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From principles to localized implementation: villagers' experiences of IWRM in the Shiyang River basin, Northwest China

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From principles to localized implementation: villagers’ experiences of IWRM in the Shiyang River basin, Northwest China

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Understanding perceptions of resource users and influencing factors that affect these perceptions has significant value in evaluating the success or failure of IWRM (integrated water resource management) reforms. This article explores villagers’ experiences of China’s recent powerful enforcement of IWRM and the locally perceived impacts through three in-depth case studies. Results show that neither villagers’ perspectives nor the implementation processes and outcomes are monolithic. Political trust plays a key role in shaping villagers’ perspectives and responses towards IWRM, which is constantly shaped and reshaped by understanding, experiences and negotiation among different stakeholders in the embedded physical, socio-economic and political environment.

Keywords: villagers’ perspectives; political trust; IWRM; Shiyang River basin; China

Introduction

Sustainable water governance is essential for society, but remains a formidable challenge across the world (Biswas & Tortajada, 2010). Over the past few decades, the water management paradigm has progressively shifted from the traditional “hard path” approach to a “soft path” (Gleick, 2003), combining equitable pricing, decentralization, participatory decision making and environmental protection. Integrated water resources management (IWRM) is a process that promotes coordinated development and management of water, land and other related resources to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (GWP, 2000), and with a special focus on the critical role of public participation.

Scholars argue that public participation will better adjust government intervention strategies to local contexts, increase rate of adoption, reduce management costs and transform adversarial relations into partnerships (Reed, 2008; Susskind, 2013). However, the involvement of stakeholders cannot automatically achieve these objectives (Meinzen-Dick, Raju, & Gulati, 2002), which to a large extent depend on the processes that lead to it (Reed, 2008; Yu, Lora-Wainwright, Edmunds, & Thomas, 2013). More specifically, improving irrigation management requires understanding and management of multiple stakeholders and the synergies among them throughout the implementation process, which directly influence the implementation and outcomes of IWRM. Therefore, to understand and assess local IWRM solutions, it is essential to explore different water users’ agendas.

However, most IWRM studies have focused on the discussion of potential implementation challenges and outcome assessments from outsiders’ perspectives.
Notably, there are practical concerns about its wider applicability, suggesting that it has been developed in the West and may not easily transfer to the developing world (Biswas, 2008; Grigg, 2008; McDonnell, 2008; Nesheim et al., 2010; Swatuk, 2005; Bandaragoda & Babel, 2010). To the authors’ best knowledge; there is little in-depth analysis of empirical evidence to date on public understanding of IWRM principles, implementation processes or impacts, based on insiders’ understanding, in China.

IWRM was written into China’s 2002 Water Law and since then has become a general policy framework for water management. However, although the literature emphasizes the roles of local stakeholders, contexts and scales in water governance (Ostrom, 1990), in China as in most other countries, both water policies and research on IWRM take a national or regional rather than a local perspective. In practice, the incentives for and the processes and impacts of IWRM reforms vary considerably among different actors, households, communities and villages in diverse socio-economic environments. More importantly, implementation of IWRM in these contexts can be severely restricted if key factors influencing those who are carrying out IWRM processes remain overlooked (Goldin, Rutherford, & Schoch, 2008). Agrawal (2001) classifies factors impacting resource governance into four categories: characteristics of resources; of users; of institutions; and of the external environment. This article focuses on characteristics of institutions and environment, and more specifically how the factor of political trust affects people’s perceptions and reactions in the water management process.

The crucial role of political trust in managing natural resources, including water, land and forest, has received much attention (Abers, 2007; Breetz, Fisher-Vanden, Jacobs, & Schary, 2005; Leahy & Anderson, 2008). Much work has been done regarding how trust in either institutions or regulatory actors affects people’s attitudes and responses (Brunk, 2006; Priest, Bonfadelli, & Rusanen, 2003). There is a general consensus in the literature that trust in management agencies or government can help increase participation and cooperation, bringing public support of policies and decisions without coercion (Manion, 2006; Sharp, Thwaites, Curtis, & Millar, 2012; Shi, 2001), while distrust induces doubt, uncertainty and even resistance (Shindler, Brunson, & Stankey, 2002) which can threaten the regime and its principles. Others (Goldin, 2010; Juntti & Potter, 2002; Mariola, 2012; Wade, 1988) argues that the performance of natural resources management systems depends on local trust in officials, and that the bigger the system, the more crucial trust is. Leahy and Anderson (2008) also suggest that in the United States trust has severe implications for quality and durability of natural resources policies, while Goldin (2010) suggests that distrust between the public and government is an entrenched obstacle to water reforms in South Africa. Mariola (2012) proves that trust helps water quality programmes succeed through making information more credible to farmers and making projects more acceptable and efficient. Parkins and Mitchell (2005) similarly show a clear relationship between trust and participatory governance of natural resources. However, despite the growing body of literature on the significant role of political trust in the success and sustainability of natural resources management, little has been reported on China.

