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Bureaucratic Reform in Irrigation: A Review of Four Case Studies

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ABSTRACT: Poor performance of government-managed irrigation systems persists globally. This paper argues that addressing performance requires not simply more investment or different policy approaches, but reform of the bureaucracies responsible for irrigation management. Based on reform experiences in The Philippines, Mexico, Indonesia, and Uzbekistan, we argue that irrigation (policy) reform cannot be treated in isolation from the overall functioning of government bureaucracies and the wider political structure of the states. Understanding of how and why government bureaucracies shape reform processes and outcomes is crucial to increase the actual significance of reforms. To demonstrate this, the paper links reform processes in the irrigation sector with the wider discourse of bureaucratic reform in the political science, public administration, and organisational science literature. Doing so brings to light the need for systematic comparative research on the organisational characteristic of the irrigation bureaucracies, their bureaucratic identities, and how these are shaped by various segments within the bureaucracies to provide the insights needed to improve irrigation systems performance.

KEYWORDS: Irrigation development, irrigation bureaucracies, policy reform, poor systems performance, bureaucratic reform

INTRODUCTION

Poor performance of government-managed irrigation systems persists globally (Jones, 1995; Mukherji et al., 2009a) despite multiple policy approaches over the last four decades to address the problem, often with financial support from major international donor agencies such as the World Bank and the Asian Development Bank (ADB). These approaches include the shift from construction and rehabilitation to Operation and Maintenance (O&M) (O'Mara, 1990) to improve system maintenance, widespread formation of Water Users Associations (WUAs) to give farmers greater involvement in system management (Bottrall, 1981; World Bank, 1986), introduction of Irrigation Service Fees (ISFs) (Svendsen, 1993; Dinar and Subramaniam, 1997) to improve cost recovery, and Irrigation Management Transfer (IMT) (Groenfeldt and Svendsen, 2000; Johnson III et al., 2004) to reduce government expenditure and give farmers greater control and responsibility.

Many of these approaches implicitly recognise the need for bureaucratic reform and the role of irrigation bureaucracies in the reform process. For example, the need for institutional changes was

recognised in the shift in policy and financial focus from construction of new irrigation systems to O&M of existing systems by the formation and establishment of new organisational units responsible for O&M within irrigation bureaucracies. Similarly, the idea of bureaucratic reform is implicit in WUA formation and IMT policy, as both require transfer of responsibilities from the irrigation agency to water users or their representatives. Nevertheless, the implementation of reforms by national governments was rarely associated with fundamental changes in bureaucratic structures. Though international donors behind reform processes were also aware of the need for bureaucratic reform, they typically viewed it merely as a broader governance issue to be addressed outside the irrigation sector through the national political system (Mollinga and Bolding, 2004).

Most research on irrigation reform also tends to neglect the role of bureaucracy and instead focuses either on whether defined reform targets are achieved, or on so-called 'policy preconditions' for such achievement (Vermillion et al., 2000; Theesfeld, 2008; Latif and Tariq, 2009). Some research has focused on how irrigation bureaucracies design and shape reform implementation in line with their own interests and access to resources and as key actors in the policy formulation processes (Oorthuizen, 2003; Rap, 2004; Suhardiman, 2008; Wester, 2008). However, even this work and others (Mollinga and Bolding 2004) do not look at the irrigation bureaucracy as a governance entity in its own right. With the exception of Wade's work (1982, 1984) on canal irrigation in India, analysis of irrigation bureaucracies' identities and their main organisational properties, and how these identities and properties are shaped by existing power structures have hardly been addressed in irrigation literature. Furthermore, the limited general work that has been done on bureaucratic reform in the irrigation sector has not drawn significantly on the theoretical underpinnings of other disciplines strongly focused on the topic of government bureaucracy such as public administration, political science, organisational science, and policy science.

The goals of this paper are to highlight 1) why it is important to link irrigation policy reform processes with the wider debate of bureaucratic reform and 2) the need for additional systematic comparative research on the organisational characteristics of irrigation bureaucracies, their origins, and how they have evolved over time at multiple governance levels (global, national, sub-national, and local). It provides evidence based on the authors' extensive field research on IMT in Mexico, Indonesia, and Uzbekistan and draws on published research from The Philippines – Korten and Siy (1989), Oorthuizen (2003); Mexico – Rap (2004) and Wester (2008); Indonesia – Bruns and Atmanto (1992), Suhardiman (2008); and Uzbekistan – Wegerich (2005), Yalcin and Mollinga (2007), where some study of irrigation bureaucracies has taken place. The findings highlight the need to consider the irrigation bureaucracy itself as an object of interest and an endogenous part of reforms (see also Special Issue on Hydraulic Bureaucracies: Flows of water, flows of power in Water Alternatives) and the imperative to understand: 1) irrigation bureaucracies' identities, rationales, interests, and access to resources and how these determine their position towards reform; 2) the different foci, orientations, and interests of various segments within a single bureaucracy; and 3) the positioning of irrigation bureaucracies within the wider socio-economic and political structures of the state. We conclude that understanding of irrigation bureaucracies' roles and positions, and how they perceive and shape the overall idea of reform, is crucial to increase the actual significance of irrigation reforms.

A BRIEF HISTORY OF IRRIGATION REFORM

Modern irrigation reform efforts began in the late 1970s focused mainly on shifting the emphasis of investment from construction of physical infrastructure to operations and maintenance (O&M) of

existing infrastructure, often called the O&M approach (World Bank, 1986).¹ Within irrigation bureaucracies, the O&M approach manifested itself in the formation of new organisational units in charge of system O&M. The basic idea of reform was that if irrigation bureaucracies put more emphasis on maintenance activities and were assigned a separate budget to perform maintenance, infrastructure deterioration would cease and premature rehabilitation could be prevented. In practice, however, bureaucracies continued to neglect system maintenance (Uphoff et al., 1985; Coward, 1986). This negligence is most apparent in the way O&M budgets are often used for purposes other than maintenance, for example as an additional source for staff salary (Suhardiman, 2008).

In the early 1980s, alongside O&M approach, the concept of farmer participation was introduced as a potential solution to persistent poor performance (Bottrall, 1981; Coward, 1986). The farmer participation concept was encouraged by the emerging influence of community-based approaches in development studies (Coward, 1984; Ostrom, 1990), which pointed out the importance of social organisation and empowerment. Farmer participation in irrigation was encouraged primarily through the formation of WUAs (Lowdermilk, 1986). In general, WUAs were seen as a way to empower farmers to manage their schemes and create incentives to improve system performance, while also indirectly putting pressure on irrigation bureaucracies to provide better services and bring about higher-level reforms. Past and current research shows, however, that there is no clear linkage between WUA formation and improved O&M (Vermillion et al., 2000; Mukherji et al., 2009a; Ghazouani et al., 2012). While WUA formation has resulted in increased irrigation service fee collection in some places (Johnson III, 1997), farmers remain reluctant to pay in other places (Suhardiman, 2008). Similarly, while WUAs have reduced water conflicts among farmers in some countries (Vermillion et al., 2000; Nikku, 2006), in others they exist only on paper or are dominated by rural elites and function mainly as an extension of irrigation agencies to collect fees from farmers (Suhardiman, 2008; Ghazouani et al., 2012).

