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The Hydraulic Mission and the Mexican Hydrocracy: Regulating and Reforming the Flows of Water and Power

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ABSTRACT: In Mexico, the hydraulic mission, the centralisation of water control, and the growth of the federal hydraulic bureaucracy (hydrocracy) recursively shaped and reinforced each other during the 20th century. The hydraulic mission entails that the state, embodied in an autonomous hydrocracy, takes the lead in water resources development to capture as much water as possible for human uses. The hydraulic mission was central to the formation of Mexico's hydrocracy, which highly prized its autonomy. Bureaucratic rivals, political transitions, and economic developments recurrently challenged the hydrocracy's degree of autonomy. However, driven by the argument that a single water authority should regulate and control the nation's waters, the hydrocracy consistently managed to renew its, always precarious, autonomy at different political moments in the country's history. The legacy of the hydraulic mission continues to inform water reforms in Mexico, and largely explains the strong resilience of the Mexican hydrocracy to 'deep' institutional change and political transitions. While the emphasis on infrastructure has lessened, the hydrocracy has actively renewed its control over water decisions and budgets and has played a remarkably constant, hegemonic role in defining and shaping Mexico's water laws, policies and institutions.

KEYWORDS: Hydraulic mission, hydrocracy, water reforms, Mexico

INTRODUCTION

During the 20th century, water resources development by the state was an emergent, and frequently intentional, political strategy for controlling space, water and people in many countries (Worster, 1985; Wehr, 2004; Swyngedouw, 2007; Boelens, 2008; Wester, 2008). This led to the growth of hydrocracies that set out to control rivers and 'green the desert' by 'developing' water resources for the sake of progress and human welfare. Driven by the hydraulic mission (Wester, 2009), these hydrocracies sought to create idealised orders (Rap, 2006), or hydro-political dream schemes (Boelens, 2008), consisting of rivers tamed by dams and dykes, well-behaved farmers on large irrigation schemes and large urban water infrastructures. The rapid expansion of water infrastructure literally built the state and deepened its control over territory and people.

The hydraulic mission grew out of the 'irrigation crusade' of the late 1800s, with increasing calls for central governments to take a leading role in irrigation development. In their colonies, the British (Stone, 1984; van Halsema, 2002), Dutch (Ravesteijn, 1997; Ertsen, 2005) and French (van Beusekom, 1997; Bolding, 2004; Ertsen, 2006) eagerly took up irrigation development as part of their "civilising

mission". In the USA, deep political shifts from the mid-1890s onwards, with Progressive Republicanism sweeping into power, opened the way for the conservation movement and its "gospel of efficiency" to deeply influence natural resources management (Hays, 1959; Kelley, 1998). In contrast to the laissez-faire attitude of the traditional Democrats, the Progressives believed that it was necessary to take "the country's abused natural resources out of the realm of entirely unrestrained private enterprise and putting them under the (presumably) rational, consciously scientific management that trained experts could provide and that corrupt legislative bodies (…) seemed never able to produce" (Kelley, 1998). This mindset, fully shared and promoted by President Theodore Roosevelt, led to the passage of the National Reclamation Act and the creation of the Reclamation Service in 1902, to develop the irrigation potential of the West (Pisani, 2002).

Turton and Ohlsson (1999), inspired by the works of Worster (1985), Reisner (1993), and Swyngedouw (1999), refer to the transition from local- to state-directed water resources development as the birth of the hydraulic mission, embodied in a central government agency consisting of hydraulic engineers.[1] Based on Wester, 2009, this paper defines the hydraulic mission as "the strong conviction that every drop of water flowing to the ocean is a waste and that the state should develop hydraulic infrastructure to capture as much water as possible for human uses". The carrier of this mission was the hydrocracy that, based on a high-modernist worldview (Scott, 1998), set out to ensure water was used 'efficiently', namely by damming every river in sight so that not a drop of water was 'wasted' by letting it run to the sea.[2] The term 'mission' is used intentionally because of its military and religious connotations and to reflect the conviction that it is the duty of the state to develop water resources. Especially this second component of the hydraulic mission will inform the analysis in this article. While increasing environmental awareness has dampened the drive to dam rivers, the conviction that the state should take the leading role in water resources development and management, embodied in an autonomous hydrocracy, remains strong.

Internationally, the environmental destruction wrought by the hydraulic mission led to increasing protests, starting in the 1960s and 1970s, with the rise of the environmental movement and opposition to new dams (Allan, 2002). This was most strongly the case in the western USA (Berkman and Viscusi, 1973; Gottlieb, 1988; Feldman, 1991; Reisner, 1993) and in the Netherlands (Disco, 2002; Wiering and Arts, 2006), but also in many other countries the power of hydrocracies started to be challenged. Although uneven and debated, this has led to an "ecological turn" in water management (Disco, 2002; Allan, 2006), with more emphasis being placed on "putting water back into the environment" (Allan, 2002). Whether 'deep' institutional change is occurring as part of the ecological turn or whether hydrocracies are promoting Integrated Water Resources Management (IWRM) to maintain their vested interests is open to debate (Conca, 2006; Wiering and Arts, 2006; Molle, 2008; Warner et al., 2008; Saravanan et al., 2009). Although the need for a "water transition" is well established (Wester et al., 2001), this has only very partially informed the water reforms of the past three decades, which have focussed more on the neoliberal agenda of downsizing the state and formalising property rights (Boelens and Zwarteveen, 2005).

Based on their review of water reforms in the past three decades, Merrey et al. (2007) conclude that the state needs to play a leading role in water reforms, while at the same time hydrocracies are most in need of reform. The resistance of hydrocracies to change and their resourcefulness in maintaining their command-and-control and construction orientation – under the guise of apparently drastic institutional

[1] However, Reisner (1993) does not use the term hydraulic mission in his book, while Swyngedouw (1999) speaks of the hydraulic engineering mission, but does not define it. Similarly, Turton and Ohlsson do not define it, nor does Allan (2002, 2006) in his discussion of the concept.

