



Water Policy Reform in China's Fragmented Hydraulic State: Focus on Self-Funded/Managed Irrigation and Drainage Districts

James Nickum

Tokyo Jogakkan College, Japan; nickum.water@yahoo.com

ABSTRACT: This essay explores the nature of China's unique decentralised 'authoritarian' regime and its various origins; the continuous dialectic between state-directed and market-directed approaches to the economy (including water); the economic and budgetary drivers of water policy change; whether the concept of integrated water resources management (IWRM) is overly 'loaded' with liberal ideas or even if not, whether it provides any insights beyond concepts more widely accepted in China; whether the state-society dichotomy makes sense in China's *guanxi* (personal relations) culture; and the course of the World Bank-sponsored Self-funded/managed Irrigation and Drainage District (SIDD) reforms.

KEYWORDS: China, regime, water policy, SIDD (Self-funded/managed Irrigation and Drainage Districts), IWRM

INTRODUCTION

The idea that there is a link between the imperatives of water control (especially irrigation and flood prevention) and the nature of the state is hardly new. Wittfogel (1957), building on Marx, hypothesised that their hydraulic societies generated "Oriental despotisms" in historical India and China and that, at least in the case of China, this authoritarianism continued into the contemporary era.

Certainly water control, especially over floods, has always been considered one of the most important duties of the Chinese state (Flessel, 1974) – Yu the Great, the legendary founder of the first Chinese dynasty, is reputed to have risen to his greatness by taming the waters. The twentieth century brought a modern militarised mass approach to the natural land- and waterscape of China by both Nationalist and Communist governments (Muscolino, 2010; Shapiro, 2001). During the Maoist era, rural collectivisation in 1956-57 and the subsequent formation of people's communes during the Great Leap Forward were both linked closely with government water conservancy campaigns, in particular through the ability of those organisations to mobilise unprecedented levels of de facto corvée labour (Oksenberg, 1969; Nickum, 1978).

The collectives did not long survive Chairman Mao, who died in 1976, nor did many of the key characteristics of his regime, or its hydraulic society. The corvée system wilted, engines of promoting agricultural growth other than water were found and the rural economy, like its national counterpart, opened up. Irrigation itself has come increasingly to rely on tube wells that are largely beyond the gaze of the state, but are depleting groundwater reserves. The water agencies of the government have faded in relative importance and budget. New demands for water have grown in industries and especially in the rapidly expanding cities as the economy has exploded; their management and the negotiation of intersectoral conflicts require very untraditional bureaucratic skills, sometimes even markets. Although large projects such as dams and inter-basin diversions continue to be built, increasingly attention has turned to maintaining and paying for the enormous inventory of water projects that was built up in the latter half of the twentieth century. China's inventory of large dams, for instance, is far greater than that of any other country. Water quality is increasingly salient on the agenda of state and society alike, as are environmental uses. River basins such as the Yellow or the Hai are effectively closed, as no more

water is available. Climate change is forcing greater consideration of adaptive measures. While the threat of flooding has receded in the oversubscribed rivers of the North China Plain, floods elsewhere, aggravated by degraded watersheds and reclaimed lakes, continue to pose a challenge to the state.

China's decision makers, many of them educated in the finest Western universities, are well aware of international water discourse, and are often active participants. Furthermore, they recognise and embrace the principles of water pricing, water rights, markets and participation perhaps as much as their Western colleagues and mentors. Yet they, like others, recognise that there is a huge implementation gap in many areas. Is this because of the regime? Is it because it is China? Is it because of the water? This article will explore whether the nature of the contemporary Chinese regime is an important factor in determining water outcomes or, perhaps even more, the actual processes of decision making. This is only an exploration; the growing complexity and shifting character of both water problems and China's economic and political institutions rule out definitive answers. At the discourse level, it will look at one example of externally sourced discourse that alleges to address this complexity – IWRM – but which is not widely cited in China, even though many of its elements are familiar. At the implementation level, it will look at one relatively well documented example of a World Bank-initiated attempt at institutional reform that has had mixed results – the Self-Managed [Financed] Irrigation and Drainage Districts (SIDDs).

THE CONTEMPORARY CHINESE REGIME: CONTESTED, FRAGMENTED, DECENTRALISED SEMI-AUTHORITARIANISM

It is common among outside analysts to identify China's regime as authoritarian, albeit one that is increasingly marketised and pluralised (Landry, 2008; Schedler, 2009). Chinese citizens who live on the inside of the fringes of dissent against the regime might find it difficult to accept that their China should be classified as authoritarian, or even semi-authoritarian, for a number of reasons. With a few exceptions,¹ decision making has been fragmented even beyond what a generation ago led to China's system being characterised as "fragmented authoritarianism" (Lieberthal and Oksenberg, 1988). Discursive space has expanded significantly in an increasingly heterogeneous polity that includes NGOs and the information highway (Mertha, 2008), and central authorities are apparently unable to impose their will on local decision makers. Furthermore, China is open to the rest of the world as never before, especially in investment and trade (Steinfeld, 2010), and a significant level of individual autonomy is now allowed by the one-party state.

