



Economy and Environment Program
for Southeast Asia
22 Cross Street #02-55
South Bridge Court
Singapore 048421

Phone : (65) 6438 7877
Fax : (65) 6438 4844
E-mail : hfrancisco@idrc.org.sg
Web site : www.eepsea.org

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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Community Management Of Water Resources – A Case Study From China

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China faces a growing water shortage problem. To help policymakers tackle this significant challenge, a new EEPSEA study has assessed one of the country's key water management initiatives: Water User Associations (WUAs). WUAs are user-based, participatory organizations that manage and conserve a village's irrigation water. The study is the work of Dr. Shun Wang from the Department of Economics at the →

**A summary of EEPSEA Research Report No. 2010-RR8: 'Social Capital, Local Government, and the Management of Irrigation Systems in Northwest China' by Dr. Shun Wang, Department of Economics, University of British Columbia, 997 - 1873 East Mall, Vancouver, BC, Canada, V6T 1Z1.
Tel: + 1-778-3712727
Email: swangubc@hotmail.com**

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The map of Gansu province in China

→ University of British Columbia.

The study finds that there has been relatively poor implementation of the WUA policy in China. The main reason for this failure is the fact that local government agencies have not been effective at involving water users properly. The study recommends that more should be done to incentivize and improve the performance of local government officials to involving water users in managing the resource. The study also finds that stronger communities that have more 'social capital' often enhance the operation of WUAs; it recommends ways in which this can be capitalized upon.

The Water Shortage Challenge

The shortage of water in China has been identified as one of the main obstacles standing in the way of the country achieving its environmental

and poverty reduction goals. To cope with the problem, the Chinese government has invested a lot of money to develop new water resources. Over 100 billion US dollars has been spent on this work since the 1950s. However, this huge investment has not proven to be as effective as expected.

In response to the systemic failures of supply-oriented water projects, China's government began to implement water management reform in the 1990s. This reform was based on the principle that organized and empowered farmer communities should manage irrigation systems. One aspect of this work has been the development of Water User Associations (WUAs).

As said, WUAs are defined as water user-based, participatory organizations that are set up to manage a village's irrigation water.

They are organized to provide services according to users' preferences and demands, with users involved in the construction, operation, and maintenance of infrastructure and water allocation. By 2006, more than 20,000 WUAs had been formed in over 30 provinces in China.

Why are WUAs not Working?

Unfortunately, WUAs have not been as effective as hoped. Among the factors that have caused this poor performance is the fact that it is still local village committees and water officials who tend to determine the actual management structure of WUAs. Government officials do not seem to understand the importance of water users' participation in the management of WUAs. They are also reluctant to transfer power to water users.

Despite the poor performance of WUAs, the Chinese government is still trying to develop more of these associations to better manage irrigation water. This makes it vital to examine the WUA policy in order to find ways in which it can be made more effective. Better management would reduce the agricultural use of water so that more water could be allocated to protect the environment. This is important especially in arid and semi-arid areas where the environment is very fragile.

To shed further light on this problem, this study assesses the performance of the WUAs. It also looks at villagers' perception of the WUAs. It then assesses the impact of social capital and the quality of local government on the performance of the WUAs and villagers' perceptions of them. The study also

implementation of the WUAs.”

looks at the interaction of awareness and social capital to see if social capital has more impact on the performance of WUAs when villagers were aware of the existence of WUAs. Social capital is defined as the social connections among individuals and the levels of reciprocity and trustworthiness amongst them. In other words, it is one measure of the strength of a community.

Awareness of WUAs in the Research Area

The fieldwork for this research was conducted in the river basins of the Yellow, Shiyang, and Heihe rivers in Gansu Province. Gansu Province lies in Northwest China. It was chosen as the research area for three reasons: First, the province was one of the first to move from the traditional water management approach to WUAs. Second, it is one of the districts that experiences great shortages of irrigation water. Third, the environment in the province is very vulnerable and sensitive to water overuse. For example, the Minqin Oasis at the end of Shiyang River becomes a desert if there is not enough water in the river.

To gather information, the study used a household survey, which involved 690 carefully selected respondents in 275 villages. To serve as enumerators, 12 senior undergraduate students and graduates were recruited from Lanzhou University. Classroom lectures were held to familiarize them with the research topic, relevant theories, and the household questionnaires.

In the research areas, many villagers were not directly involved in the management of the WUAs.

Awareness of the existence of WUAs was therefore used as an indicator for the villagers' influence on WUA management. Awareness was important because if the villagers did not know about the WUAs they would have no chance of influencing water management. If households were aware of the existence of WUAs, they were expected to influence the management of the WUAs through the election of village leaders, who were also the heads of the WUAs.