A number of studies have discussed Chinese villagers’ political trust in government (Li, 2008; Manion, 2006; Shi, 2001; Yan, 2010; Yang & Tang, 2010). There are two major contrasting views. One is that the Chinese government has managed to maintain a high level of political trust despite all the changes over the past few decades; the other argues that public trust in government, especially amongst villagers, has declined over the years. More specifically, O’Brien (1996) and Li (2010) for example have describe the political trust of villagers as divided, which means that people attach different degrees of trust to different government levels, with a generally higher rate of trust in central government and
distrust in local government. Political distrust in local government tends to make villagers uninterested in participating in conventional political activities and adopt aggressive political behaviour (Yang & Tang, 2010). As yet, however, there is no empirical research in China on the role of political trust in accepting and implementing government water policies, more specifically IWRM policies, particularly at the local level.

To fill this gap, the crux of villager–state relations and the role of political trust in IWRM processes and outcomes are the centre and original contribution of this article. Although based within the socialist authoritarian context of rural China, the problems discussed here are not unique to China, and thus the findings of this article should have valuable implications for water governance and IWRM agendas in other regions and countries with similar water-related problems.

**Study area and research methods**

The study was carried out in the Shiyang River basin (101°41′–104°16′E, 36°29′–39°27′N), in Gansu Province, Northwest China (Figure 1). It covers an area of 41,600 km² and has a population of 2.27 million. Surrounded by the Badan Jairan and Tengger Deserts, the area has an arid continental climate with low, erratic annual rainfall and high evaporation. It is divided into three climatic zones: (1) the southern mountain area, with an elevation of 2000–5000 metres above sea level, average annual rainfall of 340–650 mm and evaporation of 720–1200 mm; (2) the middle arid and semi-arid region, with an elevation of 1500–2000 metres, average annual rainfall of 160–340 mm and evaporation of 2000–2200 mm; and (3) the northern arid zones, surrounded by deserts, with an elevation of 1300–1500 metres, less than 150 mm of annual rainfall and 2200–2640 mm evaporation.

![Figure 1. Location of the Shiyang River basin in Gansu Province, China.](image)
Agriculture remains the dominant means of livelihood and supports over 77% of the local population. Irrigated agriculture accounts for over 86.4% of all water use. Over the past few decades, through rapid socio-economic development and population growth throughout the basin, the water utilization rate in the basin has reached 172% (i.e. the ratio of actual water use to total water availability is 172:100). Good summaries of water exploitation history and the physical water problems in the area, including physical water shortage, groundwater over-exploitation with falling groundwater tables, land degradation, salinization and desertification, are given by Kang et al. (2004) and Ma, Wang, and Edmunds (2005), among others. These water problems have been increasingly threatening local people’s livelihoods, socio-economic development, stability and environmental balance (Ma et al., 2005). The area is a typical example of unbalanced water allocation between upstream and downstream water users, between society and nature, and between current and future generations.

In 2007, IWRM reforms were initiated in the Shiyang River basin aiming for more effective, equitable, and sustainable water management. A variety of officially designed IWRM policies have been enforced, including introduction of water rights, water pricing and compulsory irrigation quotas; shutting down pumping wells; reducing irrigated land area; and changing from traditional water-intensive agriculture patterns that are grain-based to new cash-crop-based patterns. For example, under the slogan of “2311” in downstream Minqin County, the official target is 2 mu of greenhouse, 3 mu of fruit trees, 1mu of water-efficient field crops and CNY 10,000 annual income per capita for every household (1mu = 0.067 ha; CNY 1 = GBP 0.1). IWRM policies provide the comprehensive framework and set the main official targets, while how these targets are met and the specific measures to achieve them are at the discretion of local governments.

Three villages, Wang, Wen and Xin, in the upper, middle and lower reaches of the river basin respectively, were chosen for in-depth case studies (see Figure 2 and Table 1). Because the study entailed a degree of risk for the people and villages investigated, pseudonyms are used for the villages to preserve anonymity. Both quantitative and qualitative methods were employed, including questionnaire surveys (162 participants), semi-structured interviews (100 participants; some key informants participated in both survey and interview), group discussion, participant observation and many casual conversations. Villagers were interviewed regarding their understanding of the four basic principles of IWRM, and the purposes and the actual impacts of IWRM policies. Key informants included village council members, community leaders and villagers. They were selected using a stratified and snowballing sample method.