Mertha (2008) asserts that we may have to look at water issues in China by turning Karl Wittfogel "on his head" in this "increasingly complex, diverse, and far less top-heavy hydraulic state". Nonetheless, "the state and party play a significant, embedded role" (Mitter, 2008) in the economy and policy, and are not accommodating to challenges to that role. By the measures of pervasiveness and non-rivalry, China's regime can no doubt be classified as at least semi-authoritarian, even if it is a far cry from what it was thirty years ago. But what does that mean in practice, particularly for water policy? Is the government's hold weakening with the rapid economic, institutional and social changes of recent decades, or is it successfully fending off the challenge?

A great explosion of sophisticated laws, including notably the Water Codes (*Shuifa*) of 1988 and 2002, often modelled on those of liberal democracies, has occurred since reform began in late 1978. This would appear to be due to a serious attempt by central authorities to use law and legal institutions to govern the country as a firewall against a return of the arbitrariness of Maoist governance. The problem is that governance through these formal legal norms is nascent at best, and exists in "uneasy tension" with that embodied in "responsibility systems" that evaluate and reward administrators (Minzner, 2009). Secondly, fiscally, China is one of the most decentralised countries in the world, with

¹ Including urban water service bureaux integrating water functions at a municipal level, strengthened river basin authorities and the consolidation of many (but not all) competencies over water in the Ministry of Water Resources.

nearly 70% of all government spending undertaken at sub-national levels in 2002 compared to less than 50% in the highly decentralised federal systems of the United States and Switzerland (Landry, 2008). The original ratios between central and local water investment in the Eleventh Five-Year Plan (2006-2010) were comparable, at 1:2 (175 billion Yuan and 342 billion Yuan) (Chen Lei, 2010). There has been a shift back towards central financing in the very recent past for countercyclical reasons, but this is likely to prove ephemeral. As a corollary, central plans were never as significant as in the Soviet economies and do not appear to have figured large in China's dynamic post-reform economy. The third point is that local powers indeed appear to twist efforts at reform, but ironically that may be because of inevitable distortions in the personnel reward ('responsibility') systems that themselves come down from the political centre (Minzner, 2009).

Bardhan (2009) makes a number of interesting comparisons between India and China, the two largest 'hydraulic societies' historically. The two countries are relatively comparable in population and in economic level, but provide a contrast between democratic and authoritarian governance. In particular, Bardhan finds that India faces certain endemic problems with its multi-ethnic electoral system that results in an "anomic inability to carry out collective action or to overcome populist hindrances to long-term investment in order to address the infrastructural deficit that is reaching crisis proportions". This would appear to advantage China in general. It is not clear, however, that India's water bureaucrats are significantly more constrained in undertaking hydraulic constructions, or any more in touch with the end-users or those displaced by projects (Scudder, 2005).

Bardhan notes that recent decentralisation and regional autonomy policies in China encourage local initiatives and incentives, but the system provides vertical checks on local officials through a competitive promotion and reward system within the party (and presumably state) hierarchies. At the same time, those rewards are strongly biased towards economic and fiscal performance, made more intense by a widespread budget crisis in China's rural areas and compounded by unfunded mandates for local governments.² Minzner (2009) elaborates on these points in arguing persuasively that many local governance dysfunctions are counterproductive outcomes of the 'responsibility systems' used by the Chinese Communist Party to address pervasive principal-agent problems in the world's largest bureaucracy (which happens to be also authoritarian). These systems are relatively new but have roots in the imperial system, which similarly applied strict, collective and vicarious liability to local magistrates in meeting numerical targets such as for tax revenue. Soviet industrial management methods imported in the 1950s, holding managers personally responsible for the fulfilment of quotas, fit comfortably into this pattern as did, ironically, reforms used to replace the more collective reward systems and political campaigns of the Maoist model. Responsibility systems may have actually grown in importance, as other levers of authority have weakened with increased mobility and economic reforms and as law and legal reforms, also (as noted) responses to Maoist excesses, are seen at least by some central authorities to be inadequate governance mechanisms.

In 2007, those authorities added environmental outcomes as a criterion in officials' performance evaluations (Ongley, 2009). Although this was a positive step within the context of the responsibility system, one can easily imagine a number of implementation problems such as excessive focus on measurable criteria, the manipulation of reported results and tradeoffs with other career enhancing norms, such as economic growth and employment. In the crunch,

local officials pay significant attention to meeting (or creating the appearance of meeting) [targets for generating revenue, avoiding social protests, and controlling births]... while disregarding targets [that are

² Whereas once nearly all revenue flowed through the centre, China has had a system of fiscal decentralisation since the beginning of reform in 1979. A 1994 budgetary reform produced a significant shift of revenues to central government, placing increasing pressure on local governments to find extra-budgetary sources of income and focus on revenue-generating activities (Jin Jing and Zou Heng-fu, 2005). Water projects, especially irrigation, water quality improvements and sewerage, are rarely profitable. As of the end of May 2009, local (provincial and below) governments in China had accumulated 5 trillion Yuan in debt, one-sixth of the country's 2008 GDP (Guo Qiang, 2010).

less quantifiable or can be kept out of the gaze of the state] such as respecting villagers' autonomy or limiting peasants' burden (Minzner, 2009).