[2] For the case of Spain, Swyngedouw (1999) quotes a parliamentary document from 1912: "not a single drop of water should reach the Ocean, without paying its obligatory tribute to the earth". Similar quotes can be found for all the countries where large water works were constructed. For example, Reisner quotes from a 1901 speech by Theodore Roosevelt, who stated that "The western half of the United States would sustain a population greater than that of our whole country if the waters that now run to waste were saved and used for irrigation" (1993).

reforms – has been highlighted by Mollinga and Bolding (2004), based on in-depth studies of irrigation reforms in seven countries. Gottlieb (1988) and McCool (1994) make a convincing argument that this is also the case in the western USA, as does Waller (1994) for Southern California. For India, Mollinga (2008) paints a similar picture. This raises the question whether there is something special about hydrocracies that makes them resilient to change, as shown by Lach et al. (2005) for the USA.

We explore these issues by delving into the history of the Mexican hydrocracy, which has been deeply influenced by Mexico's political regime. The political authorities that ruled Mexico from the 1920s to 2000 managed to establish a relatively stable political regime, characterised as bureaucratic-authoritarian and corporatist. The triumphant political elite gathered in the *Partido Revolucionario Institucional* (PRI; Revolutionary Institutional Party) appropriated the Mexican Revolution. Since its foundation in 1929, the PRI ruled the country uninterruptedly until 2000 and strongly centralised power at the federal level. The president, who is elected for one term of 6 years (termed the *sexenio*), plays a dominant role in Mexican politics and has a strong influence on the reordering of bureaucratic domains and the materialisation of political and economic reforms during his *sexenio*. A rupture with the preceding administration characterises the beginning of each *sexenio*, through changes in the leadership at all levels of the federal administration. At the end of the *sexenio* bureaucratic groups align themselves with and offer their support to the expected presidential candidate and his close allies. Such alliances can be essential in settling a struggle between bureaucratic agencies that are functional rivals (Greenberg, 1970). Policy changes and bureaucratic transitions are thus most frequently shaped and defined at the end of a *sexenio*, to be initiated at the beginning of a new *sexenio*.

The PRI owed its 'success' to its early establishment of political and economic mechanisms, such as clientelism and corporatist representation and control, for solving conflicts within the elite and for ensuring mass support and political control (Grindle, 1996; Camp, 1999). The hydrocracy played an important role in this process of state formation. Through the expansion of irrigation and the centralisation of water control, the Mexican regime managed to keep in check sharp socio-economic differences and increase its political control over the country (Vargas, 1996; Aboites, 1998). The centralisation of water resources development, the hydraulic mission and the growth of the federal hydrocracy in Mexico reinforced one another and created a legacy that strongly influences current water reforms. We first analyse the centralisation of water control from around 1875 to 1975 (sections 2 and 3) and then the changes that have occurred after 1975 with the apparent demise of the hydraulic mission and the advent of water reforms. We conclude that the hydraulic mission has strongly contributed to the resilience of the hydrocracy in the face of large political and institutional transitions and has deeply informed its quest for autonomy. This becomes understandable if water reforms are seen as attempts by hydrocrats to reproduce and strengthen the hydrocracy (Rap et al., 2004) rather than "neutral and technical interventions aimed at assisting central water agencies in controlling and managing water resources and crises" (Boelens and Zwarteveen, 2005). We argue that the resilience of the hydrocracy lies in its historical ability to create, renew and consolidate its autonomy through a direct bond with the presidency and exercise, at crucial political moments, an unusual discretion in defining policy, institutional domains, hydrosocial-networks and resource flows in its support. The hydraulic mission traditionally legitimated this discretion and its outcomes.

REVOLUTIONARY IRRIGATION AND THE RISE OF THE HYDRAULIC MISSION

In the late 19th century, the federal government began asserting its control over water, both to promote commercial agriculture and to arbitrate in water allocation conflicts. The centralisation of water development accelerated in 1926 with the creation of the *Comisión Nacional de Irrigación* (CNI; National Irrigation Commission). This was an outcome of the Revolution of 1910-1920, which led to the redistribution of land and much stronger state intervention in irrigation development. The expansion of irrigation and the centralisation of water development were strongly interwoven with the efforts of

post-revolutionary governments to politically stabilise the country and to achieve economic development.

The birth of the hydraulic mission

The conviction that the state should develop water resources started to gain force in Mexico towards the end of Porfirio Díaz's regime (1876-1911), known as the Porfiriato. Mexico's independence from Spain in 1821 was followed by 50 years of political unrest and economic stagnation. It was ruled by 45 governments between 1821 and 1875, was invaded several times and lost nearly half its territory to the USA (Centeno, 1997). The turmoil subsided during the Porfiriato, although the plight of the majority of the Mexicans worsened. To consolidate his rule Díaz granted state favours to *hacendados* (large landowners), industrialists and bankers, as well as extensive concessions to individuals, corporate, and government interests from the United States (Cockcroft, 1983). During his regime, the federal government established control over the country and focussed on the development of mining and the building of railroads. It also started to play a more active role in water development and the concessioning of water rights, to further strengthen federal control over the country (Molina, 1978 [1909]). Before then, irrigation and drinking water had largely been local affairs, although land and water rights were originally based on royal grants during the colonial period (Aboites, 1998). This started to change in 1888, when Congress passed the *Ley General de Vías de Comunicación* (General Law on Communication Routes), that placed lakes and navigable rivers as well as boundary rivers under federal jurisdiction. The law did not establish water as national property, but it did authorise the federal government to regulate the public and private use of navigable and interstate rivers and specified that water concessions could only be issued by the federal government (Aboites, 1998).

The 1888 law met with criticism from large landowners and industrialists, as existing water rights had to be confirmed by the federal government. However, the federal government wanted to go much further and establish federal jurisdiction over all of Mexico's water, but could not do so as the liberal 1857 Constitution defined water as private property. A decisive step in the centralisation of water management was the amendment of Article 72 of the Constitution in 1908, which placed rivers in the public domain. Based on this amendment, surface water as private property no longer existed and access to surface water was only possible through concessions issued by the federal government. In the 20 years after 1888, the federal government became actively involved in drawing up river regulations, as existing water rights had to be confirmed on rivers falling under federal jurisdiction, and the federal government had to approve new water concessions. Kroeber (1983) and Aboites (1998) provide a detailed account of how the Water Directorate of the *Secretaría de Fomento* (Ministry of Development) drew up an increasing number of river regulations and how this led to increased federal control over water. While the Water Directorate did not design or construct hydraulic structures, and contracted engineering consultants to review water concessions, it can be seen as the predecessor of the hydrocracy that developed after the Mexican Revolution. Thus, in a space of 20 years, in legal terms, water in Mexico passed from being a local affair to falling in the public domain administered by the federal government (Aboites, 1998). Despite this, the hydrocracy was just starting to be formed and lacked hydrological and hydraulic expertise.