**Understanding the IWRM concept: the four basic principles**

Villagers were questioned on their understanding of the four basic principles of IWRM, also known as the Dublin Principles (GWP, 2000). These are: (1) fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; (2) water is a public good and has a social and economic value in all its competing uses; (3) water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels; and (4) women play a central part in the provision, management and safeguarding of water.

**Principle 1 – water as a finite and essential resource**

Traditionally, water, especially groundwater, had been perceived as an infinite, open-access resource in China. However, Figure 3 shows that among 162 respondents, most...
(73.5%) agreed that water is a limited and vulnerable resource, while others (26.5%) showed disagreement. Perceptions differ among respondents from different villages (Table 2). It seems that people have a better understanding when they experience or perceive more serious water problems (Whitmarch, 2008). In addition, there is a distinct difference between villagers’ perceptions of groundwater and surface water. As one farmer (male, 55, Wen Village) explained, “For groundwater, the water table may fall one metre per year, but we can always dig deeper.” It seems that most interviewed villagers largely based their understanding on their experience. Other respondents believe that there will always be some groundwater because the water from irrigation goes directly back to the ground. This shows that some villagers are not well aware of the fact that their over-exploitative behaviour, especially for groundwater resources, will cause perceptible damage to local resources and environment. This is in line with the findings of Berkes (2002) and Pretty (2003) that villagers do not always have the knowledge to appreciate that their behaviour may be harmful even though scientific evidence and government

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<th>Table 1. Village profiles.</th>
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<td>Wang</td>
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<td>Population</td>
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<td>Average annual income per capita (CNY)</td>
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<td>Land area per capita in mu (actual/official)</td>
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<td>Official irrigation quota (m3/mu per year)</td>
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<td>Irrigation sources (GW = groundwater, SW = surface water)</td>
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Figure 2. Location of the case-study villages in the Shiyang River basin.
reports show that it is. The finding further suggests that external support from environmental NGOs, government agencies or other international organizations in finding effective ways to improve villagers’ collective consciousness and water knowledge base is urgently needed.

**Principle 2 – water as a social and economic good**

Regarding the social and economic nature of water, 73.5% of villagers expressed the view that any people using the state’s water for irrigation should pay for it. Despite the increased price of irrigation water, most villagers are very willing to pay for their irrigation uses. Actually, most villagers, including the poor, are more than willing to pay even more for better water services. For example, one villager (male, 46, Wen Village) commented, “If reasonably priced and correctly measured, we certainly would like to pay for our irrigation water uses.” It was also found that there is a difference between villagers’ willingness to pay, in the order from upper to lower reaches: Wang < Wen < Xin. Thus, people in the lower reaches, who are at a natural disadvantage compared to their upstream competitors, are more willing to pay for irrigation water. On the other hand, despite this general willingness to pay, villagers share much deeper concerns about irrigation-water prices, the calculation methods and the expenses of their water fees that are collected by the government and water agencies at lower levels. These concerns, together with a severe lack of transparency in ways of calculating water fees and the expenses of collecting them, have resulted in villagers’ distrust, which directly influenced villagers’ attitudes towards Principle 2. For example, as one villager from Wang explained, “I do not know how the amount of water fees is calculated by upper levels, or what they are for. All I do is to pay however much they ask for, as all my neighbours do.”

**Principle 3 – participatory water management**

Another key IWRM principle is participatory water management, for instance to increase public participation in decision making, management and supervision of water rights, water pricing and water allocation processes through organizations such as water user

| Table 2. Percentage of villagers aware of IWRM principles (total N = 162). |
|-----------------------------|-----------------|-----------------|-----------------|-----------------|
|                             | Principle 1     | Principle 2     | Principle 3     | Principle 4     |
| Wang                        | 66.7            | 70.6            | 88.2            | 25.5            |
| Wen                         | 70.6            | 72.1            | 83.8            | 45.6            |
| Xin                         | 86.0            | 79.1            | 60.5            | 44.2            |
associations (WUAs). Actually the WUA has been made a mandatory mechanism for irrigation management in the area studied. Villagers’ perspectives regarding public participation in water management show a general consensus in favour of participatory irrigation governance. However, analysis of qualitative data suggests that despite this general agreement, villagers have doubts about genuine opportunities for participation and its potential effectiveness. One farmer (49, male, Wen Village) argued: “How can they [officials] let us [farmers] participate and make decisions when they need to use it [water] to control us to do their bidding and pay their salary?” Another villager (55, male, Wang Village) went even further: “Everything has been officially fixed so there is nothing left for us to decide; that is why so few people are interested in participation even though there are fines for non-participation.” Elsewhere, Yu et al. (2013) show that participation incentives are directly related to the actual participation processes in a specific time and context. IWRM policies of decentralizing local irrigation governance by creating mandatory organizations such as WUAs have actually jeopardized potential participants’ interest in participation per se. The state and local governments have shown themselves to be powerful actors capable of penetrating to the lowest reaches of society and the finest details of water control; formal participation channels were in most cases ineffective.

