

# Participatory Irrigation Management: Issues from Contemporary China

*John G. Taylor<sup>1</sup>*

## Context

Water shortage is probably the single most important problem currently facing China. Water shortage is beginning to have a serious impact on development in the northern part of the country, where the water overdraft is currently estimated at 30 billion m<sup>3</sup>/year. In the north, approximately one-third of the population lives under conditions of "absolute water scarcity."<sup>2</sup> Water usage will rise by 60 percent by the year 2050, as an increasing proportion of the people becomes urban dwellers.<sup>3</sup> Similarly, water shortages threaten food production. Reassuring statistics indicating that China is maintaining its area of cultivated and irrigated land are misleading, since fertile land around eastern cities with a wet climate is being lost to urbanization and replaced with less-fertile land in the arid west, where irrigation will be imperative. Proposed plans to transfer water from surplus areas in the southern to northern areas will be largely palliative and cannot provide a sustainable solution.<sup>4</sup>

In this situation, reform of irrigation management is becoming increasingly important for saving water in irrigation. Farmer participation in irrigation-system management or participatory irrigation management (PIM) has been developed as one of the key means for improving irrigation management.

In working on water projects in several provinces in China in recent years, we have been able to observe the development of PIM. Additionally, in a recent research examining linkages between environmental improvement and poverty reduction in World Bank projects,<sup>5</sup> the impact of water user associations (WUAs) on poverty levels and living standards was examined for several counties in the Hunan Province.

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<sup>1</sup>Professor of Politics, South Bank University, London.

<sup>2</sup>See Gavin McCormack 2000.

<sup>3</sup>This estimate is taken from Holland 2000.

<sup>4</sup>For a detailed and comprehensive assessment of the south-north transfer proposals, see Warren 2001.

<sup>5</sup>John G. Taylor et al. Forthcoming.

This presentation will briefly outline some conclusions drawn from observations. Hopefully, these will have some relevance for IWMI's objective in this project of assessing the role of managerial, institutional and governance factors in "pro-poor" interventions in irrigated agriculture.

Four topics will be covered in this presentation:

1. Background to the development of PIM in China.
2. Development of PIM in China
3. The Impact of WUAs in China—a short summary
4. PIM and Poverty Reduction<sup>6</sup>

## Background

A few details on the background of irrigation management in China are given in the following bulleted points:

- Water prices in China are too low to cover the costs of water, resulting in inadequate maintenance and deterioration of irrigation systems.
- Water charges collected are often used for purposes other than irrigation operation and maintenance, discouraging payment of water charges.
- Management of irrigation systems is fragmented between levels of government administration, rather than being unified on the basis of hydraulic units.
- Water charges paid by farmers are levied on an area basis (by mu), and not by volume. This discourages efficient water use and leads to waste.
- Inadequate farmer participation and ownership contribute to low irrigation management efficiency, conflicts between water users, and low collection of water charges.
- Lack of a clear, legal, quantitative water rights system results in insecurity for water users, thus discouraging farmer investment in more efficient technology and water management.

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<sup>6</sup>In examining these issues, I have benefited considerably from discussions with Richard Reidinger, Lead Agricultural Economist, World Bank, Beijing, with Dr. George Radosovich, President of Resources Administration and Development International, Bangkok, and additionally with Dr. Chen Shaojun, National Center for Resettlement, Hohai University, Nanjing.

- Lack of effective water licensing and controls over abstraction results in unrestricted use of groundwater in water-short areas, contributing to water shortages, overdraft of groundwater and falling water tables (notably in North China).<sup>7</sup>

These problems, of course, are not particular to China. Elsewhere too, there exists inadequate cost recovery, poor maintenance, declining infrastructure, poor-quality irrigation services, reductions in irrigated areas, and falling output resulting in farmers' dissatisfaction and unwillingness to pay water charges, the "vicious circle" presented in the project proposal. The transfer of management of irrigation from government bureaus to farmer organizations in China and elsewhere has aimed to break this cycle by:

- reducing costs to government
- increasing productivity, efficiency and profitability of irrigation management
- relating irrigation management more adequately to the actual needs of water users.

### **Development of PIM in China.**

In China, WUAs were first piloted in World Bank (WB) projects in the Hubei Province (in the WB Yangtze Basin Project, 1994–2000). Management was transferred to farmer "water user" groups, with responsibility for local irrigation distribution networks. These formed part of a new concept, Self-Financing Irrigation and Drainage Districts (SIDDS). SIDDS are implemented through water supply corporations (WSCs) and WUAs. The WSCs and WUAs replace existing diverse authorities such as local water resources bureaus, water management stations and townships. The WSCs operate and maintain reservoirs and branch canals, with the aim of providing and regulating supplies of water to farmers grouped in WUAs. The WSCs, owned and funded by water users, sell water to WUAs, based on equitable and accurate standards, aiming at recovery of capital and operating costs. Water is purchased according to the number of cubic meters used and the WSC measures water deliveries at the WUA at the lateral head. Water deliveries to the WUAs by the WSC are regulated by water sales agreements between the two parties, specifying the rights and responsibilities of both. Because water deliveries are charged by volume, farmers in the WUAs have an incentive to use water more efficiently and less wastefully. WUAs collect water charges from their members and buy water from the WSC for their members based on water demand. WUAs are responsible for the design, construction, maintenance and management of water delivery at the farm level. They are registered as legal entities, and can contract, lease or auction the operation of canal maintenance.