CHANGES IN INSTITUTIONAL FRAMEWORK: A CONTINUOUS DIALECTIC

It is clear that however the regime in China is characterised, it has followed a different historical path from most of the post-Cold War cases that find themselves in hot water. The embrace of economic liberalism, at least in principle, began a decade before the others in 1979, after the traumatic punctuation of the Cultural Revolution. There was openness to new ideas and international discourse among a new generation of young intellectuals, many of whom studied abroad at centres of liberal discourse, even before international financial institutions hit the shores in force.³

If anything, the fall of reformist Premier Zhao Ziyang in mid-1989, following Tiananmen and the unravelling and collapse of the Soviet Union and its empire not long thereafter, moved China's leaders away from experiments with political openness. Still, while China has remained a one-party system, there have been some significant shifts in the nature of that party and its behaviour. In particular, it has expanded its membership to include members of the post-reform emergent capitalist class, reflecting its embrace of economic reform. At the same time, there has been a continuous dialectic between state, collective and private (including foreign) ownership and plan-directed and market-directed approaches to the economy, including water policy. For example, public companies have replaced formal bureaucracies in much of the water sector,⁴ infrastructure projects have come to rely heavily on subcontracting and competitive procurement and much of China's urban water supply and sanitation is built and operated by foreign and domestic companies. Nonetheless, pricing has more often than not remained under state control, necessitating continuing reliance on the state budget. Naughton (1995) saw the overall trend of this process, at least until 1993, as a nearly inexorable "growing out of the plan", where a relatively static state sector was diminishing in relative importance. The trend towards marketisation was further accelerated with China's entry into the World Trade Organization (WTO), and public sector employment actually fell in absolute terms. In response to the current (2008-) world economic crisis, however, government involvement in the economy has increased with large infusions of investment funds, often through state enterprises – a process termed *guojin mintui* (the state advances as the private sector retreats) (Wheatley, 2010). State water bureaucracy, notably the Ministry of Water Resources, was a major beneficiary of those funds.

DRIVERS OF WATER POLICY: THE FLOW OF FUNDS

It is difficult to establish a clear relationship between state governance and water policy, given the wide variation of national experience, strength of social capital at very local scales and bureaucratic culture and opportunity structures within specific systems, sometimes at a quite local level. For example, even in two 'strong state' industrial democracies, the siting of nuclear power plants in France is undertaken in a largely coercive (semi-authoritarian) way, while local communities have more say in dam sites; it is just the reverse in Japan (Aldrich, 2008). Furthermore, although in retrospect Wittfogel's (1957) case for hydraulic imperatives leading to despotic systems may have been overstated, it is worth noting that to

³ Most famous of these is probably Lin Yifu (Justin Lin), who obtained a PhD in economics at the University of Chicago in 1986 and is now Chief Economist and Senior Vice President at the World Bank.

⁴ The general trend is towards 'debureaucratisation' of water, with extensive subcontracting, the establishment of companies (often state-owned) and greater cost recovery from end-users. One of the longest standing impediments to independent water management is the state's maintenance of price control over most water uses. For example, the South-to-North Water Transfer Project is formally 'owned' by a separate company that is at least formally obligated to repay bank loans from eventual water revenue, but the rate setting is controlled by local public authorities. The water supply companies set up as part of the SIDD reform discussed later were required to provide water to agriculture at a loss, yet still make a profit and pay corporate taxes. There has also been a continuous dialectic between the recognition of a need to apply a 'user pays' principle to irrigation and a reluctance to add to the financial burdens of farmers.

a large extent the governance of many water projects (especially those such as flood control or navigation) follows from, or is at least constrained by, their strong public good (excludability, congestability) characteristics. Construction-oriented bureaucracies, especially when reinforced by public works-oriented fiscal policies, can be locked into a 'project culture' that becomes highly dysfunctional as water economies mature (Nickum, 1999). High levels of asset specificity (including siting) and highly vested but increasingly ineffective (entropic) water rights systems can lead to state complicity in private rent-seeking behaviour that may not at all serve the water needs of society at large, even in democratic systems (Gopalakrishnan, 2004).

One of the major factors driving water policy reform in China, as elsewhere, is the budget, especially for operating and maintaining these capital-intensive systems once they are built. The project culture can build dams, diversions, pump wells, irrigation networks down to a certain level and municipal water supply and sanitation facilities. External funding agencies have assisted with many of these constructions in recent decades, while adding some fiscal discipline in the form of an obligation to repay. The recouping of capital costs has been an important feature of even domestically funded projects in recent years.