The imperative link between water control and power is hardly new (Nickum, 2010), especially in a hydraulic setting such as China, with wide variation in water availability (Wittfogel, 1981). In the arid Shiyang River basin, which is heavily agriculture-based and with annual rainfall of around 200 mm, water control basically means absolute power over resource-dependent users. As one villager said, “If you control the water, you control us.” Thus, it is understandable that meaningful participation or empowerment of water users is not given any serious concern or priority despite the nominal prevalence of WUAs. Stakeholders are more interested in participating if they can have a real influence in water-related decisions and IWRM processes that directly influence their livelihoods, rather than official channels existing for nominal participation.

Principle 4 – central role of women
Women’s contribution in irrigation-related activities was generally not acknowledged. Some 61% of respondents showed disagreement about women’s roles in local water use and management. Part of the explanation is the tradition and the nature of local irrigation activities. Irrigation is considered a laborious men’s job, especially considering the poor condition of irrigation infrastructure in the past, for example dredging canals or damming manually. More interestingly, a clear difference was found between respondents from upper and lower reaches regarding women’s roles (Table 2). While most people from the upper reaches still consider women’s participation somewhat unnecessary, half of the respondents in lower-reach Wen and Xin agree that women should play and have been playing an indispensable role in local water activities. This difference can be explained by the different forms of irrigation management in the villages studied. In Wang, irrigation is managed by private contracts between male village leaders and hired labour, while in the lower reaches irrigation is managed as a common pool resource by collective action. Also, in the lower reaches where people perceive and/or are faced with more serious water problems physically and politically (for example, IWRM policies are carried out more strictly in downstream areas than upstream), most male family members have been forced to migrate away for off-farm employment, a process known as ‘feminization of agriculture’. This has unavoidably increased women’s roles and significance in agriculture and irrigation practices. In Wang, however, where people have a natural advantage of
better irrigation access with more irrigated land and less strict water policies, most men can still support their families by staying in the village and making agriculture their main livelihood. In other words, in upstream villages men still control irrigation-related activities, and this makes them believe that women’s participation or their roles in irrigation management are generally insignificant or unnecessary.

Perceived impacts of IWRM policies at the village level

The impacts of IWRM policies were also evaluated by informants in interviews and group discussion. The results show that from the villagers’ perspective, the impacts of IWRM policies can be categorized into three main aspects. Firstly, IWRM policies have increased government control of water and have also directly led to unreasonable irrigation schedules and inefficient water uses. For example, one respondent (male, 64, Wang Village) said:

The irrigation amount is not determined by us [villagers] or by how high the water fees are, but by the climate, crop types and soil situations here. Now, we do not know when and how much water we will get for the next irrigation, so most people are irrigating more and trying to irrigate whenever we have access, and this generates a lot of water waste rather than savings.

Villagers have been in a constant struggle caused by increasing irrigation instability, uncertainty and inflexibility. The direct result of too much water control is corrupt behaviour and illegal water use, locally called ‘strategies of survival’, ‘ways to get by’ or ‘making the best of an increasingly hard life as a farmer in a water-scarce community’ (author’s field note).

Secondly, most respondents agreed that IWRM policies had unavoidably decreased their agricultural income. For example, among 162 respondents, 63% said their income had fallen since the reform, 23% said it was more or less the same, and only 13% believed that it had risen. One respondent (female, 46, Wen Village) said, “Under the IWRM reform, half of my irrigated land area has been mandatorily reduced and abandoned to reduce water use without any compensation. My income has decreased, even halved.”

Another example is the policy of government investment in constructing greenhouses, which aims to transform traditional water-consumptive agriculture patterns into more profitable cash crops. To local villagers, this is a non-adaptive, top-down mandatory order for farmers to get irrigation access, and a waste of government investment and villagers’ own money. Although farmers are forced to finish these tasks, only a few of them would actually make use of the greenhouses or make any money from them. For villagers, local officials were just trying to carry out officially assigned tasks (IWRM policies), no matter how these adversely impact villagers’ livelihoods.