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<sup>7</sup>For a discussion of these issues, see Reidinger 2001.

Thus far, in China, approximately 250 WUAs and 17 WSCs have been established in eight provinces. They have been supported by the Ministry of Water Resources,<sup>8</sup> and the current drafting process for the new Water Law is seeking ways to further extend their introduction and operation.

## The Impact of WUAs

In most of the areas in which they have been introduced (and particularly in the Hunan and Hubei Provinces) WUAs have resulted in marked improvements, notably in:

- reducing wastage
- improving canal maintenance
- improved designs from farmers for physical rehabilitation
- fewer crop failures due to more efficient water use
- economies of scale generated through group action
- reduced flooding
- improvements in soil conservation.

They also appear to have led to a reduction in water costs to farmers although only limited investigation has been undertaken of this area.<sup>9</sup> Similar trends were documented in a more extensive survey of SIDDS undertaken in the Tieshan Irrigation District, Hunan, June 1998.<sup>10</sup>

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<sup>8</sup>See the Policy Circular of the Ministry of Water Resources to Provincial Water Resource Bureaus, 28 July 2000.

<sup>9</sup>For example, in WUAs visited in four counties in Hunan by a World Bank mission in July, 2000, the cost of water to farmers had fallen, on average, from 40 to 32 *yuan per mu* since the setting up of the WUAs in 1996 (compared with no reductions in nonproject villages).

<sup>10</sup>See "The First Phase Evaluation on Performance of Self-Financed Irrigation and Drainage Districts and WUAs in Tieshan Irrigation District, College of Water Resources, WUHEE, June 1998.

## WUAs and Poverty Reduction

However, in addition to these efficiency dividends, the introduction of WUAs seems to have had further results, important for developing improved frameworks for poverty reduction. We were able to examine these briefly during field visits to WUAs in Longhui County, southwest Hunan, as part of a recent (April 2001) project<sup>11</sup> assessing the experiences of the World Bank in attempting to establish linkages between environmental improvements and poverty reduction in recent projects.

Thus, from the "pro-poor" perspective, the following results are seen:

- The creation of WUAs has been important in ensuring a regular, guaranteed supply of water to farmers, who then allocate water equitably through the user associations. This contributes to improved productivity and security, reinforced by the introduction of legal rights to water. Thus, the fundamental issue of security is addressed.
- The implementation of WUAs has resulted in a marked reduction in the number of disputes over water.
- Additionally, the operation of WUAs has been important in building capacity for increased farmer participation in decision making. WUAs are democratic organizations with elected executives responsible for implementing farmers' choices in the use and distribution of water. During site visits to Longhui County, for example, farmers described in detail their involvement in the short-listing of local candidates based on their expertise, and their organization of the ballot for chair and executive committee members.

Such improvements in security and participation are important bases for addressing poverty but, from our observations, it appears that WUAs may also contribute in more direct ways to poverty reduction.

### For example:

In many WUAs visited, water executives consulted with their members on deferral of water payments by poor households. These related particularly to households in which elderly people had little or no family support, to single-parent families, and to households in which migrants had been unable to return remittances.

In resource-constrained poor areas, time formerly devoted to waiting for water, collecting water, and digging wells could now be put to more productive uses. In most villages, farmers interviewed cited newly available labor time as the main reason for increases in productivity and diversification.

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<sup>11</sup>See "Environment-Poverty Linkages....," footnote 5.

Additionally, in many villages, women now have more time available. They no longer have to perform their traditional role of guarding irrigation channels during periods when they estimated that water would be released from upstream villages. Guarding was no longer necessary, since households no longer had any need to fight for water, given the agreed responsibility of the WUA to deliver agreed shares of water on a regular basis.

Indebtedness previously incurred during drought periods had largely disappeared, and the absence of drought had also contributed to increases in productivity.

Improvements in security had led to increased male migration from poor villages, resulting both in increased incomes and, in some areas, greater participation by women in WUAs.

Clearly, these results, based on a brief assessment of a small area, cannot provide any basis for generalization. However, they do indicate that the promotion of WUAs in the interests of dividends in efficient water use appears to have facilitated the development of enabling frameworks for poverty reduction, and to have contributed directly to reducing, in limited ways, some of the adverse effects of poverty. Additionally, they appear to be similar to conclusions reached by researchers working on WUAs and poverty reduction in other regions and countries.<sup>12</sup>

There are, of course, problem areas. Despite World Bank calculations, in all areas visited in our research, whilst farmers could meet operation and maintenance costs, they all felt that they would have difficulties in meeting longer-term capital costs. Additionally, whilst the establishment of WUAs requires a strong commitment from county and township governments, it was clear that, in many areas, only a limited capacity had been built for this.