The birth of the hydraulic mission during the Porfiriato also entailed that the federal government supported *hacendados* in developing water resources through land reclamation, hydropower and irrigation projects. While these water projects were undertaken by large landowners, sometimes in conjunction with foreign capital, there was an increasing involvement of the federal government in the funding and approval of these initiatives (Aboites, 1998; Kroeber, 1983; Sánchez, 2005; Wester, 2009). This oligarchic form of water resources development entailed that the federal government itself did not construct water works, but rather supported a clique of *hacendados* with loans and water concession to do so. However, local autonomy and control over water remained strong during the Porfiriato, and the incursion of the federal government was selective (Aboites, 1998; Sánchez, 2005). In the final years of

the Porfiriato, several leading intellectuals close to the regime published reports promoting large federal investments in irrigation development as the solution to Mexico's agricultural problems (Gayol, 1994 [1909]; L. Palacios, 1994 [1909]). It was not until after the Revolution of 1910-1920 that their calls were heeded, with a much stronger centralisation of water resources development and federal control over water from the 1930s onwards.

From oligarchic to revolutionary irrigation

The widespread concentration of landholdings and the impoverishment of large segments of the population led to the Mexican Revolution of 1910 to 1920. What started as a middle-class movement against the re-election of Porfirio Díaz in 1910 rapidly degenerated into a civil war. It led to the rise of the "Constitutionalists", a group of army generals from the northern states of Coahuila and Sonora, whose goal was to restore constitutional order. By April 1916, the Constitutionalists had secured control over Mexico City and Carranza declared himself president and called for a convention to draw up a new constitution that was signed on 31 January 1917, and is still in force today (Cockcroft, 1983).

The trend towards stronger federal control over water initiated during the Porfiriato was consolidated in Article 27 of the 1917 Constitution. Article 27 defined natural resources, including oil, land and water, as the inalienable property of the nation and established the *ejido* (common property) form of land tenure for the redistribution of the *haciendas* to the landless. Article 27 also established that the only way to gain access to surface water was through a concession granted by the federal government. While the new Constitution partly incorporated the economic and social reforms fought for by the revolutionary armies, especially regarding landownership and worker rights it also centralised power in the federal government and gave the president extensive powers.

As shown by Aboites (1988, 1998), water resources development by the federal government played an important role in the formation and consolidation of the post-revolutionary state. Based on Article 27 the centralisation of water control began in earnest in the 1920s, when President Calles launched a programme for the construction of large-scale irrigation districts as a crucial component of his agrarian policy. This programme found its legal expression in the Irrigation Law issued in January 1926, which also created the *Comisión Nacional de Irrigación*, the first government agency solely devoted to the construction and management of irrigation districts (Orive-Alba, 1960).

In Calles' vision, the agrarian question was to be solved by breaking up the *haciendas* through the construction of irrigation systems and colonising them with a prosperous group of middle-class farmers. Aboites (1988) termed this "revolutionary irrigation" as Calles focused on using irrigation instead of extensive agrarian reform to achieve the revolutionary promise of "land and liberty". Based on the 1926 irrigation law, the CNI subdivided *haciendas* where it constructed irrigation systems and handed out the thus obtained land to independent farmers (Greenberg, 1970). It was envisioned that this rural middle class would be instrumental in achieving social stability in the countryside and would serve as an example to small farmers of how to practise modern irrigated agriculture. In Calles' vision, the *ejidos* were a transitional form of land tenure and in the long term agriculture could only prosper if it was based on private property. Thus, instead of making the peasantry the target of land redistribution, Calles' agricultural and irrigation policies contributed to the creation of a new rural middle class, mainly in the northern regions (Aboites, 1998).

The CNI was formed as a semi-autonomous agency within the federal *Secretaría de Agricultura y Fomento* (SAyF; Ministry of Agriculture and Development). The Waters Directorate within SAyF also continued to exist and focussed on developing river regulations and water concessions as it had during the Porfiriato. The CNI focussed on the design and construction of irrigation systems, but as there was hardly any hydraulic expertise in Mexico, several US companies with Mexican subsidiaries were hired to construct dams and other large works. In the early 1940s, the American interests in these subsidiaries were bought out and the CNI began awarding construction contracts to Mexican companies (Greenberg, 1970). The CNI also contracted four senior engineers from the US Bureau of Reclamation. While being

advisors to the CNI, these men took most of the technical decisions in the CNI and trained a new generation of Mexican hydraulic engineers (Greenberg, 1970). The CNI rapidly established itself as a competent hydrocracy and set to work developing irrigation districts, with 11 under construction by 1935. Orive-Alba (1960) estimated that some 800,000 ha were irrigated in Mexico before the creation of the CNI. In 20 years' time the CNI doubled this figure through the construction of 816,200 ha of large-scale irrigation systems and 21,343 ha of small-scale systems (SRH, 1975). A statement by one of its leading engineers brings out the hydraulic mission mindset of the CNI (Quirós-Martínez, 1931):

> It being the mission of this institution [the CNI] to utilise all the waters in irrigation works or for producing energy (…) it can be said of this dam [Tepuxtepec] that it is the first of the works that the [CNI] is studying to achieve the most efficient and complete utilisation of the waters of the Río Lerma.[3]

From the 1930s onwards, the content of irrigation policy was influenced by the tension between policies targeting private capital as a means of increasing agricultural production and those directed at the *ejido* sector to retain political support in rural areas (Fox, 1992; Stanford, 1993). In the mid-1930s, President Cárdenas (1934-1940) dealt with this challenge by proceeding to make true the revolutionary promise of giving the "land to the tiller", especially in regions where large landowners were amongst his political opponents. In 1930, *ejidos* controlled 15% of the land in irrigation districts, but by 1940 this had increased to 60% (Wionczek, 1982). Although the beneficiaries of the revolutionary irrigation policy were different, what remained the same was that the federal government led this social transformation process (Aboites, 1998). The management of the irrigation districts also became increasingly centralised from the 1930s onwards, although the water laws promulgated between 1926 and 1947 contained provisions for the creation of water boards to manage irrigation districts (Rap et al., 2004).

In just two decades, the CNI succeeded in centralising and consolidating its control over water resources and according itself a primary role in Mexico's water development. After the revolution, with surface water defined as national property in 1917, a strong hydrocracy was created that embodied the hydraulic mission. During this period, water resources development under the control of the federal government was seen as part of a modernisation project and as a source of legitimacy for the post-revolutionary, authoritarian-bureaucratic regime.