Thirdly, IWRM policies have in general adversely impacted local equity. A distinct and visible difference has been created between villagers and villages that know how to adapt and take advantage of favourable IWRM-based policies and those who do not. These policies include attraction of microcredit for construction of water-saving projects and government investment in construction and rehabilitation of infrastructures, while working the reform processes to minimize disadvantages. For instance, villages or teams which are relatively rich or well-connected can take advantage of whatever social networks (guanxi) they have with external authorities to attract more investment, opportunities and information, and facilitate localized IWRM policies towards their advantage, such as attracting project investment. In many cases, the IWRM process hurts the people who have the least capital (physical, natural, human, financial and social) to start with and have lost most of their lands that they mainly depend on. On the other hand, the ‘best players’, who know how to grab the opportunity and take advantage of local
policies, get richer, for example by obtaining government project money and ‘farming projects’ and acquiring better control of irrigation, either legally or illegally. IWRM reforms are not neutral. There are social, economic and political factors that determine the use and abuse of IWRM policies that are at the discretion of local governments and stakeholders. Local governments which value projects or officially set targets will understandably shift strategies towards short-term perceptible and quantifiable targets such as reducing the irrigated area and the amount of irrigation use, rather than long-term sustainability or people’s welfare. This also explains the pervasiveness of hidden agendas, selective implementation, and even manipulation and distortion of records.

Respondents were further asked to assess the general impacts of IWRM policies on a scale from 0 to 5, where 0 means “don’t know”, 1 is the poorest level and 5 means optimum performance. As shown in Figure 4, 43.8% of respondents see IWRM performance as low and 12.4% as very low (see also Table 3). The performance scores among different villages are also highly diversified. It seems that most villagers from upstream Wang see the performance of IWRM policies as between low and very low, while Wen villagers see it as low or average, and Xin villagers, from the very end of the river basin, regard it as high or very high. These patterns again indicate that perceived impacts of IWRM reforms are rather divided and more specifically localized. Being in different villages seems to have a very significant influence on villagers’ understanding of IWRM impacts.

One is, however, inevitably brought back to the issue of intentions, which can only be guessed at. It is understandable and even natural for affected populations to comment negatively on IWRM policies. We are faced with the problem of defining what the wants and needs of a diversified subordinate class really are. It is difficult to know whether the negative assessment of IWRM expressed by both upstream and middle-stream villagers is accurate, or if their intention was only to ‘be left alone’, or to attract more government investment and project compensation; and whether the relatively better feedback from the Xin villagers in the lowest reach is true or represents concerns about losing project support. However, it is these complexities that make the case interesting and demonstrate that water decisions remain mostly outside the control of those affected, though they have affected villagers’ livelihoods in significant and different ways.

Figure 4. Villagers’ scores of IWRM performance.
The role of political trust

The data show that political trust plays a pivotal role in shaping villagers’ attitudes towards IWRM. Villagers’ political trust is grouped into three categories: general trust in upper- and central-level governments; distrust of local government agents; and lack of trust in both central and local governments. Evidence confirms that most villagers still trust the government at higher levels, expressed for example as, “The bigger communist figures are the good ones, while the smaller communist officials at lower levels are corrupt, and as it goes down to lower levels, the situation only gets worse” (female, 47, Wen Village). As villagers see it, many of the IWRM policies do not come from the central government but are localized interpretations, distorted by local officials who aspire to implement vanity projects in order to gain rapid promotion, regardless of sacrificing villagers’ livelihoods. Villagers stated that they would support the policies more if they were made by higher-level government, which they believe is oriented towards their benefit. In contrast, local policies made by untrustworthy local officials have created more doubt and less support, and villagers believe that their incomes and welfare have been ignored. In line with findings on the crucial role of trust in local acceptance of policies (Ellis, Barry, & Robinson, 2007; Jones, Clark, Panteli, Proikaki, & Dimitrakopoulos, 2012; Mankad & Tapsuwan, 2011), this study shows that political distrust of local agents and their policies has obviously affected villagers’ understanding of and responses to IWRM.

Moreover, villagers who trust government at central and higher levels distinguish between the government’s good intentions and its actual capacity to implement IWRM reforms as planned or to monitor its local agents. Some emphasized that “upper-level officials do not know the actual situation; the village is too remote and the emperor is too far away” (shangao huangdi yuan); while other villagers argued that leaders from higher levels are aware of what is happening on the ground, but there is nothing they can do to make local agents do their exact bidding. Some respondents went further, stressing that from central to local levels, the government officials are on the same side and are all corrupt: “After all, officials are officials and civilians are civilians; officials always protect each other” (male, 61, Wang Village). It appears that people may perceive their relations with local government agents as either exploitative and coercive or supportive and cooperative, and this difference will largely influence their perspectives and responses towards IWRM policies and the actual implementation processes and outcomes of these policies in specific contexts. A general lack of political trust and a perceived exploitative relation between local officials and villagers has increased illegal behaviour such as corruption, water-stealing and over-exploitation of groundwater resources.