These fiscal factors have been a driving force behind the enormous interest in the water sector, even before the recent economic reform period, in making greater use of economics – in part to pay for at least operations and maintenance expenses and the costs of delivering water. One of the first battlegrounds of the Cultural Revolution in 1965 was a dispute over whether to charge farmers water fees, preferably on a volumetric basis. Proponents were branded 'capitalist roaders'. By 1985, the capitalist road (in this sense) was definitely opened up for policy traffic, following a significant cut in the central budget going to water. In that year, the Ministry of Water Resources issued a set of 'opinions' that sought to turn irrigation districts into self-financing enterprises with independent accounts. Management of irrigation districts was to be transferred from the state to 'democratic' stakeholders' associations, underpinned by 'mass' management groups. The state budget was to be relieved by removing irrigation districts as an expense, with their staff also moving off the state payroll and instead relying on locally generated funds (Nickum, 2005). Later that year the State Council, China's parliament, issued guidelines for the assessment and collection of water fees from irrigation districts. Nonetheless, water fee collection did not rise to meet expenses and did not all go to the service providers, who were often left in an insecure financial position (Turner and Nickum, 1995).

Some of the thinking in China on water markets and water rights has been strongly attuned to developments elsewhere in the world, especially since the issuance of the revised Water Law in 2002 (see Cui Yansong, 2003) and even more so following the mandate in the Eleventh Five-Year Plan (2006-10) for the establishment of national systems for the allocation and transfer of water rights at regional- (covering inter-basin transfers) and farmer-levels. In particular, the Ministry of Water Resources and the Australian Department of the Environment, Water, Heritage and the Arts carried out a joint project to look at the status and possibilities of a water rights system in China (Sun Xuetao, 2009; Gao Erkun, 2007; Calow et al., 2009). There appears to be a clear awareness at the central policy level that the adoption of market mechanisms is necessary. The issue remains, though, whether it is possible to enforce a system of water rights allocations in the current institutional environment in China.

One of the major factors impeding water policy reform is that it often is directed at increasing revenues from activities that at least on the margin do not pay off financially. Under the Maoist system, enforced procurement of grain at artificially low prices inhibited the imposition of water charges. With the use of the price mechanism for agricultural output ruled out, increased irrigation was seen as a primary means for increasing grain production, but this did not work very well. In the 1980s, grain production jumped in large part because producer prices were allowed to increase, while irrigated areas remained stagnant. Recovering the costs of water delivery (much less environmental or resource scarcity charges) may set up a conflict with increasing freedom of choice for many farmers. As they broaden their horizons and income portfolios beyond a fragmented set of poorly paying irrigated fields,

farmers or local leaders may not find it appealing to invest in the transaction costs of collective action on irrigation management.

Since grain farmers tend to have relatively low incomes, yet are the most numerous rural dwellers, increases in water charges risk criticism on equity and political grounds. Extensions of irrigation are still often seen as a way of providing income and security to most marginal farmers (Ringler et al., 2010). In this light, WTO entry, by tying China's grain prices to the international market, may have ironically undercut the trend towards increased cost recovery and related user participation in irrigation by making the economic viability (and with it political stability) of grain production more precarious (Central Committee, 2008; Chin Leng Lim and Yiang Yu Wang, 2009).

IWRM: NOT A CHINESE CONCEPT

Perhaps reflecting its lack of success in doing so, China's water policy is continuously seeking to address problems of integration across physical and administrative boundaries, and to deal with issues such as ownership, river and lake basin management, urban water supply and sewage, rights transfer, flood control, water quality and the environment. Here, germane is Mollinga's (2010) posing of the question whether the concept of integrated water resources management (IWRM) is too embedded in Western liberalism to be useful either to Chinese policymakers or those seeking to understand their behaviour. Certainly, IWRM does not appear to constitute a significant part of the policy vocabulary in China per se. Not surprisingly then, the rare exception is linked to external funding, such as the GEF Haihe Integrated Water and Environmental Management Project (2004-10) (Zhong et al., 2010). At the same time, Chinese formulations that could be translated as IWRM have made their way into academic literature that surveys foreign concepts and experiences and considers their applicability to China (see f.i. Li Xuesong, 2006, esp. ch. 4).

Some of the myriad concepts that now go into IWRM have been incorporated into Chinese policy discourse, prominently sustainable development and participatory management. In addition, China has a rich collection of related home-grown concepts such as 'harmonisation' and 'unified management' (Ongley, 2009), as well as "unified planning with due consideration for all concerned" (*tongchou jiangu*). Whether these are indigenous substitutes for IWRM depends largely on what is meant by IWRM. If it includes liberal values such as democracy and transparency as essential components, these desiderata, while also embraced in principle (see f.i. Li Xuesong, 2006), may have different outcomes in practice. At the same time, if, following Grigg (2008), IWRM is seen as "a framework for planning, organising and operating water systems to unify and balance the relevant views and goals of stakeholders", it could easily be used as a framework for unravelling a significant share of the concerns and policy initiatives of China's policymakers. Following Grigg, particular focus then would be on integrating elements such as:

- a) policy sectors (integrating water with natural resources, environment, public health, energy, agriculture, transportation, and emergency management);
- b) water sectors (water supply, water quality, environmental water control, irrigation, flood control, navigation, hydropower and recreation);
- c) geographic units (basin management and inter-basin management);
- d) government units (both vertical and horizontal, the latter international as well as interstate (province) and inter-local);
- e) organisational levels (alignment of policy, management and operational levels);
- f) functions of management (engineering, finance, planning, operations and maintenance);
- g) phases of management (planning, construction, operation, renewal) and
- h) disciplines and professions.