In the late 1980s, the concept of farmer participation was translated into Participatory Irrigation Management (PIM) and later embedded into Irrigation Management Transfer (IMT). Both PIM and IMT were introduced in response to persistent poor performance of government irrigation systems (Groenfeldt and Svendsen, 2000). The policy shift from farmer participation to management transfer was justified by the neo-liberal discourse in development policy (Carney and Farrington, 1998). In the irrigation sector, though, the discussion tends to narrow down to economic incentives and financial arrangements for system management (Moigne et al., 1994; Dinar and Subramaniam, 1997). In this context, the purpose of management transfer is to reduce government expenditure in the irrigation sector and give financial responsibility and incentive to farmers for O&M. In the late 1990s, IMT was also linked to the concept of good governance (Grindle, 1997) and civil society movements. In the irrigation sector, this was symbolised by attempts to increase farmers' decision-making authority in system management.

International donors and policy makers perceived management transfer as the key to solve the problem of persistent poor performance in government irrigation systems. With IMT, they proposed the transfer of irrigation management tasks and responsibilities (both operationally and financially) from the irrigation agency to farmers' groups or WUAs and Federations of WUAs (FWUAs) at, respectively, tertiary and secondary levels of the irrigation systems. IMT presents the most extreme idea of bureaucratic reform within irrigation by partly moving system management tasks and responsibility from the irrigation agency staff to WUAs and FWUAs. Though there are a few exceptional cases where IMT has been documented to have resulted in improved system performance and better cost recovery, such as in Turkey and Mexico (Samad, 2001), in general, poor system performance persists as WUAs, and FWUAs remain dependent on irrigation agency field staff for their water

¹ In practice, however, construction of irrigation physical infrastructure continued into the early 1990s and is again back on the development agenda.

distribution and play only limited roles in overall system management, even after the transfer (Oorthuizen, 2003; Mollinga and Bolding, 2004; Suhardiman, 2008).

What is notably absent in each of the efforts to improve irrigation performance is a recognition that irrigation bureaucracies themselves are one of the main actors in the irrigation sector. While reform proponents might understand that bureaucracies do not always support reforms, or that bureaucracies have other objectives beyond improved irrigation performance (Araral, 2008; Suhardiman and Mollinga, 2012), this understanding seems not to be taken into account in the shaping of reform policies. Instead, reform policies typically assume that improved irrigation system performance is everyone's goal and do not consider how change may (or may not) benefit the bureaucracies themselves. Questions such as what incentive the lower and middle regiments of the bureaucracy have to support IMT if there is no obvious benefit to them and, in fact, if they may lose their jobs, are not asked. While consideration of bureaucratic interests and power is key to effectiveness of reform, it has been disregarded in the formulation and implementation of reform policies.

It is thus not surprising that the current discourse on irrigation reform also lacks substantial discussion on the fundamental roles and constraints of existing bureaucracy in moving towards improved system performance. Given that the irrigation literature does not have a strong history of research on bureaucracies and bureaucratic reform, we now review how both have been viewed and addressed in other disciplinary fields. Based on the review, we develop a typology to examine key contributions and gaps in the limited irrigation literature in which bureaucracy has been discussed. In turn, we use the results to draw lessons on how future research could provide insights into the role and possibilities of bureaucratic reform in irrigation.

DIFFERENT APPROACHES TO CONCEPTUALISE BUREAUCRATIC REFORM

The idea of bureaucratic reform has been perceived in different ways by different disciplines, contributing to various approaches to reform. This section describes and discusses the idea of bureaucratic reform from the fields of political science (Furlong, 1998; Olsen, 2008), public administration (Klitgaard, 1997; Awortwi, 2010), and organisational science (Whitford, 2002; Lowndes, 2005).

Political science

In political science, bureaucratic reform is analysed from the perspective of power struggles, focusing mainly on the relationship between politicians and bureaucrats (Carboni, 2010) and how they shape and reshape their connections in line with their own interests, strategies, and access to resources. From both the actors' and institutions' perspectives, it looks at bureaucrats' and politicians' access to power, the types and sources of power that they possess (Olsen, 2008), and how they strategically use power to produce authority and gain control over each other. Focusing on an understanding of power relations within the bureaucracies and how it is linked to wider political system or constellation, political science studies on bureaucratic reform view bureaucracies as part of a larger political and institutional order and not as a closed system.

Political science studies look at politician-bureaucrat relations through two distinct analytical lenses. The first lens looks specifically at the political forces (i.e. Parliament, Senate, Judicial system) (Weingast and Moran, 1983; Waterman and Meier, 1998; Miller, 2005) governing and influencing bureaucratic functioning (Furlong, 1998). It positions politicians as the power holders and emphasises the role of political authorities in shaping the bureaucracy (Moe, 2002), bringing to light the bureaucracy's many 'masters'. It views reform as a procedure to adjust or change the current functioning of the bureaucracy to meet politicians' needs and objectives (Gains et al., 2008). Bureaucratic reform here focuses mainly on formal actions such as the formulation of parliamentary acts or other regulations as politicians' means to govern and control the overall functioning of the bureaucracy.

The second lens highlights the role of government bureaucracy as an agent with its own interests and identity (Niskanen, 1971). It discusses the notion of bureaucratic autonomy or the political power of the agent in policy making, and how such power can be gained by ensuring the agent's access to important resources. This lens focuses on the analysis of agencies' expertise and mission (Rourke, 1984) and how they use these as a source of power vis-à-vis the power of politicians to control the bureaucracy. As stated by Olsen (2008: 17): "The bureaucracy is an institution with a *raison d'être* of its own, organisational and normative principles with intrinsic value, and some degree of autonomy and legitimate non-adaptation to leaders' orders and environmental demands". Quarles van Ufford (1988), Moe (1989) and Mosse (2004) also discuss this notion of 'bureaucratic identity', emphasising the importance of understanding the government bureaucracy's main interests, and basic mechanisms in shaping its strategy to gain, sustain, and reproduce power (Espeland, 2000).

Public administration

Analysis of bureaucratic reform from a public administration perspective is mainly derived from New Public Management (NPM) approaches. These approaches focus on increasing the overall efficiency of government bureaucracies to serve the economy better by 1) shrinking the public sector and limiting the role of government in society and economy; and 2) improving control over public administration through market competition and pricing systems (Christensen and Laegreid, 2003).

The rationale behind reform is mainly linked to the need to invigorate the civil service through, for instance, the positioning of markets as alternative governance mechanisms. In line with this rationale, the need for reform is often argued from the perspective of budget shortage caused either by growing government expenditures or declining revenue (Awortwi, 2010). Proposed reforms include privatisation, deregulation, devolution of authority, commercialisation, outsourcing, joint venture, public private partnership, and management by contract and competitive tendering. The NPM approaches present government bureaucracies as administrative agencies with clear task definitions, distinct goals and responsibilities, and transparent access to resources.