Uncertainty

Increasing uncertainty, caused by the external origin of IWRM policies in terms of their purposes, processes and impacts, is another key factor. This research shows that the
uncertainty is largely caused by communities’ lack of political trust, rather than a lack of knowledge (Ostrom, 1990). As some put it, “Nothing is certain apart from the official orders that these changes must happen at any cost.” Many respondents summed up their concerns by saying that these policies may neither benefit their community as a whole nor benefit them individually in the short or long term: “Nobody knows where all these changes will lead us. Officials come and go while we stay and suffer the consequences.”

It is quite common to find that most villagers are caught in a complex and uncertain situation or an ‘IWRM reform dilemma’. Water and land still lie at the root of villagers’ livelihood security. On the one hand, villagers welcome changes, especially considering the increasingly low profit margin that is caused by growing agricultural input and the constant threat of water shortage. On the other hand, they fear changes, more specifically the uncertain policies and outcomes that follow these changes, bearing in mind that they have little trust in local agents.

Villagers also claim that the local IWRM implementers frequently behave inconsistently, which is another source of uncertainty. They complain that on the one hand officials allege that their purpose is to conserve water for future generations; and on the other hand, when farmers are willing to pay more, officials will secretly agree, as if there is more water to sell, only at higher prices. In practice, these experiences and local officials’ inconsistent actions have fuelled villagers’ distrust in the allegedly well-intentioned IWRM policies. This has increased villagers’ perceived uncertainty, which in turn triggers responses of non-cooperation and even resistance towards local IWRM policies, in individual or organized forms.

Fairness

Fairness is another very important aspect related to political distrust. It has a significant influence on villagers’ attitudes and responses towards IWRM. Communities repeatedly stated that they were being treated unfairly, this being a key factor influencing their decisions on whether to accept or trust IWRM policies. As mentioned, not all communities are impacted in the same way. Conflict between upstream and downstream water users is nothing new. For instance, it was found that informants perceive significant unfairness between upstream and downstream residents. Upstream Wang villagers tend to believe that the dire water and environmental circumstances in the lower reaches have little to do with their actions, and thus they should not have to pay for them. They believe that downstream villagers have over-exploited their water resources for agriculture development, from which they made a fortune, and now upper- and middle-streamers are unfairly forced to pay the price through IWRM reform. On the other hand, downstream users argue that it is the over-use of surface water by those upstream that directly forced them to over-exploit groundwater for their livelihoods. Therefore, upstream users should contribute to restoring the water and environmental situations downstream as well, especially considering the strategic role of the downstream basin in protecting the eco-security of the whole river basin.

Just as officials use irrigation access and mandatory quotas to make farmers comply with local IWRM policies, some farmers realize the officials’ need for their cooperation as well. Thus, they use this need to negotiate with external authorities for extra water allocation and other benefits. The key would seem to be how to manipulate, bargain and selectively implement IWRM policies using social networks (guanxi) or other privileges to villagers’ benefit. Thus local inequity has been increased rather than decreased, and this perceived unfairness fuels doubts, dissatisfaction, non-cooperation and even resistance. As
some indicated: “If they treat me unfairly, why would I help them fulfil their tasks [official IWRM targets such as construction of greenhouses]?”

Discussion

So, what is the actual situation? Successful implementation of IWRM in the Shiyang River basin has been widely reported. According to official records, overall water use in Wuwei County decreased by 0.714 km$^3$ in 2010; agricultural water use was reduced by 0.884 km$^3$, and groundwater abstraction from 1.105 km$^3$ to 0.494 km$^3$. Over 3300 pumping wells were shut down, and over 816 WUAs were established. Irrigated area was reduced by 0.63 million mu, and fruit trees planted on 266,400 mu. Farmers’ average annual income is reported to have increased from CNY 3724 in 2006 to CNY 5617 in 2010. In the lower reach of Minqin County, according to official figures, over-exploitation of groundwater has been controlled, and groundwater abstraction reduced from over 0.29 km$^3$ to 0.0869 km$^3$. The water table in Qingtu Lake in the lowest reach has risen by 0.42 m compared to 2007. The average income per farmer has increased by over CNY 1000, to CNY 5200 in 2010, according to official records. However, caution is advisable when interpreting this apparent success.