POR LA GRANDEZA DE MEXICO: THE GOLDEN ERA OF THE MEXICAN HYDROCRACY

The golden era of the Mexican hydrocracy started with the creation of the *Secretaría de Recursos Hidráulicos* (SRH; Ministry of Hydraulic Resources) in 1946, uniting all federal government responsibilities concerning water in one ministry. The SRH became one of the most powerful federal ministries in Mexico and the hydraulic mission reached its zenith in the early 1970s with the passage of a new water law and the formulation of a national hydraulic plan. The centralisation of water resources development led to a large increase in the irrigated area in Mexico intertwined with the formation and expansion of a strong hydrocracy with a keen sense of its hydraulic mission. The logo of the SRH contains the bold mission statement of Mexico's hydrocracy: *Por la Grandeza de México* (for the greatness of Mexico).

The zenith of the hydraulic mission

In the 1940s, Mexican agrarian policy shifted away from land reform to emphasise commercial production. The task of agriculture became to support the industrialisation of the country by generating foreign exchange, both through the provision of cheap basic grains and the production of export crops. To achieve this objective renewed emphasis was placed on the construction of irrigation systems and dams. Also during the 1940s, the concept of river basins as a unit of development became influential in

[3] All translations from Spanish by the authors. Original quotes are on file with the authors.

Mexico, based on the Tennessee Valley Authority (TVA) model. During the election campaign of Miguel Alemán in 1946, the CNI supported the presidential candidate and successfully lobbied him to initiate projects for comprehensive river basin development and to form a strong water ministry. Until 1946, responsibilities for water resources development were spread over several federal ministries and agencies. The then executive director of the CNI, Adolfo Orive-Alba, convinced Alemán of the need to tackle this administrative fragmentation. Directly after Alemán became president, this happened, with the creation of the *Secretaría de Recursos Hidráulicos* (SRH) in December 1946. The objective of the SRH was the comprehensive development of water resources and the concentration of the government's efforts in this field in a single agency. This move shows the central role of the hydrocracy in making water policy and strengthening its own autonomy by creating a new water agency at the ministerial level in direct contact with the president.

Along with the concentration of water resources development in the SRH, executive river basin commissions were created by presidential decrees between 1947 and 1950 for several of Mexico's key basins, such as the Papaloapan, Tepalcatepec, Fuerte and Grijalva (Barkin and King, 1970). These commissions were to pursue comprehensive river basin development based on the TVA model, but bureaucratically controlled from the capital by the SRH minister as their president. The emphasis on comprehensive river basin development was to characterise the zenith of the hydraulic mission. From 1946 to 1976 the SRH vastly expanded its activities and mandate, with the river basin commissions serving to bypass state governments and other federal agencies. However, these hegemonic tendencies created conflicts with states and federal agencies (Greenberg, 1970) and the assessment of the benefits of "regional development" as opposed to regular government investments has been quite negative (cf. Barkin and King, 1970). The river basin approach did lead to the construction of dams and irrigation systems on an unprecedented scale and further strengthened the hydrocracy.

The overriding concerns of the hydrocracy

To further unpack the hydraulic mission, this section delves into the overriding concerns of the hydrocracy, specifically control over the irrigation districts and bureaucratic and financial autonomy. These concerns developed as an outcome of the priority given by the federal government to large-scale irrigation development and the centralisation of water resources development. This led to the formation and expansion of a hydrocracy that attained a large degree of bureaucratic and financial autonomy through the good relations that it maintained with the presidency, the party and a broader set of state institutions and funding agencies. The hydrocracy's overriding concerns were reinforced by the hydraulic mission and its efforts to develop and control water resources 'for the greatness of the country'.

Control over the irrigation districts

The hydrocracy actively established control over the irrigation districts and the wider hydrosocial-networks in which they are embedded (Wester, 2008). The construction, settlement and management of irrigation districts entailed control over large sums of money as well as political control over the selection of beneficiaries. Consequently, control over the irrigation districts was the subject of much bureaucratic competition between "functional rivals". Greenberg (1970) argues that the functional rivals of the hydrocracy consisted of those agencies whose activities were similar enough that their staff felt them to be in competition with each other. Concerning the irrigation districts, the ministry of agriculture in particular fits this bill.

Under President Calles, the CNI enjoyed a large degree of budgetary and bureaucratic autonomy and control over the irrigation districts. In the mid-1930s President Cárdenas transferred the administration and responsibility for the settlement (but not of the construction) of the irrigation districts to his trustees at the Bank of Agricultural Credit, as he doubted whether the CNI would support his land reform policies. The CNI opposed this move and in 1943 regained control over most of the irrigation

districts (Orive-Alba, 1960). However, this was to last briefly, as in December 1946 the *Secretaría de Agricultura y Ganadería* (SAG; Ministry of Agriculture and Livestock) persuaded president Alemán that it should manage the irrigation districts (Orive-Alba, 1960). Again this met with strong resistance from the hydrocracy, and control over the irrigation districts by agriculture was to last only until 1951. In the following decades, the SRH consolidated its control over the irrigation districts and managed to keep the ministry of agriculture out. This culminated in 1972, with the promulgation of the *Ley Federal de Aguas* (Federal Water Law), in which the SRH was charged with the planning, construction, administration, operation, maintenance and development of the irrigation districts. The Federal Water Law even went so far as to forbid user management of the districts, which was permitted under the previous water laws.

Financial autonomy

Financial autonomy refers to the degree that a bureaucracy can generate and control its income flows, set its own budgets and decide on investments independently from other bureaucratic entities. The monopoly of the CNI and the SRH in the construction of irrigation systems secured the hydrocracy a large and steady income flow between the 1930s and the 1970s. These resources represented an important element of continuity and largely account for the financially wealthy and autonomous bureaucracy that the SRH became. The SRH's budget was one of the largest among the federal agencies with 61 to 100% of public investments in agriculture going to the construction of irrigation works between 1926 and 1976 (Durán, 1988). Further, it managed its own funds and had relative budgetary freedom from other bureaucratic entities, although subject to presidential and party priorities (Greenberg, 1970; Wionczek, 1982). Although there were the usual collusions between the hydrocracy and construction companies, the SRH was a relatively incorrupt ministry in which promotion was based on merit.