NPM approaches have been criticised for their attempts to depoliticise decision-making and protect 'impartial' expertise against political influence by delegating authority to single-purpose institutions (Christensen and Laegreid, 2003) and for the mere fact that markets, like governments, are not perfect either (Olsen, 2008). NPM critics argue that NPM has been highly ambivalent about reform implications, especially in relation to political control and accountability (Mulgan, 2000).

More recent debates in public policy on bureaucratic reform bring to light the issue of bureaucratic preferences and the important role of senior officials in shaping these preferences (Gains et al., 2008). Dunleavy's (1991) bureau-shaping model put the idea of bureaucratic preferences at the centre stage of current discussions. Countering Niskanen's (1971) earlier analysis that public servants will seek to inflate the budgets of their bureaus, Dunleavy's analysis shows that bureaucrats link their perception of reform with their job preferences. Most importantly, this analysis highlights the heterogeneous nature of government bureaucracies irrespective of their positions, tasks and roles. This extends the concept of bureaucratic autonomy developed in political science, emphasising the fact that government bureaucracies can have various, sometime conflicting, interests. This implies that distinct bureaucratic segments can view, respond and implement reform differently.

Organisational science

From the perspective of organisational science, the idea of bureaucratic reform is discussed mainly from the view of government bureaucracy as an institution. The work looks at the bureaucracies' organisational structures, rules, procedures, mechanisms, and cultures and how these influence their functioning (Cabrera et al., 2001). How bureaucratic/organisational rules are defined, applied, shaped and reshaped form the central analysis in organisational theory. As stated by Lowndes (2005: 294):

"Rules create positions; they determine how participants enter or leave these positions; what actions they are permitted to take; and what outcomes they are allowed to affect".

In organisational science, bureaucratic reform is discussed using two alternative approaches (Lowndes, 2005): 1) institutional inertia and 2) institutional innovation. Institutional inertia highlights the issue of path dependence (Stewart, 2000) and how it can potentially affect institutional reform. Referring to the idea of the 'inherited world', proponents of the path dependence view argue that once politicians and policy makers have begun moving down a particular path, the costs of changing paths are high. The institutional innovation approach focuses on the notion of 'punctuated evolution' (John and Margetts, 2003) and on how the evolution in an institution or organisation is shaped by the adoption of new ideas (innovations). In practical terms, bureaucratic reform in the institutional innovation approach takes the form of agency's reorganisation.

In line with the notion of bureaucratic identity from political science, organisational science highlights the importance of bureaucrats in shaping reform processes and outcomes through organisational culture (Schein, 1992). Organisational culture refers to the set of values, norms, attitudes and beliefs, which exist within every organisation and is comparable to the idea of belief systems in the Advocacy Coalition Framework (Sabatier and Hunter, 1989). As stated by Carboni (2010: 381): "This set of values is increasingly rooted inside organisations. It shapes members' identities and practices over time". This implies the importance of bureaucrats as an endogenous part of reform.

CASE STUDIES OF IRRIGATION REFORMS

In this section we examine how the insights on bureaucracy of the three schools described above have been partially incorporated in published analyses of irrigation reform. As noted, there have in fact been few studies that specifically examine irrigation bureaucracy. We thus take The Philippines, Mexico, Indonesia, and Uzbekistan as our case studies, because they are amongst the few examples of countries where scholars have examined how irrigation bureaucracies perceive the overall idea of reforms, how this perception shapes the reform process, and to a certain extent predetermines reform outcomes. The studies behind the four examples provide insights on power struggles in shaping reform processes and outcomes, how such struggles are driven by multiple bureaucratic interests, how these interests are linked to the institutional trajectories of the irrigation bureaucracies, and how all these factors determine various actors' reform strategies. We argue that better understanding of all these research elements on bureaucratic reform is crucial to increase actual significance of reform. We use insights and lacunae from these four examples as our starting point to highlight the need for a comprehensive and systematic analysis of (bureaucratic) reform processes in irrigation.

The Philippines

The Philippines was one of the first countries to implement Irrigation Management Transfer (IMT) and began the process in the early to mid-1980s as part of the World Bank-funded Irrigation Operation Support Programme (IOSP). IMT continues to be implemented in The Philippines as part of donor-funded programmes, sometimes in the same places where the reform was started 30 years ago. The need for bureaucratic reform in the Philippine irrigation was implied in two contrasting sets of ideas, which formed the rationale for the Philippine IMT policy. The first were New Public Management approaches aimed at reducing the size of government bureaucracies and increasing its overall efficiency. The second were organisational reforms through farmer empowerment.

IMT policy formulation and implementation formed an integral part of Philippine 'streamlining policies', which aimed to cut costs by reducing the number of the National Irrigation Administration (NIA) staff. These policies were pushed by the central government in response to a fiscal crisis that started in the beginning of the 1980s and continued to the end of the 1990s. In line with these streamlining policies, IMT was linked with the idea of financial autonomy. Unlike earlier, the NIA, as a

government corporation, was to generate its own income and operating funds through collection of fees from farmers in return for service provision to the farmers. One result was a steep decline in staff within the NIA as evidenced, for example, by large reductions in its key service providers, the field staff.

The idea of organisational reforms through farmer empowerment was linked to the Assistant Administrator of the NIA's (Benjamin Bagadion) efforts "to promote what has come to be known as 'the participatory approach' in irrigation system management" in which farmers take on greater responsibility for irrigation management. The approach was originally inspired by a strong belief in the capability of farming communities to organise themselves as well as by a perception that organisation and empowerment of farmers would serve as a means of reducing anti-Marcos and anti-authoritarian struggles (Castillo, 1983; Illo and Volante, 1984; Raby, 1997). IMT thus became a policy means to reduce government expenditures, involve farmers in irrigation system management and increase farmer access to decision-making through substantial changes in NIA-farmer relationships.

In operationalising IMT, government agencies turned over part of irrigation system management to farmer organisations via newly established WUAs. NIA district engineers saw the downsizing of their field staff as a great loss for system management. Moreover, as NIA national staff began to see the development of WUAs as a potential threat to their bureaucratic importance, the degree and scope of IMT was weakened and farmers' involvement in system management was narrowed. In addition to these problems, those reform-oriented groups within the NIA lost power after the fall of Marcos in 1986, and reform programmes no longer attempted substantial change in NIA-farmer relationships.

Consequently, the World Bank-funded IOSP programme did not result in as great an increase in turnover of system management as previously planned. Instead, IMT became merely a tool to cope with the NIA's financial problem, rather than to re-organise the overall set-up of irrigation system management at district level. In practice, the NIA used development funds from donors mainly for system rehabilitation and construction and only a small portion of it went for 'institutional development' (Oorthuizen, 2003).

