorough questioning about the seriousness with which I would approach this topic. Prachanda was obviously used to overseas consultants who fly in, take up a lot of people's time, duplicate materials, and then are never heard from again. After asking me a whole host of questions including how we train graduate students, I obviously passed the test. I was graciously granted a long interview with him and the possibility of copying a large number of original case materials located in his fantastic files.

In stark contrast, I found that the original mission on which we were sent to be extraordinarily difficult. As many people in the audience will remember, the decentralization program "in effect" in 1989 was among the most *centralized* decentralization programs one could find in the world at that time. Several interviews with key officials in Kathmandu convinced me that we would not be able to be very constructive in reviewing that policy. Simply criticizing a government policy is not terribly useful. After several discussions with Larry Schroeder and Jamie Thomson and with the officials at USAID, we came up with a much more effective project. Since many of the irrigation systems in Nepal were already effectively decentralized, we would focus our study on the performance of Farmer Managed Irrigation Systems (FMIS) as contrasted to Agency Managed Irrigation Systems (AMIS).

During the rest of that first trip, we collected extensive materials, talked with scholars familiar with irrigation in Nepal, and prepared to do a serious study of the reasons why FMIS seem to be so much more effective than AMIS in Nepal.

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² The continuous support of the Ford Foundation in New Delhi is deeply appreciated by all of us who have worked on the NIIS database through the years. We also appreciate the helpfulness of Dr. John Ambler and Dr. Ujjwal Pradhan, who have consistently supported our efforts with effective collegial input as well as essential resources.

It was on that trip that I also learned about the work of Ganesh Shivakoti. He was at that time just finishing his doctorate at Michigan State University. We were in great good fortune when we were able to bring Ganesh to Bloomington for a period of time after his doctorate. He worked with Paul Benjamin and others at the Workshop in the design and execution of our project. As many of you know, we created a structured database called the Nepal Irrigation Institutions and Systems (NIIS) Database.³ We shared the design of this database with a number of colleagues who are deeply familiar with irrigation, and began to code the 135 case studies that we had collected from our trips to Nepal and from the published literature—many of them authored by Pradhan and Yoder.

Discussions with colleagues at the Department of Irrigation (DOI) and the Institute of Agriculture and Animal Science (IAAS) in Rampur, and at several irrigation systems, showed us that the approach we were taking was likely going to be fruitful and generate some important information for policymakers into the future.

Our team coded most of the cases that we had brought back to IU, but then found that we had a serious problem of missing information regarding key variables for some of our cases. Whenever one uses a structured coding form to extract data from a case that someone else has written, it is almost inevitable that one finds that the case author did not share the same conceptual framework and thus did not record information on all of the key variables in the new analysis. It was at this point that we went to Dr. John Ambler who was then with the Ford Foundation. We shared with him some of our initial papers and exciting findings that we had already extracted from the completed cases. The high performance of FMIS in Nepal when contrasted with the performance of AMIS was well documented in our initial papers, even with substantial missing data. John not only supported a field visit to return to sites where we needed to obtain missing information, he encouraged us to add cases to our sample. By adding some of the smaller government systems as well as FMIS, he helped us strengthen our analysis. He was concerned—and legitimately so—that our findings regarding the higher performance of FMIS might be interpreted as due largely to the size of FMIS and not to the form of organization. By adding larger FMIS and smaller AMIS to our database, we were able to increase the number of medium-sized irrigation systems where we could do a side-by-side comparison to complement the earlier data that we had coded. Given the support of the Ford Foundation, we were able to visit 80 systems, fill in missing data, corroborate the coding we had done earlier, and add new systems. Much to all of our relief, we found that our earlier coding had been quite accurate and that adding new systems only strengthened the relationships we had found earlier and did not weaken them (see Lam, 1998).

With the hard work of many colleagues at the Institute of Agriculture and Animal Science in Chitwan, we have added still further cases to the database. We have now analyzed information on the structure and performance of 231 irrigation systems (183 FMIS and 48 AMIS) in Nepal (see Joshi et. al., 2000). Since we have undertaken a lot of statistical analysis through the years, I won't bore you with many tables and figures. There are, however, some important facts that have been consistently found in our studies (see Ostrom, Lam, and Lee, 1994; Ostrom, 1996; Sowerwine et. al., 1994; Shivakoti et. al., 1997; and Shivakoti and Ostrom, 2002).

What we have consistently found through all of our analyses is that FMIS generally achieve higher levels

³ The NIIS database is currently located at the Institute of and Agriculture and Animal Science in Chitwan and at the Workshop in Political Theory and Policy Analysis, Indiana University, in Bloomington, Indiana. Many faculty and graduate students at both institutions have devoted substantial time and effort to acquiring accurate and valid information about many irrigation systems in Nepal. We are all indebted to the many farmers who have spent long periods of time with us in the field telling us about the history and operation of their system as well as many Department of Irrigation staff members who have shared information and insights with us.

of performance than AMIS in regard to the following performance variables:

- (1) The physical condition of the system—how well maintained is the system given the type of headworks and canals in use?
- (2) The technical efficiency of the system—of the water that reaches the head end of a system, what proportion reaches the tail end?
- (3) Agricultural productivity—what is the cropping intensity achieved on a system?