In the 1960s, foreign loans started to become important for the SRH (Durán, 1988; Greenberg, 1970; World Bank, 1983). Because of an international reputation as an efficient and technically competent ministry, the SRH was very successful in acquiring international loans for irrigation construction, thereby generating urgently needed foreign reserves for the government. From 1966 to 1975, foreign loans constituted more than 15% of SRH's irrigation investments on average (Durán, 1988; World Bank, 1983). As a major recipient of external funding, the SRH was granted privileges not given to other ministries, such as autonomy in making technical decisions and a significant budget to hire and form a cadre of well-trained professional engineers (Greenberg, 1970).

Another source of income for the hydrocracy was the water charges that it levied on irrigators. However, this source of income was much less stable and controllable. Apart from the fact that the water charges collected in the districts were never sufficient to fully cover operation and maintenance (O&M) costs, the fees were not paid directly to the SRH but to the ministry of finance (van der Zaag, 1992). The initial policy intention under Calles was that those who benefited from state-built irrigation works would reimburse the state for its investment as well as fully cover the O&M costs of the irrigation systems (Wionczek, 1982). This objective was reiterated in the 1947 irrigation law. Nonetheless, water charges generally covered only a fraction of irrigation investments and O&M costs (Aboites, 1998). Between 1950 and 1964 cost recovery averaged 60% (Orive-Alba, 1970). From 1965 to 1976 this average slipped slightly to around 56%, but between 1977 and 1982, it dropped drastically to around 20% (Johnson, 1997).

Bureaucratic autonomy and culture

The third overriding concern of the hydrocracy was bureaucratic autonomy that is the degree of operational freedom and internal control that a bureaucracy has and the extent to which it can prevent external influence on decision making. During the SRH era the hydrocracy attained a large degree of autonomy with near-complete freedom in technical decisions, personnel recruitment and investment

decisions (Greenberg, 1970). This was due to the importance of the ministry and the good relations of its elite with the president and the PRI. During the SRH era, senior hydrocrats stood in direct contact with the presidency. The president allowed his minister, often a friend and political confidant, to build a personal empire in the SRH by appointing his own team of trusted collaborators and left the internal operations and the management of funds to the discretion of the minister, without this leading to known cases of embezzlement. Historically, well-qualified men, trained as civil engineers and with experience in the ministry, led the SRH. The SRH minister also played an important role in national politics and in the presidential succession (Greenberg, 1970; Castañeda, 1999). The bureaucratic control over infrastructure, staff and resource flows were appropriated politically around elections in favour of a presidential candidate, and played a role in furthering the hydrocracy's agenda during the start of a new *sexenio* (Rap, 2007).

A distinct attribute of the hydrocracy was the homogeneous composition of its staff, with similar academic and bureaucratic careers, which contributed to the closed and hierarchical culture of the SRH and the strong sense of identity of hydrocrats. The staff consisted of civil and irrigation engineers trained in the two major Mexican engineering schools: the Faculty of Engineering of the National Autonomous University of Mexico (civil engineers) and the Chapingo National School of Agriculture (irrigation engineers). Apart from professional skills, these schools imparted students with a strong sense of hierarchy and discipline, while many students developed strong friendship bonds and clientele networks in these schools, which benefited them in their bureaucratic careers. The similar training and bureaucratic trajectories of most of the engineers had an important impact on the bureaucratic culture and professional climate of the SRH (Greenberg, 1970). In comparison with the ministry of agriculture, the SRH was known for its closed, conservative and authoritarian culture, the discipline of its teams and its strong esprit de corps. Upward mobility was primarily based on professional merit and not on political relations, which was quite uncommon in Mexican bureaucracies (Grindle, 1977).

The central component of the hydraulic mission was the creation of hydraulic infrastructure. Thus, an important relation that the hydrocracy maintained was with construction companies. In the early 1940s, it was decided to exclusively tender contracts for construction works to Mexican companies. This resulted in the formation of several large Mexican construction companies, which played a major role in the development of the SRH, since they served both as builders and as consultants to the ministry (Greenberg, 1970). In addition, former members of the hydrocracy frequently staffed them and senior hydrocrats were advisors for these companies or had financial interests in them. The hydrocrat thus fulfilled different roles, namely that of bureaucrat, politician and businessman. Understandably, the close links with contractors resulted in pressures within the SRH to give priority to construction projects and partly explains the strong construction bias of the hydrocracy (Greenberg, 1970).

FROM CONFUSION TO THE REBIRTH OF THE HYDROCRACY

The golden era of the hydrocracy came to an abrupt end in 1976, when it was merged with the ministry of agriculture. At the same time, the economic crisis of the 1980s reduced the construction of hydraulic infrastructure. The political and bureaucratic transformations in the 1970s and 1980s relating to water resulted in the consolidation of a water reform package in the run-up to the presidential elections of July 1988. The content of the Mexican water reforms and the commitment to them emerged from a protracted process of bureaucratic struggles and political accommodations, strongly driven by the hydrocracy's quest for renewed autonomy and its ambition to be the sole water authority in Mexico. While the construction component of the hydraulic mission became less strong, the conviction that the state should control water through an autonomous hydrocracy strongly influenced the water reforms.

The confusion years: Loss of autonomy and control

In 1976, President López-Portillo merged SRH with SAG to create the *Secretaría de Agricultura y Recursos Hidráulicos* (SARH; Ministry of Agriculture and Hydraulic Resources). As a Minister of Finance during the Echeverría administration (1970-1976), he had found it difficult to enforce budgetary discipline on the SRH. In addition, a group of senior hydrocrats chose to support his competitor for the presidential candidacy, for which he punished them through this fusion when he came to power. During his term, López-Portillo expanded the state's interventionist role in the economy and society, made possible by the discovery of new oil deposits and the increases in oil prices after 1976 (Grindle, 1996). He also embarked on a substantial administrative reform programme to rationalise the wide array of bureaucracies created in previous decades. The creation of SARH was part of this administrative reform and served to unify all activities related to agriculture in one ministry (Arce, 1993).

With the creation of SARH, the SRH was downgraded to the level of an under-ministry. Merino Rabago, an experienced politician, but without an engineering degree, was appointed as the new SARH minister. SARH was divided in three under-ministries, each headed by a deputy minister: Agriculture and Operation, Planning, and Hydraulic Infrastructure, to which most of the old SRH officials were assigned. As a result, senior hydrocrats were no longer in direct contact with the president. The deputy minister now had to submit his policy initiatives to the SARH minister, significantly curtailing his discretionary powers. Senior hydrocrats lost control over crucial bureaucratic domains and resource flows to other bureaucratic groups, which came to dominate SARH. The hydrocracy thus lost its bureaucratic and financial autonomy and was subjected to the control of the agricultural bureaucracy.