Scholarship on irrigation reform in the Philippines has looked at two aspects of bureaucracy, partially linking IMT policy analysis with the notion of bureaucratic reform. Korten and Siy (1989) look at the bureaucratic transformation during the early years of reform focusing mainly on the role of irrigation agency field staff in fine-tuning water delivery schedules through NIA-farmer relationships at communal systems. Oorthuizen (2003) analyses irrigation reform processes in the post-Marcos era from a political economy perspective, emphasising the close link between IMT policy formulation and the neo-liberal development model. As stated by Oorthuizen (2003: 41):

The Philippine government's motivation for these policies was based on neo-liberal views on a lean and mean state. Moreover, anti-authoritarian feelings inspired such policy making during the post-Marcos administration of President Aquino whose key slogan was 'people's power'. The bureaucracy had to be cleansed from anti-democratic elements and government corporations, like the NIA, had to be closed down or at least set free from Marcos cronies.

Oorthuizen (2003) shows how the bureaucratic transformation processes in the early years of reform had been halted due to conflicts of interest between various segments within the NIA, as reflected in the power struggles between local/sub-national irrigation staff and their national colleagues. He shows how attempts of irrigation agency field staff to extend the scope and degree of reform to the national level were stalled, as they did not correspond to national bureaucracy goals and interests. As stated by Oorthuizen (2003: 38):

The early programs designed for national systems tried to build up strong farmer associations that would be given real authority in the management of the systems, and which would have access to considerable funds. This however, did not push through.

Mexico

Mexican Irrigation Management Transfer (IMT) in the 1990s is also associated with global irrigation policy models aligned with neo-liberal doctrines. However, what is less known is that the origins of Mexican reform lie in a bureaucratic struggle that preceded the neo-liberal period. In 1976, President Lopez-Portillo merged the smaller but financially affluent SRH (Ministry of Hydraulic Resources) with the larger but financially poorer SAG (Ministry of Agriculture) to create the SARH (Ministry of Agriculture and Hydraulic Resources). The reform ostensibly served to unify all activities related to agriculture in one ministry, but it was also designed as a political punishment for senior water bureaucrats who supported the losing candidate during the previous presidential campaign (Rap et al., 2004).

With the creation of SARH, the SRH was effectively downgraded to the level of an under-ministry. The SARH fusion negatively affected a set of 'overriding concerns' characteristic of the organisational culture and professional identities of the water bureaucracy. These concerns were 1) financial autonomy, 2) bureaucratic autonomy and authority, and 3) control over the irrigation districts. Bureaucratic reforms in the decades after this merger were shaped by attempts of former senior SRH officials to redress a situation of declining bureaucratic status and professional authority within the state apparatus. The fusion renewed a bureaucratic struggle between functional rivals that had historically competed over the bureaucratic jurisdiction of irrigated agriculture.

In 1982 an economic crisis hit Mexico, which resulted in the organisational restructuring of SARH, the lifting of government subsidies for agricultural input, and reduced expenditure in irrigation and other areas of public investment. To make matters worse, the World Bank stopped its loans to the irrigation sector as a response to the moratorium on payments of foreign debts declared by the Government of Mexico. SARH budget shortage and international financial pressures provided the entry point for the emergence of management transfer as a policy idea.

A new ideological wind rose that focused increasingly on the misgivings of public irrigation management. Too many public investments in irrigation were not effective, it was argued. Public agencies were more interested in constructing new infrastructure than in managing water efficiently and maintaining systems well. Further, because irrigation fees were low and not re-invested, irrigation systems could not sustain themselves financially. As a result, systems were not maintained or rehabilitated and productivity levels in irrigation were declining.

By 1986, senior civil engineers within SARH had begun to discuss the transfer of irrigation districts as a policy option that could address these issues and help to regain international loans, financial autonomy and control over the irrigation districts. Dr. Gonzalez Villareal, a former water planner, headed the resumed loan negotiations with the World Bank in 1986, and in 1988 he supported the presidential campaign of Salinas de Gortari with his expertise on the water sector. In the run-up to the presidential elections, his group was therefore able to act on several of the above-mentioned concerns of the hydraulic bureaucracy and introduce policy ideas that were received favorably by the president and international donors. In 1989, shortly after becoming president, Salinas created the National Water Commission (CNA), which restored autonomy to the hydraulic bureaucracy. The CNA still resided under the Ministry of Agriculture, but it gained the authority to enter into direct contact with the president and international donors and to regain control over the irrigation districts and autonomy over finances (Rap, 2004). After 1994, CNA became part of the newly formed Ministry of Environment where it enjoyed an even larger autonomy.

In the early 1990s, Salinas' government (1989-1994) transferred 2.5 million ha (of 3.4 million) of government irrigation districts to WUAs. The speed of transfer surprised donors, consultants, water professionals and researchers alike. Consequently, Mexico's IMT programme was considered a 'success' in water-policy circles, and the Mexican policy model became an international showcase for promoting neo-liberal water reforms (Gorriz et al., 1995; Johnson III, 1997). To investigate this success, a

significant part of the internationally financed research has subsequently focused on measuring the impact of IMT on the performance of irrigation systems and has shown mixed results (Johnson III, 1997; Kloezen et al., 1997; Vermillion, 1997; Garcés-Restrepo et al., 2007).

In general, the policy literature on IMT in Mexico has presented the bureaucratic reforms as an unavoidable governmental response to the economic crisis of the 1980s:

This process [IMT] was initiated as a result of mounting budgetary pressures during the financial crisis that Mexico experienced during the 1980s. Investments in the irrigation sector fell dramatically, resulting in deterioration of the schemes, poorly maintained irrigation and drainage canals, roads and infrastructure. This period of structural adjustment *forced* drastic changes in Mexico's agricultural and irrigation policies. The program to transfer management of the irrigation districts to water users was adopted *out of necessity* (Groenfeldt, 1998: 55-56; emphasis added).

It has also framed the reform process in a way that underplayed the political and bureaucratic dimensions of water reforms.

Rap et al. (2004) and Wester et al. (2009) show the crucial role of the planning segments of the hydraulic bureaucracy in the making of reforms and the success of a policy model (Rap, 2006). Bureaucratic reform was the outcome of a politically motivated merger that ensued a power struggle between the agricultural and hydraulic bureaucracies (Rap and Wester, 2013). As senior bureaucrats played an important role in making reform strategies, it is further not surprising that they did so in self-serving ways. These senior officials devised strategies to bypass the lower-level bureaucratic opposition to the loss of jobs through a mixture of early retirements, frequent staff circulations and employment of temporary teams of community organisers to build local support for the transfer. Furthermore, the Mexican case suggests that international political and economic structures exerted financial and political pressures to impose neo-liberal reforms, and also that they depended on national bureaucratic actors to demonstrate a credible and legitimate policy model to be followed elsewhere. In addition, the account of a bureaucratic merger shows how historically shaped bureaucratic identities and contrasting cultures play a role in reform trajectories.

Indonesia

In Indonesia, IMT policy was first adopted in 1987, under the Irrigation Operation and Maintenance Project (IOMP) statement, and renewed in 1999 under the World Bank-funded Water Sector Adjustment Loan, or WATSAL. In the 1987 statement, IMT was formulated as part of a policy agreement between the irrigation agency and the World Bank as the funder of the project. Under WATSAL, IMT was linked to the overall application of regional autonomy (Aspinall and Fealy, 2003) following the country's political reform and the fall of the Suharto's 32 year regime in 1998.