Further, we have consistently found that FMIS are more capable of getting water to the tailenders of a system. Of the FMIS included in our analysis, for example, 53 percent are able to deliver adequate levels of water in a predictable fashion to the tail end of their systems while only 11 percent of the AMIS have a similar record (Joshi et. al., 2000).

How is this consistently higher performance possible when most of the AMIS have iron and steel head gates, cement-lined canals, and all the advantages of modern technology? Even controlling for the size of a system and the slope and other relevant physical characteristics, FMIS consistently outperform AMIS in Nepal. One finding that we have come across helps us understand perhaps how this all happens. We have the rather intriguing finding that systems that do *not* have permanent headworks have higher performance records than those systems with modern cement and steel headworks. On the other hand, we find modernized systems with fully-lined canals do have high performance. Why this difference?

Having been on a number of FMIS and talking with colleagues who have attended the annual meetings of such associations, we think we understand why this may be the case. There appears to be two basic reasons: the internal dynamics among farmers related to water distribution, and the importance of getting water to the tail end. These two are related.

It would appear that on many of the AMIS—even though the headworks is a modern control structure—the system was not developed with an effort to clarify the existing water rights and management regime of various farmers. The government, or a donor, built the system and then presumed that the farmers would figure out how to distribute the water. Given that a substantial amount of labor is saved by the installation of permanent headworks as contrasted to the need to construct and reconstruct traditional headworks frequently, farmers on such a system do not have to confront one another every spring to discuss how they are going to repair or even produce entirely new headworks in order to get any water at all.

I do not have to tell the people in this room the importance of the annual meetings that occur on FMIS to discuss relative allocations of water and labor duties. On most FMIS, farmers near the head end do not have enough labor to be able to maintain the system year after year. The headenders need the tailenders. Thus, the tail-end farmers have some real voice on these systems. We consistently find that when high labor requirements exist, water tends to be distributed more equitably between the head- and tail-end farmers.

On AMIS, where maintenance requires much lower labor contributions from the farmers, the head-end farmers no longer need the labor contributions of the tailenders. This enables those who are in the physically most advantaged situation—the headenders—to be sure their fields are thoroughly watered before they let any water pass on down the canal. Thus, on these systems the proportion of tail-end farmers who receive water in the dryer seasons (the non-monsoon seasons) is much smaller. Thus, one of the major recurrent patterns is that those farming near the head end of an AMIS obtain a larger proportion of the water. Those farming near the tail end receive a smaller proportion. The overall cropping intensity and productivity for the system is thus less.

The findings regarding the lining of canals are also related to getting the water to the tail end of the system. When the canal is lined, it ensures that a larger proportion of the water gets to the tail end. Thus, lining canals has helped tail-end farmers, while building modern headworks has led to an internal dynamic among the farmers that has harmed the tail-end farmers. Of course, no necessary relationship exists between the type of headworks and reduced productivity. Everyone here knows, however, that the way farmers relate to one another, manage their own affairs, and allocate their own water affects overall productivity. Since water fees are not uniformly collected and used to manage the system from which they are collected, no one “needs” the inputs of the tail-end farmers. Without being needed, their interests can be ignored.

Well, what do we learn from all of this? One lesson I hope we are sure to learn is that we cannot be smug and self-satisfied. Not all FMIS operate as well as others. Some have failed totally. Some systems have succeeded for long periods of time before breaking down. On average, however, farmers do a much better job of governing and organizing on their own systems than government officials do on their systems.

Further, we cannot assert that mud and wooden dams will always be more efficient than modern engineered works. It is not the modern engineering that leads to a reduction in productivity but rather the primary focus on physical capital and absence of a focus on social capital (see Uphoff, 2002). All too many farmers in Nepal face a three- to five-month period every year of hunger. All too many of their families are not able to get a decent education or reasonable health care. Thus, if improvements in physical capital were matched with the recognition of prior social capital and efforts to enhance future social capital, the negative relationship between modern headworks and performance could be reversed.

Achieving a higher standard of living without losing some of the strong capabilities of self-governance is a major challenge. To do so, however, requires listening to farmers in the first place and gaining information about their needs, their property rights, their ways of governing irrigation, and facilitating their plans for ways of managing improved physical capital. For some engineers who pride themselves on their technical training, the idea of listening to farmers who have much less formal education is an anathema. The farmers, however, have much more local knowledge about the biophysical conditions in their region. And, if they have managed their own system in the past, they know what kind of property rights and duties have been established in the past that need to be taken into account in any effort to “modernize” a system. An effective irrigation system is not just an accumulation of good physical capital. No physical plant runs effectively anywhere in the world without a build up of social capital among those operating the systems.

When donors speak to me about increasing the democratic process in Nepal and other countries, I immediately think of enhancing the capability of FMIS and forest-user groups. Some outside interventions have, however, endangered these democratic institutions by ignoring them or presuming they did not exist. Where they have survived, however, they are a solid foundation on which to build broader-based democratic institutions (so long as we do not confuse party dominance of an electoral process with a democratic process). True democratic processes allow individuals from all walks of life to perceive and articulate the problems that are most important to them and find ways of overcoming them. The farmers of Nepal have for many centuries found ways of solving some of their problems relatively well by associating, sharing knowledge, getting technical information where relevant, and monitoring government to be sure that it is honest, fair, and efficient. FMIS, and the FMIS Trust in particular, will play a major role in the democratic process in Nepal well into the future.

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