This reinforces the need for further research into the impact of WUAs. Currently, there is an increasing recognition amongst Chinese researchers and practitioners that forestry management committees and watershed rehabilitation management groups can improve both levels of efficiency and participation, and have the potential to contribute to poverty reduction. It is surprising that research has thus far not attempted to establish this in the case of WUAs, where such links can also be found.

<sup>12</sup>For an outline of some recent work in this area, see, for example, Frank Rijsberman, "Poverty and water management for agriculture: Reflections on lessons for development policy." Presentation prepared for the 2nd Dutch Water Week, Noordwijk, October 2001. For assessments of participatory irrigation systems on issues such as household incomes, gender, participation levels, and equitable distribution, see (respectively): Chancellor and Hide 1997; Zwarteween 1996; Van Koppen 2000; and Bandaragoda 1999. For a thorough and detailed assessment of the introduction of WUAs in one region, see Raju 2001.

## Conclusion

In recent years, China has piloted a type of PIM reform, which seems capable of improving irrigation management by promoting farmer participation in system operation, maintenance and management. Thus far, WUAs appear to have produced benefits for farmers and, potentially for provincial and central governments through water savings, increased production, reduction in conflicts over water distribution, reduction in government expenditures, improvements in design and maintenance, and improved access to water. WUAs also appear to have contributed to poverty reduction. As such, they are worthy of further investigation in the interest of devising pro-poor strategies for demand management—one of our shared concerns in this project.

## Literature Cited

- Bandaragoda, D. J. 1999. *Institutional change and shared management of water resources in large canal systems: Results of an action research programme in Pakistan*, Research Report no.36. Colombo, Sri Lanka. International Water Management Institute (IWMI).
- Brown, Lester; and Brian Halweil. 1998. China's water shortages could shake world food security. *World Watch* 11 (2): 10-18.
- Chancellor, F. ; and J. Hide. 1997. *Smallholder irrigation: Ways forward*. Vols. 1 and 2, Report no. 136. UK: H.R. Wallingford.
- Hasnip, N. S.; J. Mandal; P. Morrison; and L. Smith. 2001. *Contribution of irrigation to sustaining rural livelihood*. KAR Project, Literature Review. UK: HR Wallingford.
- Holland, Lorien. 2000. Running dry. In *Far Eastern Economic Review*, February 3<sup>rd</sup>, pp.18-19
- Liu Changming. 1998. Environmental issues and the south-north water transfer scheme. *China Quarterly* no.156. December.
- Lohmar, Brian; Jinxia Wang; Scott Rozelle; Jikun Huang; and David Dawe. 2001. Investment, conflicts and incentives: The role of institutions and policies in China's agricultural water management. Duplicated.
- McCormack, Gavin. 2001. Water margins: Modernity vs. sustainability in China. Australian National University. Duplicated.
- Ministry of Water Resources, Government of China (with the Institute of Water Resources and Hydropower Research). 1999. Study on real water saving. World Bank Financed Research Project no. 7107256 (Draft).
- Nickum, J. 1998. Is China living on the water margin? *The China Quarterly*, no. 156. December.
- Raju, K. V. 2001. Participatory Irrigation Management in Andhra Pradesh, India. Paper based on a study commissioned by the Indian Network for Participatory Management. Duplicated.
- Reidinger, R. 2001. Water saving through participatory irrigation management reform: Self-financing irrigation and drainage districts in China. Paper presented to the International Seminar on Water Saving Agriculture, Beijing, January.
- Rijsberman, Frank. 2001. Poverty and water management for agriculture: Reflections on lessons for development policy. Paper presented to the 2<sup>nd</sup> Dutch Water Week, Noordwijk, Netherlands, October 9<sup>th</sup> -10<sup>th</sup>.



- Smil, Vaclav. 1998. China's energy and resource use: Continuity and change. *China Quarterly* 156:938-951. December.
- Taylor, John G.; Li Xiaoyun; and Wang Haimin. Forthcoming. Environment-Linkages in World Bank environmentally-related projects in China.
- Van Koppen, B. 2000. Gendered water and land rights in Burkino Faso. In *Negotiating Water Rights*, ed. B. R. Burns and R. Meinzen-Dick.
- Warren, S. C. 2001. The proposed south-north water transfer scheme in China: Need, justification and cost. Report for *World Wide Fund For Nature*.
- Zwarteween, M. Z. 1996. *A plot of one's own: Gender relations and irrigated land allocation policies in Burkina Faso*. Research Report, no.10. Colombo, Sri Lanka: International Irrigation Management Institute.