Under the IOMP, the irrigation agency agreed to adopt IMT as part of donor preconditions for further projects, as it lacked any other financial resources to meet O&M costs. In conjunction with the IOMP statement, the irrigation bureaucracy established a new unit called the Operations and Maintenance and Farmer Management Unit. Initially established at the national level, the unit was later spread to provincial levels as well. The unit was designed to link main system management with farmers' water distribution practices at the field level. In practice, however, the unit failed to function as an 'agent of reform' within the irrigation bureaucracy. Instead, it was co-opted into mainstream bureaucracies, dominated by infrastructure-oriented civil engineers (Suhardiman, 2008).

Under WATSAL, the degree of management transfer was increased (up to main system level), and IMT was implemented on an unprecedented scale. The scope of the IMT programme was extended to all irrigation systems in Indonesia, regardless of their size and location. In addition, WUAs were authorised to manage ISFs and were allowed to decide on the allocation of development funds for irrigation system improvement (Government Regulation number 77 of 2001 on irrigation). Putting the

regional autonomy policy as the umbrella for IMT, the World Bank appointed the Ministry of Home Affairs (MoHA) as the second implementing agency for IMT, next to the irrigation bureaucracy.

In 2004, however, the irrigation bureaucracy redirected irrigation sector development towards re-centralisation with the promulgation of a controversial Water Law, following the power struggles between various segments within the bureaucracies and involving politicians, civil society groups and academics. Relying on the Law as its legal back-up, the irrigation bureaucracy limited farmer participation to the tertiary level, cancelled earlier accounts of management transfer, and halted IMT programme implementation altogether.

Scholarship on irrigation reform in Indonesia has brought to light the irrigation bureaucracy's interests in infrastructural development and the notion of power struggles in IMT policy formulation and implementation, partially linking IMT policy analysis with the notion of bureaucratic reform. Bruns and Atmanto (1992) illustrate how the irrigation bureaucracy transformed IMT into a construction programme, shifted the emphasis from management transfer to construction works by strategically redefining the systems classification for turnover. Vermillion et al. (2000) show how the irrigation bureaucracy perceived IMT as a policy tool to mobilise development funds. Under WATSAL IMT renewal, Suhardiman (2008) describes and analyses how the World Bank's decision to appoint MoHA to implement IMT, next to the irrigation agency, was done to limit the irrigation agency's ability to hijack the actual implementation of IMT towards construction-based development by reducing its access to sectoral development funds and in so doing preventing potential delays in irrigation system turnover.

Suardiman (2008) analyses how the irrigation bureaucracy shaped IMT renewal and implementation, from its early stage of reform in 1999 until 2003, shedding light on the power struggles inherent in reform processes. She illustrates that the Bank's successful attempt to reconfigure the post-reform political context in Indonesia was due to the fact that the Ministry of Public Works (MPW) under which the irrigation bureaucracy was formerly located was abolished in 1999 at the very moment the IMT renewal was started. The MPW was abolished following the anti-corruption movement in Abdurrachman Wahid's presidency. Following the abolition, the irrigation agency was placed under the new Ministry of Settlement and Regional Development (Kimbangwil).² Between 1999 and 2001 the IMT programme implementation was carried out through Kimbangwil. In 2001, Kimbangwil was changed into the Ministry of Settlement and Regional Infrastructure, or Kimpraswil.

Suardiman (2013) illustrates and discusses how the formation of Kimpraswil led to the revival of the former MPW high officials, the so-called core policy actors (Sabatier and Hunter, 1989) within the irrigation bureaucracy, and resulted in struggles over the principles of management transfer at national level involving various government ministries, representatives of political parties, members of parliament, civil society organisations, and academics. These struggles started with the bureaucratic clash between Kimpraswil and MoHA with regard to their role as government agencies in charge of IMT implementation and were followed by subsequent political coalitions and counter-coalitions in the parliament.

Suardiman (2013) describes how the irrigation bureaucracy regained its prominence in 2003 following the formation of Kimpraswil. The success of the former MPW officials' effort to regain their bureaucratic importance is rooted in the fact that policy reform was formulated and implemented primarily through strong bureaucratic support from the Kimbangwil minister. The majority of former MPW officials who had positions in Kimbangwil, on the other hand, continued to favour infrastructure-oriented irrigation development. The role of officials supporting reform was important in channelling

² With the abolition of the MPW in 1999, the core policy actors in the irrigation agency were excluded from the overall decision-making process in irrigation sector development. In addition to the formation of Kimbangwil, the abolition of MPW was followed by the formation of the State Ministry of Public Works (Meneg PU), which consisted primarily of 'one hundred brightest officials' selected by the former MPW high officials.

policy information to the Kimbangwil minister. Nevertheless, they were unable to inculcate their pro-reform development perception in other officials in the agency. Consequently, the majority of officials in Kimbangwil welcomed the return of core policy actors to bureaucratic leadership. Kimpraswil's name has now been changed back to MPW.

The Indonesian case illustrates that formulation and implementation of policy reforms involve continuous power struggles shaped by conflicting bureaucratic interests between different bureaucratic and political segments of the state. Like the Mexican case, it singles out senior bureaucrats as key actors in shaping and reshaping reform strategies, initiatives, processes, and outcomes. In addition, it illustrates the important role played by international donors in facilitating reform processes and the irrigation bureaucracy's power to resist donor-driven policy reform agenda.

Uzbekistan

During the time of the Soviet Union, the Uzbek SSR was the cotton and irrigation development centre for Central Asia and had been supported by the Ministry of Melioration and Water Resources (MMWR) since 1927-1928. Thurman (2002: 5) argues that "by law, the functions of customer, planner, and contractor were concentrated within this single ministry". Within the Soviet Union, the MMWR was structured according to administrative boundaries at province (12 provinces and 1 autonomous republic) and district level. Up to the mid-1980s the Uzbek SSR was engaged in a hydraulic mission, increasing irrigated area to 4.2 million hectares and giving the Uzbek SSR one of the largest irrigation systems in the world. In 1991 Uzbekistan gained independence from the Soviet Union. With independence, Uzbekistan's GDP fell back to the level of the early 1980s (Dukhovny and Sokolov, 2003: 7), and as a consequence government in general was scaled down and the MMWR budget was reduced by 50% (Thurman, 2002: 7).³ Thurman (2002: 8) links the reduced budget to "very low salaries, small operational budgets, and very little equipment". As a result the Ministry did not have the logistical capacity to fulfil its role to control water distribution (Wegerich, 2004). Similar to other Central Asian countries, the Uzbek MMWR proposed the introduction of water supply charges to make up for the reduced budget (1993), but the proposal, which was particularly opposed by the Ministry of Agriculture (MA), was rejected (Yalcin and Mollinga, 2005).

In 1996/67 the MMWR and the Ministry of Agriculture (MA) were merged into the Ministry of Agriculture and Water Resources (MAWR) with the MMWR becoming a broader Water Resource Department (WRD). The new WRD lost not only staff and decision-making power, but also its old organisational objective of distributing water resources equitably. The dominant objective of the merged organisation became the old objective of the MA, namely fulfilling agricultural targets based on state orders (Wegerich, 2005). Uzbek water professionals obviously interpreted the merger as a decrease of status and power (Dukhovny et al., 2012).