The SRH elite opposed the fusion, referring to it as the "confusion", as they clearly understood that it would entail a significant loss of autonomy. To make matters worse they were fused with an old-time functional rival. In 1970, unaware of the fusion to come, Greenberg wrote that "The sharing of power with the Agriculture Ministry is the result of a long history of struggle which saw first one, and then the other agency, in a position of dominance" (1970). The fusion started a new phase in this struggle and engendered an energetic and politically expressed demand for renewed autonomy on the part of the hydrocrats.

The irrigation districts became the responsibility of the under-ministry of agriculture and operation in 1976, implying that the hydrocracy lost control over the irrigation districts (E. Palacios, 1994). In addition, after an initial phase in which the hydrocrats continued to dominate in the state delegations, many of them were replaced by agronomists (Arce, 1993). The subordinate position of the hydrocrats led to intense conflicts between groups of ex-SRH and SAG officials. The displeasure of the hydrocrats over the loss of control was not only directed at the agronomists, but also at the growing influence of 'politicians' and 'administrators' in the ministry i.e. non-engineers without experience and interest in hydraulic matters.[4] In SARH, ex-SRH officials were thus confronted with politically appointed administrators in positions that used to be occupied by engineers.

New policy initiatives during the confusion years

A group that played an important role in the hydrocracy's quest for renewed autonomy was the water resource planners formed as part of the *Plan Nacional Hidráulico* (PNH; National Hydraulic Plan) commission, created by the SRH in 1973 with funding from the World Bank. During De la Madrid's election campaign these water resource planners rose to ascendancy and in coalition with influential groups of civil engineers lobbied for renewed bureaucratic autonomy. The rise to power of this team of hydrocrats parallels a larger process at work in the Mexican bureaucracy since the 1970s, termed the

[4] The first SARH minister (1976-1982) was a politician without a professional degree and the second minister (1982-1988) was a lawyer, something which radically broke with the SRH tradition of being led by highly qualified civil engineers and with a career in the SRH itself (Greenberg, 1970).

"technocratic revolution" by Centeno (1997), whereby planning was institutionalised as the central focus of public policy making and technocrats came to dominate the state.

Dr. González-Villarreal, a civil engineer, was appointed as the General Coordinator of the PNH. He composed a team of young and dedicated professionals for this purpose, who became his close collaborators and who would later follow him to occupy key positions in the hydrocracy. This team developed policy ideas and accumulated particular experiences favouring participation of water users and handing over of government tasks in water management, although under continued government tutelage. A pilot project on drainage and supplementary irrigation in the tropical lowlands called PRODERITH was important in this respect (Rap et al., 2004). The PNH commission was converted into a permanent planning agency falling under SARH in 1976, thereby institutionalising the planning process. During this time the commission gained technical authority to play an important role in policy formulation and decision-making at the highest levels of government, thus regaining some of the autonomy the hydrocracy had lost (Herrera-Toledo, 1997).

During the election campaign of presidential candidate De la Madrid in 1982, influential groups of civil engineers started to lobby for renewed bureaucratic autonomy and explicitly expressed their demand for an autonomous water authority. A working group of senior hydrocrats was formed to define water policies for the upcoming presidential administration and campaign meetings were held on water (IEPES, 1982). The working group was coordinated by Dr. González-Villarreal in close collaboration with De la Madrid's campaign manager, Carlos Salinas de Gortari, who would later succeed De la Madrid as president (IEPES, 1982). However, this attempt to re-establish autonomy for the next sexeñio did not succeed. After De la Madrid became president in 1982 the under-ministry of hydraulic resources was maintained as a separate but dependent part of SARH. It is likely that a more autonomous authority was not feasible at this time because of the economic crisis that held the country in its grip. The working group did achieve a small success, with the appointment of their coordinator as the new deputy minister for Hydraulic Resources. In addition, these electoral alliances between the hydrocracy and the campaign team of the incoming president contributed one *sexenio* later (1988-1994) to the renewal of autonomy for the hydrocracy and a direct institutional relation with the president.

The financial situation of SARH severely worsened between 1982 and 1988, largely because of the unprecedented economic crisis that hit Mexico in 1982. To deal with the crisis, de la Madrid, the first economist after a series of lawyers as president, adopted a neoliberal approach that strongly departed from the populist and interventionist economic policies followed by previous presidents. This resulted in a restructuring of SARH, the lifting of subsidies for agricultural inputs and a liberalisation of agricultural prices (Vargas, 1996).

The hydrocracy especially felt the financial consequences of the economic crisis of 1982. During the term of De la Madrid domestic investments in irrigation halved (E. Palacios, 1994). To make matter worse, the World Bank stopped lending to Mexico, as a response to the moratorium on payments of foreign debts that the government had declared (World Bank, 1983). In the World Bank the construction bias of the hydraulic bureaucracy also started to be a matter of debate around this time (Buras, 1983). In line with international debates on irrigation management (Bottrall, 1981), a 1983 World Bank review concluded that Mexico needed to shift from the construction of new irrigation systems to improving the management and efficiency of existing systems, by increasing the role of water users in decision-making (World Bank, 1983). The report went on to recommend the bulk sale of water by the government to users' associations in the districts, who would then sell and distribute the water to its members. The 1983 report signified an important shift in the Bank's agenda for the irrigation sector and its recommendations influenced both the emergence and the contents of the Irrigation Management Transfer (IMT) policy (Rap et al., 2004).

According to several senior irrigation engineers we interviewed, Dr. González-Villareal and his team of water resources planners seriously started to consider the possibility of transferring the irrigation districts to water users in 1985. The ramifications of transfer and how to initiate it were discussed at a breakfast meeting in 1985 between the Minister of Agriculture, Dr. González-Villareal and other senior

SARH officials. They saw no way to reverse the already serious deterioration of the districts and to resolve the financial problems without drastic changes in the way the districts were administrated. They also understood that to obtain desperately needed external funds they had to accommodate the Bank's new agenda. It was clear at this point that such elements had to be incorporated in the policy agenda for the next *sexenio* if it were to accomplish something for the hydrocracy, i.e. the renewal of autonomy. To formally initiate the transfer of irrigation districts was politically not feasible in the middle of the *sexenio* and the 1985 earthquake in Mexico City, which disrupted the country and destroyed the central SARH offices, seriously slowed down concrete initiatives.