This is somewhat closer to the earliest formulations of IWRM (e.g. Hufschmidt and Tejuwani, 1993) that shied away from embracing the more overt values of Western liberalism. When IWRM is formulated in these terms, one could say that whether by name or not it has been a principal concern of water policy in China, in nearly every regard. As elsewhere, however, actual integration is rare; according to Ongley (2009), it has "been an abject failure throughout China", because "collaborative (horizontal) management requires sharing of power which is contrary to traditional institutional culture".

China's Ministry of Water Resources (MWR) long complained that there were "too many dragons struggling over the waters", and led efforts to integrate their management – under its domain. The revised Water Law of 2002 did extend the MWR's powers, but conflicts continue even now between ministries, since by its nature water cannot be treated as if it were one single and independent issue domain, under the control of one ministerial hydrocracy. Numerous scholars have pointed to the perdurance of conflict. For example, Ongley (2009) cites the conflicts over turf between the entrenched Ministry of Water Resources (MWR) and the newly empowered Ministry of Environmental Protection (MEP):

MEP and the... [MWR] argue over the interpretation of 'water resources' which MWR claims means water quantity and quality, whereas MEP argues that it alone has sole authority for water/environmental quality. This leads to serious institutional problems such as enormous duplication in monitoring and, with no sharing of data, duplication of river management plans. Each of MWR and MEP has its own system of river coding as a basis for water management. Calls to integrate or harmonise these fall on deaf ears as it is not in the interest of either ministry to do so.

If only it were that simple. River basin commissions under the MWR monitor water quality in the rivers but have no authority over its control, despite being given expanded powers under the revised Water Law of 2002. Soil erosion is under the Ministry of Agriculture or the State Forest Administration, whilst hydropower is under a panoply of state holding companies and independent power producers. The Ministry of Geology and Mining oversees groundwater (to the extent anyone else does). In addition, urban water supply and sewerage were traditionally under the Ministry of Construction, but in many places have fallen within the scope of new water service bureaus that have sought to integrate water management in many urban areas. Again, perhaps most important of all are the pricing bureaus that respond primarily to concerns over social stability (Nickum and Lee, 2007). As a consequence, prices are set too low to allow cost recovery, for urban water and sewage as well as for irrigation, even though the necessity for increases is recognised widely by those who deliver the water, and by policy experts. This kind of bureaucratic fragmentation is not unique to China, of course, but the issue is the lack of coordination, which seems to be particularly severe.

River basin commissions are also not known for their ability to override political boundaries. For example, the Yellow River Commission oversees the allocation of withdrawal quotas among provinces, but has no power to prevent a province from exceeding its allocation. Still less do the commissions have authority between basins, yet increasingly diversion projects and pollution problems transcend those very boundaries. In addition, as just noted, water cannot be isolated fiscally, as long as projects depend upon budgetary allocations and pricing bureaus have the ultimate say over water pricing.

At the same time, ironically, each level of government and the Party does seek to carry out horizontal coordination (*kuaikuai*) of activities of agencies within their purview, embedding each agency in a matrix of authority that in practice puts power in the hands of the higher ranking agencies at each level (Webber et al., 2008) and gives local heads power over careers. *Kuaikuai* may be an even greater hindrance to effective action in China than vertical principal-agent or state-society distortions, because it can subordinate inconvenient interests to those of the coordinator, rather than actually coordinate multiple and potentially conflicting interests such as popular participation and public order.

Hydropower development is another issue critical to the use of water where agency integration is difficult. For one thing, it is profitable, whereas most water projects under the oversight of the MWR require large government budget investment allocations, which can be volatile and cyclical. Attempts

by central government to solve this problem by merging the MWR with the financially resource-rich Ministry of Power have been made a number of times, but always end in divorce. The fundamental structural incompatibilities were summarised by Liberthal and Oksenberg (1988) inasmuch that the two components had "both overlapping and somewhat competing operational missions, different types of relations with subordinate units, different financial profiles, and different career paths for their officials".

STATE AND SOCIETY IN CHINA: WHO YOU KNOW

It is no secret that local power holders are not democratic representatives of local society, if one can even speak meaningfully of a Chinese society disembodied from the state, family (clan) or network of personal connections (*guanxi*). If one cannot do so, it renders moot the question as to whether the state in China operates independently from society. Certainly Fukuyama (1995), in his very influential but flawed work, argued that family-oriented cultures such as China, France, Italy and Korea are characterised by low levels of trust of unrelated strangers, thereby inhibiting the private development of capital and necessitating state intervention in development, even if it may bring with it static inefficiencies. One of the many problems with Fukuyama's scheme is that these systems are at different levels of development with quite different historical as well as cultural trajectories. In some cases, they have been dynamically more efficient (i.e. prosperous and growing) than 'trust' societies, while Northern Italy and China were actually historical loci of effective and spontaneous social capital that promoted the growth of extensive international trade networks. Nonetheless, these networks appear to have operated, and continue to operate, on the basis of different forms of social capital – *bridging* (across group memberships) in the European case and *bonding* (in-group) in China. Greif and Tabellini (2010) claim that "[e]ven today, kinship groups remain a more important conduit for economic exchange in China" than in Europe, despite attacks on them by westernisation and Maoist campaigns against them as feudal practices.