In 2003, the reform of the irrigation bureaucracy in Uzbekistan continued with the restructuring of the water management departments at lower administrative levels (provinces and districts). The WRDs at provincial and district levels were restructured based on hydrologic units. Formerly based on administrative boundaries, WRDs are now structured in line with basin and irrigation system boundaries. The reform created ten Basin Irrigation System Administrations (BISAs) with four to five Irrigation System Administrations (ISAs) within every BISA.

Scholarship on irrigation reform in Uzbekistan has looked at reform design and implementation. Yalcin and Mollinga (2005: 20-21) have emphasised that Djalalov (the First Deputy Minister of the MAWR from 1997 to 2004) was key "in designing and driving the reform" by trying to convince higher

³ Compared to other Central Asian countries, Uzbekistan was still better-off and the contraction as well as consequence for the MMWR were not as dramatic.

authorities and by closely cooperating with the international donors in Uzbekistan.⁴ They argue that the reform had the objective "to 'depoliticise' certain sectors to achieve more effective and efficient planning and management while maintaining centralised control" (Yalcin and Mollinga, 2005: 21). Informally, Djalalov (personal communication, 2012) reasoned that he lobbied and initiated the reforms mainly because of "the 'liquidation' (lowering the status) of the district water administrations and for protecting their staff". Hence, at that time, his interest was mainly to re-strengthen the power of the water bureaucracy.

Looking at the implementation of the reforms, Wegerich (2009) shows how powerful administrative units took advantage of the reforms to determine boundaries of the new management units as well as their locations. In addition, he highlights that personal allegiance and preferences of irrigation bureaucrats influenced the implementation of the reforms as well as the operationalisation thereafter. Looking at the budget of the WRD as well as staffing, it appears that with the restructuring the budget and staff declined further, with the budget increasing again only after 2007. In this respect, it is questionable whether Djalalov achieved his hidden aim. Moreover, Djalalov et al. (2011: 18) argue that out of the ten BISAs, "five BISAs are set up mainly within provincial boundaries (...) most ISAs have been set up without allowing for hydrographisation, [which] lower the efficiency and at the same time quality of water management".

More recently, the Uzbek water bureaucracy 'discovered' the concept of Integrated Water Resources Management (IWRM) and started to argue that "Considering that agriculture is only one (albeit the largest) of numerous water users, the above mentioned integration [the merger between the two Ministries] does not correspond to the IWRM principle about linking all kinds of users" (Dukhovny et al., 2012: 91, see also Djalalov et al., 2011). In effect, the Uzbek water bureaucracy began to propose not only a separation of the water resources and the agriculture sector but a priority to the water sector (Wegerich, 2014). The senior water bureaucrats used IWRM to emphasise that a water authority needs to attend different water users, not only agriculture, and that it is therefore better-off being autonomous from the Ministry of Agriculture.

The Uzbekistan case highlights how reform processes were driven first by external circumstances and then by issues of power not only within the water bureaucracy but also between bureaucracies, and by power struggles rooted in conflicting bureaucratic interests at the national level as well as the important role of senior bureaucrats in initiating and shaping reform processes and policy. However, it also suggests that bureaucrats did not always act in the best interest of the bureau but according to personal preferences. An important question the case study brings out is whether the bureaucracy can function according to its mandate or objectives when it does not have the necessary budget and logistical resources.

A TYPOLOGY OF CONTRIBUTIONS AND GAPS IN CURRENT RESEARCH ON IRRIGATION REFORMS

Our review of the bureaucratic reform literature in the fields of political science, public administration and organisational science highlighted the importance of four key areas for the understanding of reform processes. These are power struggle, bureaucratic interests, institutional trajectory and reform strategy. In this section we discuss how scholars of irrigation reform in our four case countries incorporated these areas into their research analyses, the insights they gained in doing so, and what might be added to both research and policy through further consideration of these issues in both irrigation reform research and implementation.

⁴ The drought years of 2000 and 2001 which were aggravated by upstream provinces and the objective of the MA at that level (Dukhovny, 2002; Wegerich, 2007), might have also created a window of opportunity for Djalalov to push for the reform.

Analysis of power struggles: From a focus on bureaucracy to an understanding of its place in the state and larger changes

The broader literature has examined how power struggles occur between bureaucrats and politicians as well as between segments of a particular bureaucracy. Research in political science, public administration and organisational science all show how power struggles are shaped by wider political constellations and the internal dynamics of government bureaucracies.

The case studies showed how bureaucratic segments engaged in power struggles to reshape the neo-liberal reforms that threatened the financial and bureaucratic autonomy of the irrigation bureaucracy. While these power struggles may have different precedents and outcomes as illustrated in each of the case studies, they are all driven by the irrigation bureaucracy's intent to preserve their bureaucratic interests. In Uzbekistan, the reforms merged agricultural and irrigation bureaucracies which significantly reduced the organisational power (logistics, salaries, number of staff and control over water and other resource flows) and budget independence of the latter. The decrease of bureaucratic status motivated senior bureaucrats to lobby for reforms that re-strengthened the power and budgetary discretion of the water bureaucracy. Similarly, in Mexico a bureaucratic merger threatened the financial and bureaucratic autonomy of the hydraulic bureaucracy, which specific segments consequently sought to restore by means of promoting IMT policy and other institutional reforms. In Indonesia, these power struggles are most evident in the incorporation of the MOHA as the second implementing agency for IMT, next to the irrigation bureaucracy, and how the irrigation bureaucracy responded to it to regain its power and prominence. The Philippines case illustrates how attempts to upscale IMT and bureaucratic downsizing driven by donor-supported calls for financial autonomy unleashed a power struggle between national and sub-national bureaucratic segments, which effectively obstructed further reforms, reducing their impact to public expenditure cuts instead of fundamentally changing NIA-farmer relationships. All four cases further show that neo-liberal reforms which seek decentralisation also generate a bureaucratic response that contests and delimits the transfer of power to sub-national scales and results in (re)centralisation (Ribot et al., 2006).

However, the studies did not engage with a number of other important areas of power struggle in bureaucratic reform. First, the cases did not address the internal differences in bureaucracies according to organisational properties, professional solidarities, and bureaucratic identities. We still know little about the irrigation bureaucracies as both unified and fragmented entities. For example, a major reason for the relative homogeneity of irrigation bureaucracies around the world is that they are composed of engineering cadres that are often recruited from the same prestigious engineering schools and have often developed bureaucratic careers in the same Ministry. At the same time, they are differentiated according to professional hierarchies, prestige rankings (among civil engineers, agricultural engineers, agronomists, hydrologists) and the work they do in different bureaucratic segments (construction, irrigation, drainage, maintenance, machinery, planning, administration). As such they develop different interests and positions that influence how they perceive reforms.

Second, how bureaucratic groups interact with political actors concerning reforms has been largely absent from the case studies presented here. This gap invites further research, since the cases produce sufficient ideas to challenge the traditional political-science view, which considers that political actors take policy decisions and bureaucrats implement them. The question is why irrigation and water management have been areas of public administration in which bureaucrats or technocrats have a relatively large say in determining and shaping reforms vs. party and parliamentary politicians.