Evaluation of the real impacts of IWRM policies, in terms of real water savings, improvement of water-use efficiency and water productivity in the area of study is difficult, if it is possible at all. This is not only because of the extreme sensitivity and difficulty in obtaining information which is always hidden or fabricated, but also because of the difficulty of validating such information or working out credible figures. Local agencies, for example the Water Affairs Bureaus and Electricity Bureaus which keep track of villagers’ electricity and water uses, always have multiple records which are prepared for different audiences. The official records match the officially set targets and are used for inspections, while the actual figures are kept separately, for charging villagers or other internal uses.

Under its new president, China’s official evaluation system has abandoned GDP-centred assessments and put more emphasis on public well-being and environmental performance as improved gauges of official success, rather than the blunt instrument of pure economic growth. Although this is a positive step towards more balanced and sustainable development, it is, as Nickum (2010) argues, not hard to imagine implementation problems, including obsession with measurable indices, manipulation of report results, and trade-offs between these measures and other evaluation norms, such as GDP. Under the bureaucratic upward-accountability system, IWRM reform has created a context where not only villagers but also local leaders face conflicting requests for a limited supply of reliable water. In the studied area, fulfilment of IWRM reform has been achieved through official targets. These include reduction of irrigated land area and the number of boreholes, and increment of fruit plantations. Public participation is measured only by the number of WUAs established and farmers included. Thus, leaders at city, county, township and even village levels are placed in a very difficult position. To be successful, officials have to accept and implement the limitations imposed by higher-level governments, most of which are not welcomed by either implementers or those affected. Officials therefore have to learn to ignore the objections and fulfil the targets, or to fake the results; this is achieved through methods such as hiding authentic records from higher-level officials, falsifying reports, and illegal use of IWRM funds to fulfil official targets. Even if the widely reported outcomes are reliable, the use of these targets to evaluate the real impacts of IWRM policies in local water use, management and environmental sustainability can be limited and even misleading.
In villagers’ perspectives and experiences, IWRM at the local level has more than a single face. In practice, the impacts of these interventions vary significantly with regard to the different implementation purposes, processes and outcomes, which are disaggregated into various categories among different people, groups and villages. As discussed above, political trust plays a critical role in shaping perspectives on IWRM. Villagers show significant trust in central and higher-level government, while distrust in governments at the city, county, township and village levels is evident. Among those who trust higher-level government, there is also a gap between their trust in the government’s good intentions and their belief in its ability to implement these well-intentioned policies at the local level as planned.

The impacts of villagers’ distrust of the implementation processes of IWRM policies are significant. Lack of political trust, especially of local government, has generated increasing uncertainty and widely perceived unfairness, as discussed above. All these have fuelled villagers’ lack of interest in participation and cooperation and ‘local adaptations’. One of the key strategies is to hide actual water use, irrigated land areas and crop patterns, taking advantage of the difficulty of accurately measuring every field. The whole inspection system is by production team leaders reporting to village leaders, who report to upper levels, with inspectors’ occasional checks limited by the immensity and difficulty of the task. There are examples of under-reporting of water use and related electricity consumption at the community, production team and village levels. Ironically, this fabricated reporting is what officials use as the reference for water planning and allocation. Another common strategy is to steal water, using locally invented schemes. For example, after smart cards were installed, which control water flow and quantity of pumping while recording the electricity use of each pumping well, villagers invented their own strategies of using a short circuit to pump water into their canals without using the smart card or recording any water use. Local respondents repeatedly expressed, “Officials apply some new system and we have to adapt accordingly, simply to survive and get by.”

Another interesting example is the policies to change local agriculture patterns through constructing greenhouses, adding breeding sheds for livestock husbandry and planting fruit trees such as grape, pear and plum. Detecting the crucial importance for officials to fulfil quantified targets such as how many trees have been planted or acres of land used for fruit trees, villagers tried to strike a deal of ‘returning favours’ by complying at least superficially with these policies to get more illegal irrigation access. Under this strategy, many greenhouses and breeding sheds were built, few of which were actually of proper quality or even used; and many trees were planted, few of which were expected to survive. These examples provide insight into how and why the official reports of successful IWRM policies are dubious, and explain how lack of political trust influences implementation of IWRM in practice.

It is crucial to note that villagers are not as passive or powerless as they seem or are alleged to be, despite a general appearance of compliance with imposed IWRM policies. As in Oi’s (1991) study of implementation of agriculture policies in China, we find that even today it is still necessary, and prevalent, for villagers to create an appearance of conformity with official policies –sometimes even better compliance than officially required – so as to construct or reinforce a reciprocal relationship with local IWRM implementers. This helps them gain advantage in working the system to maximize their interests or minimize adverse impacts such as decreased income or irrigation control. For example, in Wang Village, 100% of the irrigators are illegal water users, who on average manage to irrigate twice the officially allocated land area through illegal access. It is thus self-explanatory that there are considerable infringements and violations such as stealing...
water, tampering with electricity records and bribing local agents. However, instead of overt resistance, these confrontations (organized or not) have remained rather covert, comparable to what Oi (1991) called “strategies of survival”, or “soft opposition” and “rightful resistance” (Li, 2010; O’Brien, 1996), which, if not appropriately dealt with, can induce huge social, economic, environmental and political costs, such as losing villagers’ political trust and participation incentives.