Guanxi going beyond kinship groups remain a central feature in Chinese society, allowing trust relationships to be built and maintained across formal administrative barriers, especially in commercial operations. Recently, this has led to a merging of private and public in the entrepreneurial sector, especially in the transition period from 1979 to 1997, when the private sector grew without being accorded full legitimacy (Tan et al., 2008). At the local level, this has led to an unholy alliance of development interests and local power holders that has further stifled effective participation by end-users in collective resource allocation issues.

Part of the Maoist strategy, particularly during the disastrous Great Leap Forward of 1958-61, was to cut through the Gordian knot of localism and *guanxi* by promoting 'walking on two legs'. One leg was the centrally planned state directed industrial economy organised along Soviet lines, and the other the small producer mass base which was to be mobilised by the Party in a campaign mode to convert labour directly into capital (e.g. water projects) via 'labour accumulation'. At its extreme point in the early part of the Great Leap, an attempt was made to collectivise household activities through means such as common dining halls. The Maoist strategy was aimed at bridging the vast distance between the administrative state, with a formal bureaucracy extending only as far down as the approximately 2000 counties in the country, and the millions of villages (*cun*, also usually contiguous with the 'production brigade' under the people's commune system). Villages have traditionally been governed through their head, who then and now has been responsible for meeting the tax and labour demands of the government. As in Tokugawa, Japan (Nakane, 1967), horizontal linkages between villages were discouraged (Huang, 1985) except for bridal exogamy and exchanges in market towns on the days of fairs (Skinner, 2001). One practical impact of the importance of the 'village' (sometimes administratively defined rather than as a settlement cluster) as the basic unit of political organisation is that attempts to organise end-users of irrigation schemes along hydrological lines almost inevitably revert to

administrative, village bases, often with the village head or deputy head as the head of the water users' association (Mollinga et al., 2005).

Between the county and village levels are the townships (*xiang* or *zhen*), numbering in the tens of thousands. The township is sometimes considered part of the formal government structure, and sometimes local, or 'mass'. In the 1960s and 1970s, this was the locus of the people's commune, created in part to bridge the gap between state and village while maintaining its 'collective' character largely off the state payroll. The line agency handling irrigation is the Ministry of Water Resources, which these days extends down to the township, although lower-level staff in the water resource stations (*shuili zhan*) may not be full state employees. With limited ability to levy water fees (often done in the past by revenue departments, which kept a large cut of even the tiny amount collected), local water agencies were encouraged to develop non-irrigation economic 'sidelines' to supplement staff incomes. Only a few were able to achieve this (Turner and Nickum, 1995).

Water domains these days are hardly limited to irrigation, but include river and flood control, international waters, inter-basin diversions, intersectoral water transfers, urban and rural water supply and sanitation, hydropower dam construction, climate change and environmental flows and remediation. Each of these domains has its own physical and governance characteristics that may reflect different 'logics' of public/private/social management as well as constellations of administrative authorities and stakeholders. Large dams and inter-basin transfers often displace large numbers of people. While there has been an increasing recognition of this problem (it is hard to ignore the 1.3 million people displaced by the Three Gorges dam) and growing compensation rates, they are at such a scale that it is hard to see how one could operationalise a 'society-centred' approach to them. Urban water supply and sanitation have some fiscal and institutional parallels to irrigation, but with better metering possibilities and with more involvement by the private sector. The issue there, however, appears to be more public or private (or what mix, as well as between domestic and foreign capital) rather than state or society. This multiplicity of domains makes it very difficult to pull out larger regime impacts on the water sector, except on a selective basis. In some cases, such as dam displacements, participation and defensible legal rights seem to be subordinate to hydrocratic imperatives, while the mix of public and private roles in urban water and sanitation would appear to be much more contested and not essentially different from the case in many Western liberal systems.

Where society does get involved, it is not always in a way that promotes sustainability. Urban agencies controlling price changes often have 'public hearings', and these days even broadcast them live on their websites, albeit filtered. While participation appears to be strictly limited to invitees, opposition at these hearings is often cited as a reason for resisting price increases. Twenty-five representatives were invited to hearings held by the Beijing Municipal Development and Reform Commission (in charge of pricing) in December 2009 to deliberate two options for a relatively modest increase in residential water charges from 3.7 Yuan per cubic metre, where it stalled after 2004, to 4.6 Yuan. Included in the list of 25 were 10 representatives of residents, two academics, five legislators, three government officials, two water companies and one large industrial user. The press focused on criticisms by residents of any across-the-board increase in water prices, as many favoured a staggered pricing system based on usage, which the government claimed would be difficult to implement, and/or a focus on recycling. In any case, even block pricing would be unlikely to bring in adequate revenues or reach economic pricing levels. The director of the MWR's Institute of Water Resources and Hydropower Research is cited as saying that, presumably on economic grounds including Beijing's share of the cost of the South-North Water Transfer, the price should be at least 14.2 Yuan (*China Daily* website, various, 2009). A price hike of this magnitude would appear to be very difficult to implement in the near future. Beijing's water may be currently coming from unsustainable sources, but it is available. Even if the transfer begins to deliver water as currently anticipated in 2014, it may be difficult to convince rate payers that it is the least costly alternative or that they should pay to recoup the capital charges.