Towards a reform package: The 1988 election campaign

The further loss of autonomy during the De la Madrid *sexenio* was unacceptable to most hydrocrats. For them, a major issue in water management, besides the decline in irrigation investment, was the dispersion of responsibilities and resources over different bureaucratic agencies. Although SARH was legally responsible for the nation's waters, urban and industrial water use, water for hydropower and water quality fell under other ministries (IEPES, 1987). To senior hydrocrats it was clear that radically different policy scenarios had to be explored to regain autonomy for the hydrocracy. Ideally, this would entail the reconstitution of an autonomous water authority that would concentrate the responsibilities and financial resource flows related to water. To achieve this aim, different groups of hydrocrats started exerting political pressure towards the end of the *sexenio* of De la Madrid.

In January 1989, Salinas de Gortari created the *Comisión Nacional del Agua* (CNA or Conagua; National Water Commission), less than six weeks after he became president of Mexico. In June 1989, the National Development Plan was released, endorsing IMT and river basin management within a wider water reform package (Rap et al., 2004). This package materialised the hydrocracy's concerns for autonomy and control at a distance over the decentralised irrigation districts and river basins. During the run-up to the presidential elections in 1988 an influential segment of water resource planners within the hydrocracy negotiated the water reform package with the presidential candidate, Salinas de Gortari. Rap et al. (2004) present a detailed analysis of the different positions and agendas of the key policy actors and show how they reached agreement on the composition of this reform package. These can be summarised as follows:

- Presidential candidate Salinas de Gortari espoused a neoliberal agenda that aimed to modernise state-society relations and reduce government expenditures through decentralisation, shared responsibility between the public and private sector, and social reconciliation.
- Dr. González-Villareal and his team of water resource planners represented the hydrocracy in its strong will to re-establish bureaucratic and financial autonomy.
- The World Bank supported policies to reduce government intervention and expenditure in irrigation, amongst others through decentralisation, water pricing reforms and increased users' participation in decision-making. As a favoured client of the Bank, Mexico had become eligible again for new loans after a period of austerity implying that reform initiatives would be looked upon favourably.

The team of water resource planners led by Dr. González-Villarreal took the lead in proposing IMT to Salinas and convincing him of the need for an autonomous water authority during his election campaign. In this they were supported by different groups of civil engineers working in SARH, construction companies or stationed at the faculty of engineering of UNAM. When Salinas became a presidential candidate and started galvanising support from the bureaucracy for his campaign, this coalition of engineers offered its support to him in return for the creation of an autonomous water agency (van der Zaag, 1992). During the election campaign, Salinas agreed with the need to create a "single water authority". He attributed many capacities to this new authority, including the authority to

decide over its own programmes and budgets. Lastly, he acknowledged that the creation of this new authority was a precondition for his proposed policies of decentralisation and social reconciliation and reaffirmed that the irrigation districts would be transferred (PRI, 1988).

To make the move of creating an autonomous authority feasible, it had to be accompanied by a set of apparently paradoxical reforms: a concentration of bureaucratic domains and resource flows, a decentralisation of the irrigation districts, river basin management, and a new water taxes and pricing policy. If successful, this composite strategy would reduce government expenditure in water management, secure higher and more stable income flows from water use and attract international loans for irrigation development and rehabilitation. In addition, it would enjoy the political support of the president and international lending agencies. Senior hydrocrats played an active role in the definition of the reform package, driven by a concern for bureaucratic and financial autonomy and control over the irrigation districts. Thus, the rebirth of the hydrocracy and the endorsement of IMT were strongly linked with the engagement of the Mexican hydrocracy in policy making.

Anything is possible Conagua (with water)

Water reforms since the late 1980s have transformed institutional arrangements for water management and changed the role of Mexico's hydrocracy. Although the CNA was created as the sole water authority in Mexico, it also decentralised water management and created space for the participation of lower government levels and social groups. It set up state water commissions, river basin councils (Wester et al., 2003) and transferred the management of the irrigation districts to water users (Johnson, 1997) and water supply and sanitation to municipalities (Wilder and Romero-Lankao, 2006). However, decisions on water policy remained strongly under the control of the federal hydrocracy, and the aim of decentralised water management was more to improve the efficiency and sustainability of water services rather than decentralising power.

Shortly after Salinas de Gortari became president he created the CNA as an autonomous agency of SARH and designated Dr. González-Villarreal as its Director General (DG). Thus, the CNA had the authority to develop its own policies and was largely independent of SARH. Also, González-Villarreal directly interacted with the president, with little interference by the SARH minister. In its founding charter, the CNA was charged with defining water policies, granting water concessions, establishing norms for water quality and integrating regional and national water plans. At the regional level, the CNA was organised in six administrative-hydrological regions based on river basin boundaries. Responsibilities for water management at the state level were more diffuse, where the CNA state and irrigation district offices functioned under the supervision of the regional offices as well as federal headquarters. The role of state governments in water management remained limited in the 1990s to regulating and supporting municipal water utilities, and it was only in the late 1990s that the State Water Commissions started to take on a larger role.

The position and autonomy of the CNA as the sole federal water authority were consolidated with the promulgation of the *Ley de Aguas Nacionales* (Law of National Waters) in December 1992. This law calls for an integrated approach to the management of surface water and groundwater in the context of river basins, which it considers as the ideal unit for water resources management (for how this played out in the Lerma-Chapala basin, see Wester et al., 2008 and Wester, 2008). It also promotes decentralisation, stakeholder participation, better control over water withdrawals and wastewater discharges and full-cost pricing. Under the new water law, the CNA was made the country's sole water authority, charged with managing water resources both qualitatively and quantitatively.

With the creation of the CNA and the powers it was granted by the 1992 water law, the hydrocracy achieved its objective of re-establishing bureaucratic autonomy to a large degree. The financial autonomy of the hydrocracy was also strengthened through the creation of a "financial system for water". Under this system, the CNA gained direct control over a range of income sources, such as water taxes for the use of the nation's waters, water fees for bulk water delivery to the urban sector and

irrigation service fees. The income from water tariffs and fees during CNA's first 6 years increased rapidly, raising its degree of financial self-sufficiency from 51% in 1989 to 92% in 1994, thereby strongly reducing its dependency on the federal treasury (CNA, 1994). The CNA had direct control over these funds and thus a large degree of financial autonomy. In addition, new international loans for the irrigation and drinking water sectors were obtained by the CNA, further strengthening its financial position.