While the general state–society relation remains hierarchical, the relationship between villagers and lower-level officials is a complex one. Villagers did not challenge central authority or its IWRM policies, and this offers the higher-level governments some room to manoeuvre, since this trust in upper levels has prevented demands for any radical upward political reforms or resistance. On the other hand, villagers have learned to keep their distrusted leaders at arm’s length and make ‘reciprocal deals’ or bargain with them. Each side tries to work the system to pursue its own interests rather than constructing a benign cooperative partnership and working towards the same (IWRM) goal. These findings enrich the ongoing debate on state–society relations in China, going beyond the traditional confrontation-or-compliance dichotomy.

However, it would be entirely wrong and even risky to assume that lower-level officials are incapable of maintaining strict water control. What appears to be ‘participatory and localized’ water reform is still open to local cadre manipulation, and failing to appropriately understand this point will fail to touch the root causes of both local water problems and policy implementation failures. In fact, how strict the control of implementation processes is depends entirely on local agents who are in complete charge of passing on and interpreting IWRM policies to local stakeholders in a one-way communication of information. Local officials still have effective power, based on continuously influencing the access and distribution of local resources and having a free rein to locally interpret, circumvent or even subvert IWRM policies. Lower-level officials are well aware of the fact that some local policies, such as a compulsory water quota, are unrealistic, but to fulfil their political task and ensure their political career, they have to enforce them anyway. This means that they need villagers’ support and cooperation in fulfilling these targets. This explains why local political authorities tolerate villagers’ infringements by ‘keeping one eye closed’ in implementing localized IWRM policies as long as these actions do not threaten the local political status quo or the big picture. In light of this, the success or failure of IWRM cannot and should not be defined by whether officially set targets are met, but by the dynamic villager–official negotiation processes which are constantly redrawing the lines of what IWRM actually consists of and what success means in different local contexts. It is important to keep these different perspectives and the impacts of physical and socio-political factors in mind in any effort at policy implementation or analysis. Buzzwords such as “IWRM” may mask important underlying processes rather than providing useful guidelines for effective reform.

Conclusion

This article has explored Chinese villagers’ attitudes and perspectives towards IWRM by highlighting the essential roles of political trust, policy certainty and fairness in an in-depth study of three villages in the upper, middle and lower reaches of the Shiyang River basin, Northwest China. Most respondents have a good awareness of IWRM concepts and principles, but the perceived processes and impacts of IWRM policies are rather divided and problematic.
Most villagers regard the central and higher-level governments as trustworthy, while local agents are seen as corrupt and untrustworthy. Most villagers believe that there are substantial differences between the good intentions of IWRM reforms at the higher levels of government and the distorted localized IWRM policies (tuzhengce), which are not necessarily the same as originally intended. The pattern of trust revealed in this article has several important policy implications. First, the trust and belief in upper levels expressed by most villagers suggest that the communist regime still has the most power and popularity among villagers. Moreover, villagers are not as powerless as they are believed to be. The perceived inability of upper levels to implement their policies, together with the distrust and dissatisfaction with lower levels, has generated varied incentives for villagers and local officials to manipulate IWRM policies and each other in localized forms.

It may be concluded that to assess the processes and impacts of a special IWRM reform in isolation from its local contexts and stakeholders ignores the fundamental character of the reform. People do not automatically accept or reject IWRM policies that are allegedly in the public interest. It is expressly related to their experiences, their political trust, and relations with local government agents in specific physical, social and political contexts. It is these dynamics and localized adaptations that define and reflect the reality of IWRM processes. Successful implementation cannot be guaranteed by the existence of well-intentioned IWRM policies or by meeting officially set targets. It depends on the degree to which and how IWRM policies are locally understood and implemented by different stakeholders throughout the constant bargaining and negotiation processes of everyday water politics.

Political trust in central government seems not to have a direct impact on locals’ reaction towards IWRM, while trust in local government, their intentions and the institutions can be good predictors of local support for IWRM policies. Thus, building trust, especially between lower-level governments and civil society, is crucial in promoting the legitimacy and sustainability of IWRM policies and in enhancing implementation outcomes. Although the scale and potential solutions of water problems may be location-specific, understanding the nature and extent of issues related to IWRM in an area such as China and the lessons learnt can provide important insights for others as well.

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