Third, the changing position of bureaucracies in the larger state structure as a result of reforms has only partly been discussed in the four case studies. The reforms in several cases downgraded the status of the irrigation bureaucracy and radically curtailed its financial abilities and personnel, which

generated a bureaucratic response to reverse the proposed policy change and improve the bureaucracies' standing within the wider set of state institutions.⁵

Fourth, the way in which reforms are part of wider political and economic transitions of nation-states has hardly been analysed in the four case studies. For example, in Uzbekistan the collapse of, and independence from, the Soviet Union implied loss of water control in Uzbekistan, since Uzbekistan is a downstream country and upstream riparian states have control over dams impacting it. The collapse of a highly centralised Soviet state structure caused a decline in previous methods of control over the use of land and water. This might explain why the new national bureaucrats in Uzbekistan have little bureaucratic identity, organisational culture, norms and values to fall back on in defending their bureaucratic jurisdiction within the new state apparatus. Both in The Philippines and Indonesia power struggles in irrigation are part of a wider political struggle affecting the power base of bureaucracies. The presidential transition from Marcos to Aquino in The Philippines reinforced an anti-authoritarian and democratic cleansing of the state bureaucracy and a neo-liberal push towards a lean and mean state. This created contradicting interests between different bureaucratic levels, which halted reforms. In Indonesia the power struggles over IMT was part of the political reforms after the fall of the New Order Regime of Suharto which produced a push against corruption in the central government and a move towards regional autonomy. This resulted in the abolition of the Ministry of Public Works (MPW), under which the irrigation bureaucracy was located.

To be able to identify potential entry points to promote bureaucratic reform, current research on irrigation (policy) reform needs to consider national states, government bureaucracies, and how they operate within the overall political system as an integral part of the analytical framework. In line with the notion of positioning and supporting the state to lead reform processes (Merrey et al., 2007), such incorporation would help the irrigation research community and practitioners to design, formulate and implement reform measures, which perhaps are less ambitious but more grounded in the realities of power struggle and therefore have better chances of success.

Understanding the entire spectrum of bureaucratic interests beyond the hydraulic mission

In political science, public policy and organisational science, bureaucratic interests have been analysed in line with the notions of bureaucratic and financial autonomy, while also taking into account the notion of job preferences of various segments within a given bureaucracy. This work highlights the way bureaucratic interests are rooted in each agency's expertise and mission and shows how these become a means to sustain and reproduce bureaucratic power.

Scholars highlight the concept of hydraulic mission (Worster, 1982, 1985; Turton et al., 2004; Wester et al., 2009) to explain the correlation between bureaucratic interests, the size of the budgets received from both the state treasuries and international donors, the number of staff, and infrastructure-oriented development (Molle et al., 2009). Bureaucratic attempts to protect these interests have been demonstrated in studies showing how irrigation bureaucracy transformed IMT programmes into construction and rehabilitation projects in Indonesia (Bruns and Atmanto, 1992) and how, in Uzbekistan and Mexico, the bureaucracies protect their interests by using the IWRM concept as a means to sustain power and territory (Wester, 2008; Djalalov et al., 2011; Dukhovny et al., 2012).

Irrigation scholars also analyse the iron triangle between politicians, bureaucrats, contractors and other actors (Woodall, 1993) and strategic group formation (Evers and Benedikter, 2009) to show how bureaucratic interests are nourished within the wider economic and political contexts. Our Indonesian

⁵ See also Gervais' (2010) study of the French 'engineer State', which shows that material and institutional dimensions played a role in how different engineering corps agreed to a merger within the Ministry of Equipment, as this reform enabled them to negotiate significant improvements for these professional corps, in terms of statutory benefits and their relation with the State.

case showed, for instance, how certain segments within the bureaucracies formed alliances with contractors, civil society groups, politicians, and academics during the overall reform process (Bruns and Atmanto, 1992; Suhardiman, 2008).

However, this analysis focuses mainly on the interests of certain groups within the bureaucracies (mainly those who benefit from the hydraulic mission) and their economic and political alliances. Lacking a comprehensive analysis, which shows that bureaucracy is not uniform and that its different segments may have different interests across the wider political spectrum (horizontally) and administrative levels (vertically), the four case studies hardly analysed the irrigation bureaucracies' interests beyond the hydraulic mission. They also lack a conceptual underpinning with regard to how hydraulic missions came about and were sustained and reproduced.⁶

The research gap that we identify here involves an understanding of the organisational cultures, values, and norms of multiple segments and layers in the bureaucracy that struggle internally over the dominant bureaucratic orientation to reforms. While a hydraulic mission may represent the dominant interest of irrigation bureaucracies, this does not necessarily mean that members of the irrigation bureaucracy staff have uniform views towards it or towards reform in general. On the contrary, the cases examined here show how distinct bureaucratic segments can view, respond, and implement reform differently.

We would like to point out three fruitful directions in which this gap can be approached. First, as the Uzbek case (Wegerich, 2009) emphasises the personal interest and allegiances of the high and mid-level bureaucrats during reform processes, it brings to light the need to better understand the rationale and decisive factors upon which bureaucrats based their decisions to devote their loyalty to a certain group within the bureaucracies, and not to others. Second, future research should also focus on understanding how the different segments within irrigation bureaucracies perceive the very idea of reform, and how these perceptions could serve as building blocks to tailor reform initiatives. For example, the Philippines case shows how irrigation bureaucracy field staff could promote IMT, especially when they view WUA's role in water distribution contributes to their tasks in shaping the overall irrigation management at the communal systems (Korten and Siy, 1989). Similarly, the Mexican case points out the rise of a group of water planners to the apex of the CNA who initiated the IMT policy and circumvented the middle and lower layers of O&M divisions, which had the contrary interest of not losing their job (Rap and Wester, 2013). Still related to the second point, the Philippines case (Korten and Siy, 1989; Oorthuizen, 2003) brings to light the important role of irrigation agency field staff (what they called the frontline workers) in implementing reform programmes, shaping reform outcomes, and living with the consequences.

Understanding the entire spectrum of bureaucratic interests is important not only to identify potential entry points for, and blocks to, reform but also to define reform emphasis. Approaching the issue of bureaucratic interests from the perspective of the irrigation bureaucracy's various organisational cultures, values, and norms is crucial to gain this understanding and for considering irrigation bureaucracies as both the agent and object of reform.

Mapping the irrigation bureaucracy's organisational development and finding the 'right' time for reform

In the broader literature on bureaucratic reform, scholars have analysed the organisational development of government bureaucracies and how they predetermine the potential scope and degree of institutional change. This literature approaches bureaucratic reform from the perspective of

⁶ See also Molle et al. (2009) on how the concept of hydraulic mission needs further unpacking to better understand the reasons for its strengths and persistence.

institutional rules and development trajectories. While some historians have examined the organisational development of irrigation bureaucracies, they have often focused on the colonial era (e.g. Ravesteijn, 1997), and thus not linked with the organisational development of the irrigation bureaucracy in the post-independence context. Similarly, while contemporary irrigation research has shown the changing trends in irrigation development (Mukherji et al., 2009b), it has not provided an analysis of how irrigation bureaucracies cope with the change, and more importantly, how coping strategies are derived from their organisational development. The case studies presented in this article are a first step in this direction.