SIDDs: LIBERAL PRINCIPLES IN PRACTICE

The self-financed/managed⁵ irrigation and drainage district (SIDD) model, proposed by Richard Reidinger, an innovative World Bank officer with in-depth knowledge of the situation in South Asia, arose at a juncture of domestically recognised needs for reform at both user and system level and the introduction of experiences elsewhere in participatory management based on liberal principles. As a case, this model may serve to illustrate the complexity of applying reform concepts to the institutional realities of China, even when there is broad domestic acceptance of its necessity.

Three-quarters of the country's grain and over 90% of its cash crops come from the just under half of its cultivated area that is 'effectively irrigated'.⁶ Much of this is produced outside the directly state-managed system, from groundwater or small storage and diversion projects. Nonetheless, the state irrigation sector continues to play a major role in China's food security. The 434 (in 2007) large (over 20,000 ha command area) state-operated surface irrigation districts are designed to irrigate about one-quarter of China's effectively irrigated area and produce about one-quarter of the country's grain while generating over one-third of agricultural output value (Xinhua Net, 2008). The roughly 5,000 smaller irrigation districts cover about the same area (Nickum, 2005). Especially in the southern part of the country, pumping water out of a polder may be more significant than bringing water in, so state-operated drainage districts are also included in the SIDD model. Because of the size and complexity of these districts, and their locus spanning the state and village, they have been a particular, and as noted above nearly continuous, focus of institutional reform in the water sector.

One of the legacies of the Maoist period was a large inventory of ageing storage and diversion works, most of which were without adequate delivery facilities (generically termed *peitao*) to provide water beyond the state-managed main works. At the same time, the atomisation of land holding and water management to the household with the breakup of collective agriculture, itself never well integrated with the state sector, was aggravated in many places by the growing availability of off-farm employment, especially for strong male labour.

At the local level of the state-managed system, decentralisation of remuneration combined with the budget crisis led to a profit centre focus. Water rarely turns a profit, and charges are often seen by users as a tax because of poor accountability. At least until recently, this perception was more often than not correct, despite repeated official admonitions to 'use water [fees] to support water' (*yi shui yang shui*). Water fees were conventionally levied in grain and deducted by the state grain procurement agencies together with other levies, but on an area rather than volumetric basis. It was common for the lion's share of the collection to disappear into general revenue, with water management agencies receiving only a small portion.

The Yangtze river province of Hubei pioneered experimenting with irrigation management as early as the 1970s and creating experimental water groups from the 1980s onward. The latter were not fully participatory management institutions as understood elsewhere, however, as their leaders were appointed, they met only once a year and they were limited in what they could do because of problems linking with the state sector (Nickum, 2005).

The approach of the SIDD, originating in the World Bank's Yangtze River Water Resources Project launched in 1995, was to constitute more standing water users' associations (WUAs) as legal persons, who could purchase water from economically independent, multipurpose water supply corporations (WSC), which usually evolved from the lower levels of the state irrigation district system. These corporations could diversify into providing higher revenue water to industry and urban areas as long as

⁵ Originally, the SIDD referred to self-financing districts. Concerns about their financial viability led some to change this to self-managing (Nickum, 2005).

⁶ Effectively irrigated area, the most common measure of irrigated area in China, is more or less the design or command area of a project. It is relatively easy to report, since it does not require measurement or estimation of an area actually watered in a given year, or with a given probability. Hence, it is not a measure of actually irrigated area, and has nothing to say about its effectiveness (Nickum, 2003).

they guaranteed a certain supply of water to agriculture. The model WSC was the Tieshan in Hunan, established under the project to provide water to Yueyang City as well as to irrigators. The problem for Tieshan was the weakness of the interface with the farmers, given their large numbers and small farm sizes (Nickum, 2005).

The SIDDs were promoted widely in China, although not exclusively, as a model for irrigation district reform. They were lauded as combining market mechanisms with democratisation and cooperation (see Li Qiang et al., 2005) and as a mechanism for the compensated transfer of agricultural water rights that was suited to China's conditions (Zhou Zhenmin, 2007). By early 2003, there were 41 SIDDs with both WUAs and WSCs or comparable organisations, and considerably more with only WUAs (Nickum, 2005).