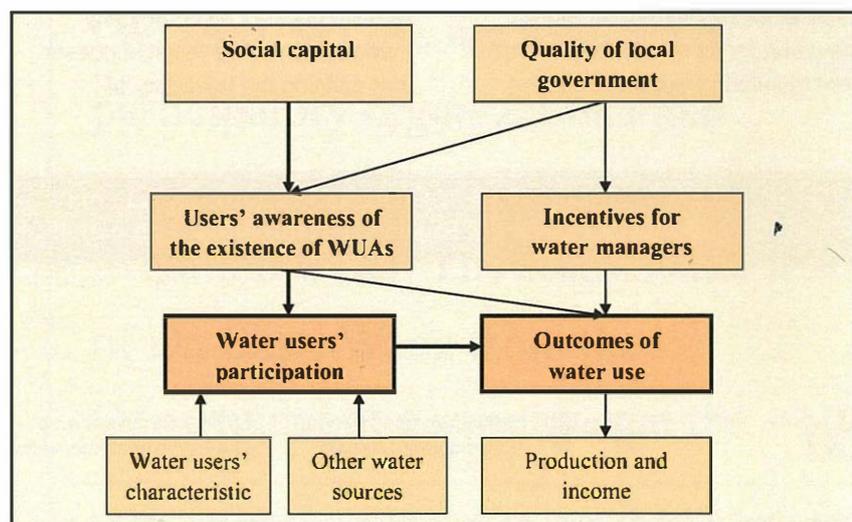
To gauge the level of social capital in each village, respondents were asked to what degree they agreed or disagreed with a number of statements regarding the trust they placed in other villagers, for example: "I can trust my neighbors to look after our house when we are away". In a similar way, to evaluate the performance of local government, villagers were asked to what degree they agreed or disagreed with a number of statements about the performance of local government agents, for example: "Our village leaders can resolve conflicts among

village members in a fair manner".

Assessing the Performance of WUAs

Six indicators were used to measure the performance of WUAs. These included the amount of water villagers used (compared to a specific target level), the time spent monitoring water distribution, the time spent maintaining canals and the proportion of villagers who delayed paying water fees. Villagers' awareness of the WUA's, their satisfaction with the current water management organizations and their satisfaction with water distribution were also assessed.

Information was also gathered on a range of irrigation issues that are linked to the performance of WUAs. These included the frequency of weather shocks, the distance to irrigation water sources, the condition of sublaterals canals and villagers' knowledge of new irrigation technologies. It should be noted that the research faced some practical challenges when it came to collecting information. Primarily, it was



Analytical framework

impossible to make an estimate of household water use due to a general lack of meters.

The Impact of Local Government

The report shows that there is poor implementation of WUA reform in China. This is indicated by the fact that the majority (69%) of the villagers in the survey were not aware of the existence of WUAs even though WUAs in their regions were already nominally formed. This confirms the general impression that in some areas, WUAs are formed in name only. The only change when they are set up is that village leaders get the extra title of WUA manager. However, the water users themselves are not even aware that these WUAs exist.

The report shows that the quality of local government has a big effect on villagers' perceptions of WUAs. The better the quality of the local government, the more aware local villagers are of WUAs and the greater their satisfaction with water distribution. Overall, it is clear that the quality of local government is the main determinant of users' awareness on the existence of WUAs.

Moreover, the quality of local government has a direct positive effect on the performance of WUAs. For example, it is clear that the quality of local government has a strong impact on the amount of time spent monitoring water distribution.

This is a relatively straightforward relationship, since the government directly organizes some monitoring activities.

These combined findings suggest that a more responsible local government not only makes a direct, positive contribution to the performance of WUAs, but that it also affects performance by increasing awareness among community members. These combined facts suggest that responsible local government can make a significant positive contribution to the performance of WUAs.

The Impact of Social Capital

The impact of social capital is less clear-cut. Higher social capital leads to a lower proportion of villagers delaying the payment of fees only if villagers know of the existence of a WUA. Similarly, if villagers are aware of WUAs, then higher social capital results in less water being used. Social capital had no effect on household members' awareness of the existence of WUAs.

The results suggest that social capital can improve the performance of WUAs, particularly where villagers are aware of the associations. However, the study also finds that only the trust that exists in densely-connected communities has a significant effect on community management. This result suggests that defining the boundary of

common pool resources at the village level will be a very important step to maximize the impact of social capital.

Local Government Must be Improved

The study shows that local government needs to do more to implement WUA reforms and transfer power to users. For example, it should be a relatively simple task for local government officials to assemble villagers and introduce them to the WUAs. However, many government officials have not been doing this. This failure points to the need to give local government officials incentives. It also highlights the need to select more responsible government officials who recognize the importance of the WUA programme and the value of user management of resources. Some literature on grassroots democracy in China shows empirical evidence that holding elections is one way to improve local government performance.

The outcome of this study will help officials to improve the implementation of water management reform and the efficiency of water use. This should help reduce poverty and improve the water users' welfare in the countryside. Moreover, the move should also mitigate the negative impact of agricultural water use on the wider environment.

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