The case of Indonesia (Bruns and Atmanto, 1992; Suhardiman, 2008) showed how reform outcomes were constrained by earlier policy choices made in the past. This was most apparent from the way the bureaucracy transformed IMT into a construction programme under the IOMP, 1987. It also demonstrates the capacity of bureaucrats to anticipate reform and take action, to defend their interests, perspectives and privileges and to shape reform in a way that supports their own institutional survival. How bureaucracies respond to mergers shows 'continuity in and through change' (Gervais, 2010). In the cases presented here, the redefinition of bureaucratic jurisdictions and boundaries is central in reform discussion. In Uzbekistan the concept of IWRM was strategically adopted to argue for a 'demerger' from the agriculture sector. The ministerial merger was intended to re-establish centralised agricultural planning, but water professionals experienced it as a decrease in status, employment and a loss of power and resources. In the power struggle that ensued, determining the boundaries of new managerial units for basin and irrigation administration was decisive.

Understanding of irrigation bureaucracies' organisational development paths and how these have been sustained, changed or evolved over time is crucial to identify and analyse decisive factors and mechanisms that could help initiate reform processes from within the bureaucracy, shaping the overall reform strategies, and finding the right time to introduce reform ideas or propose reforms.

Reform strategies: There is no such thing as 'best practice'

In the broader literature, the rationale for reform as well as the resulting reform strategies have been analysed from a wide range of perspectives including politicians' perceived needs, budget shortage, and bureaucratic reorganisation. Our case studies, in contrast, have highlighted the role of international donors in shaping the overall reform strategies.

International donors have played a dominant role in shaping reform strategies in most developing countries, but the involvement of elements of national bureaucracies differs per country and sector. Irrigation studies have shown not only how donors create dominant policy narratives and models through the formulation of 'global' policy paradigms and their enforcement through loan agreements (Mollinga and Bolding, 2004; Suhardiman and Mollinga, 2012), but also that reform strategies have been shaped from within (Wegerich, 2009; Rap and Wester, 2013). In our four case studies, international donors as well as bureaucratic actors have played an important role in irrigation development and bureaucratic reforms. All cases thus combine internationally-driven, with domestically motivated, elements, but the balance between them is very different.

Our four case studies reveal that there is no single formula with regard to externally driven and/or endogenous reform in particular, and in how to formulate and implement irrigation policy reform strategies in general. The Indonesian case raises the question of how effective the imposition of externally driven reforms are when they are isolated from the mainstream bureaucratic structure for water management. Reform strategies are often designed to purposefully bypass irrigation bureaucracies. Trapped within the context of external, donor-driven policy interventions, existing reform strategies do not position irrigation bureaucracies as endogenous actors of the reform, but rather as a 'problem' that needs to be 'removed' through reform. The Indonesian and Uzbekistan cases

show that external pressure was not able to prevent the capacity of the irrigation bureaucracy to transform the meaning of reforms into something different from what was intended.

The Mexican and the Philippine cases generate the question of whether bureaucracies alone can meaningfully reform themselves without support or pressure from the highest political levels and foreign donors. In the Philippine case long-term support from international donors such as USAID and the World Bank has made it possible for Bagadion's team to continuously promote the idea of irrigation sector reform. But upscaling these reform efforts has got bogged down when they lacked bureaucratic support at the higher levels. The Mexican case shows (perhaps more than in other cases) how a senior bureaucratic segment was able to skilfully manage the reforms in favour of its desire to recover bureaucratic autonomy with support from the Mexican President and the World Bank and overcome the internal bureaucratic opposition resulting from fear of losing jobs.

If future studies would link international donors' rationale in promoting policy change with how the different segments within the irrigation bureaucracy perceive the very idea of irrigation sector reform, we would gain a better understanding not only of key conflicts which could derail reform but also of areas for potential synergies and be better equipped to initiate more meaningful policy discussion.

CONCLUSIONS

There have been multiple waves of irrigation reforms over the last few decades. One common feature in each reform effort has been the failure to consider the important role of bureaucracies both as integral parts of irrigation systems and as reform agents or opponents. While there has also been little emphasis on bureaucracy amongst irrigation scholars, the fields of political science, public administration and organisational science highlight a variety of ways in which knowledge of bureaucracy is critical to understanding reform. These include concepts of 1) power struggles, 2) bureaucratic interests, 3) institutional trajectories, and 4) reform strategies.

Application of these concepts to the limited available work on irrigation bureaucracy emphasises the new perspectives that can be brought to analyse reform processes and their potential usefulness by making bureaucracy more integral to reform efforts, for example by better understanding the nature, organisational culture, value and norm of the multiple segments of irrigation bureaucracies implementing, or impacted by, reform strategies. Such understanding could help guide irrigation scholars, policy makers, and practitioners in identifying potential segments within bureaucracies that are in favour of reform and designing alternative measures for their empowerment as reform agents. It would also allow identification of those in opposition to reform and provide guidance to mechanisms, which could turn that opposition around. In Indonesia and The Philippines, for example, irrigation reform would have had greater significance if the emphasis had been put on the need to reshape farmer-agency relationships at the field level rather than trying to reduce the national irrigation bureaucracies' power and responsibility through formation of WUAs and management transfer (Suhardiman and Giordano, 2014). Our case studies from Indonesia (Suhardiman, 2008) and The Philippines (Oorthuizen, 2003) reveal how field-level irrigation staff, unlike their colleagues at national level, could view IMT positively as a means to reduce their workload and fulfil their day-to-day tasks in irrigation system management. As most irrigation bureaucracies have hardly recruited new field personnel (due to budget restrictions), staff knew that they could gain by working together with farmers and WUAs, and to a certain extent relying on them to 'link' main system management with farmers' fields. Identifying and mapping these potential points for synergies are crucial to inform decision-making processes surrounding irrigation-sector reform.

To prevent potential missed opportunities in the future, donors could address the paradox of positioning the irrigation agency both as incapable government entity in need of reform and the agent for implementing reform through strategic and selective empowering of various segments within irrigation bureaucracies. This implies that donors need to be more innovative about their approach to

irrigation reform. By viewing irrigation bureaucracies as a compilation of multiple segments representing various organisational cultures, values and norms, international donors could unravel 'what the irrigation bureaucracy is', gain better understanding of how they work and function from national down to field level, and identify potential entry points for more meaningful policy reform. The question remains whether donors are willing and technically able to take such an approach (Mosley et al., 1995; Araral, 2005).

The presented case studies on the role of bureaucracy in irrigation reform have shown that international donors cannot simply impose the idea of change through funding provision. Irrigation policy reform can only have intended significance if the very idea of reform represents the interests and organisational development path of some segments within the bureaucracies. For better or for worse, irrigation-sector reform cannot start without the irrigation bureaucracies' knowledge, conscience and experience.

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