Of the two components, the WSCs were a harder sell, in part because of pricing regulations requiring them to sell to agriculture at a loss, while they were not exempt from corporate taxes. WUAs, on the other hand, were far easier to promote. Nevertheless, despite successes in areas such as reducing conflicts between individual farmers over watering their fields, they met resistance, especially from the township governments, whose budgets suffered financially from the self-funding provisions of the WUAs. In addition, there was a concern that they were simply co-opted by village governments as an additional 'nameplate' (Nickum, 2005). Pro-SIDD Chinese analysts noted a number of problems of implementation:

1. a reluctance to register the WUAs as legal entities, out of concern for the trouble and cost and a lack of understanding of the benefits;
2. the crippling effect on the village- and field-level water management of ageing structures and a lack of adequate delivery structures in the irrigation district, with vastly inadequate state funding for rehabilitation;
3. no mechanism for the WUAs to impose penalties on violators of the rules or check corrupt or violent behaviour;
4. as noted above, especially where the WUAs were organised along village lines, a tendency for WUA management to be absorbed into village governments, resulting in a lack of full-time commitment by WUA-cum-village officials who received no additional remuneration beyond their regular salaries to take on additional and burdensome duties of coordination, motivation and fee collection (Zhou Zhenmin, 2007);
5. similarly, the township and village governments who were asked to transfer authority to the WUA requiring them to change their work style and functions without intervention by third parties to motivate them to do so (a factor identified in a survey of farmers as the single greatest obstacle to reform); and
6. a lack of appreciation by farmers of the value of collective action, especially but not exclusively in WUAs that spanned village boundaries (Li Qiang et al., 2005).

Looking at SIDD irrigation district reform in areas with World Bank loans, Mollinga et al. (2005) found that one of the apparent strengths of the SIDD reforms at the advanced Zaohe Irrigation District in northern Jiangsu was "greater transparency in water fee payment and collection", but even in this instance:

Very few farmers were found who knew the exact details of their water fee. They follow the request for payment of the fee by the village committee, provided the amount of the fee is the same as that of their neighbours.

Of course, transparency does not necessarily mean end-user participation or even high levels of awareness, especially where there are high levels of either trust or resignation.

SIDDs, at least under that name, appear to have faded from view in the literature around 2005, but participatory management and WUAs have continued to be promoted, notably in Central Document No. 1 (conventionally devoted to rural policy) for 2007. In 2009, it was claimed that there were 52,700 WUAs throughout China, covering 23% of the irrigated command area. Over 20,600 of these had been registered (*zhuce dengji*) with the local authorities; about one third of them were in large irrigation districts. Only one-third of all China's WUAs were considered to be clear successes, however (Li Yuanhua, 2009). Even at best, the model is far from universal. Mention of the WSCs, the most controversial part of the SIDD model that provided a method of integrating across sectors, appears to be somewhat rarer. A description of a successful farmers' WUA in Tieshan Irrigation District, the site of the original WSC in the World Bank project, praises the roles of the irrigation district administration and local governments in guaranteeing 'democratic management', with no mention of a multisectoral water company (Huang Weibing, 2009). Nonetheless, a 2010 report from a Tibetan prefecture mentions ongoing organisational reform as constituting the conversion of county water management offices into WSCs and the establishment of village-level WUAs (Xiao Dikang, 2010), indicating the persistence of the SIDD model with Chinese administrative characteristics.

Mollinga et al. (2005) pose the question as to whether SIDD reform, and by extension water reform in general in China, can be understood as a state-led modernisation effort accompanied by technical upgrading and financial sustainability – as an effort to introduce market mechanisms for efficiency purposes, as a sincere effort to give water users democratic control over their systems, as a management simplification exercise or as an attempt by line agencies to gain power at the expense of civil administration. Of course, the answer, as they note, may involve some of all of the above, although in light of the previous discussion, the first and the last options would probably be the principal driving forces. I would add freeing up water for use by higher economic value uses while minimising the impact on agriculture, because irrigation can no longer be considered in isolation when water, labour and administrative resources all have higher uses elsewhere. Democratic control certainly does not seem to be a key objective of the reform, nor does it appear to be effective in the current institutional context.

CONCLUSION

The course of SIDD reform reflects many of the factors raised in this paper. It was attractive to Chinese officials, not only because it brought in project money from the World Bank, but also because it promised to address the well-recognised structural problems of project maintenance funding, pervasive technical and economic inefficiency and the lack of effective links between the state and end-user. The problems it encountered in implementation are not unexpected, and many of them appear to be well-embedded in China's legacy of fragmented authoritarianism, despite a high level of institutional and economic flux over the past three decades. For example, WUAs tend to be headed by local political leaders, since they are the locus of authority. They also rarely transcend existing administrative boundaries. Other problems appear to be newly generated, possibly by the fragmentation and openness of the rural economy under reform, as well as by the strengthening of the responsibility systems for local officials in response to the threat, and often reality, lack of control by higher levels of Party and state. It is easy to see implementation problems, and the continuing near-absence of end-user participation as understood in the Western liberal model, as hardwired. That, however, may be at least in part a problem of the unrealism of the Western liberal ideal. Problems that are common to water management and agriculture well beyond China are also pervasive, notably in the areas of pricing, water rights, food and income security policies and finding the right balance between the public and private good characteristics of water. It is clear that assumptions of an unchanging authoritarianism, whether from indigenous or imported legacies, at best miss critical features of ongoing reforms in China's water sector and the factors that all too often render the progress of those reforms overly glacial, such as the politics of pricing, the complexities of decentralised administration and, ironically, the power of the market.

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