During the *sexenio* of Salinas, the hydrocracy succeeded in strengthening its bureaucratic and financial autonomy at the national level and regaining control over the irrigation districts through IMT (Rap et al., 2004). At this time, the transition from a one-party regime to democracy was incipient and the opening up of water management to a wider range of stakeholders was just starting. While the hydrocracy had succeeded in re-establishing its autonomy, the changing political landscape after 1994, with the PRI regime losing its hold on power and state governments demanding a larger role in water governance, was to raise new challenges to its autonomy.

In August 1994, the PRI presidential candidate, Ernesto Zedillo, was elected president of Mexico. However, the political violence preceding his election[5] and the collapse of the peso in November 1994 was to overshadow his term in office and would lead to growing demands for change. In this context, the Zedillo administration negotiated a series of political reforms with the country's main opposition parties, including measures to guarantee the autonomy of the Federal Electoral Institute and the promise of a *nuevo federalismo* (new federalism) in which states would receive more autonomy. This paved the way for increasing election victories by the opposition parties, starting at the municipal and state level, and culminating in the presidential election victory of Vicente Fox of the *Partido Acción Nacional* (PAN; National Action Party)[6] in July 2000, the first non-PRI president elected in Mexico since the revolution of 1910.

The national crisis of 1994 also had consequences for the water sector. An important group of hydrocrats resigned from the CNA, including González-Villarreal, who had been close to presidential candidate Colosio and had convinced him to turn the CNA into a full ministry if he won the elections. Instead, Zedillo appointed Guillermo Guerrero-Villalobos, a civil engineer, as the new DG of the CNA, and transferred the CNA from SARH to the newly formed *Secretaría de Medio Ambiente, Recursos Naturales y Pesca* (SEMARNAP; Ministry of the Environment, Natural Resources and Fisheries). Senior hydrocrats pushed for this move, as the second best option instead of a full ministry, and because they wanted to move out of the ministry of agriculture. This move entailed a much larger degree of autonomy for the CNA as the ministry of the environment was formed in late 1994, and had only one-third of CNA's budget.

Guerrero-Villalobos brought in a new group of hydrocrats with a stronger construction background. Although this new group favoured centralised water management, under Zedillo's *nuevo federalismo* programme the CNA also had to develop plans to decentralise water management programmes and functions to water users and state governments and to deconcentrate the CNA. To do so, it was decided to form 25 river basin councils covering all of Mexico's river basins and to set up 13 regional offices in hydrological-administrative regions based on river basin boundaries (for details, see Scott and Banister, 2008 and Wester, 2008). It was foreseen that these regional offices would become *organismos de cuenca* (executive basin agencies), to work with the *consejos de cuenca* (river basin councils) consisting of user representatives and state governments (Wester et al., 2003). By argueing that water needed to be managed on the basis of river basins, the CNA safeguarded a large role for itself in water management. While it agreed to the creation of State Water Commissions, through its regional offices all major water decisions would continue to be made by the CNA.

[5] This included the assassination of the then PRI presidential candidate Luis Donaldo Colosio in March 1994 and the *Ejército Zapatista de Liberación Nacional* (Zapatista Army for National Liberation) uprising in Chiapas that started on 1 January 1994, the day NAFTA entered into effect.

[6] In Spanish, *pan* means bread.

Between 1995 and 2000, the centralising tendencies in the hydrocracy were very strong and proved stronger than the policy current in the CNA aiming for decentralised water management. While 13 regional offices based on hydrologic-administrative boundaries were created, these offices were not granted autonomy and remained firmly under the control of CNA's central office. Also, the state water commissions were curtailed in their influence, and investment programmes in urban water remained under the financial control and decision-making power of CNA's central office. Nonetheless, from 1995 to 2000 the CNA came under increasing scrutiny and was criticized by state governments and water users because of its reluctance to decentralise authority and funds to the regional level and to states. The CNA was also widely criticised because it functions as both "judge and participant" in water governance, as it is responsible for granting water concessions and establishing water allocation policies, but at the same time has to solve the conflicts that emerge from this. With the election of a non-PRI president in 2000, hopes were high that 'deep' institutional change would occur in the water sector.

BREAD (PAN) AND GAMES: THE HYDROCRACY AND INSTITUTIONAL CHANGE AFTER 2000

Vicente Fox was elected president on 2 July 2000 and assumed office in December 2000. His election slogan had been *Ya! El Cambio* (Now! The Change), later reduced to only *Ya!*, and his administration was termed the government of change. Hopes were high that things would really change, although the PAN had not won a majority in Congress or the Senate. However, the achievements of the first non-PRI government were quite meagre, leaving many Mexicans feeling disillusioned. What did change was the political regime, with an unprecedented incursion of new actors in politics (especially from the business community) and the partial dissolution of old, corporatist relations of loyalty and legitimacy.

To win the elections Fox had assembled a diverse coalition that he attempted to placate when forming his cabinet, which led to "an incoherent cabinet with contradictory priorities and agendas [which] was based not on a plan to govern effectively but on his perceived need to keep his various constituencies close-by" (Rubio, 2004). As his minister of agriculture he appointed Javier Usabiaga, the largest commercial farmer from Guanajuato (Fox's home state), who was critical of the CNA. As his minister for the environment he appointed Víctor Lichtinger, an agricultural economist who had been the executive director of the tri-national Mexico-U.S.-Canada Commission for Environmental Cooperation. Fox's choice for the DG of the CNA – Cristóbal Jaime Jáquez – was surprising as he was not a civil engineer or water resources planner, but a manager who had been the CEO of Coca Cola de Mexico (and hence was Fox's ex-boss), of the soft-drinks and mineral water division of Grupo Industrial Visa and lastly of the Grupo Industrial Lala, the largest dairy company in Mexico. These three men did not succeed in establishing good working relationships and especially the infighting between SEMARNAT and the CNA, which renamed itself Conagua, reached new levels of Byzantine complexity. While President Fox continued the PRI tradition to appoint his campaign supporters and confidants to key bureaucratic positions he broke with the tradition to appoint an engineer with a bureaucratic career as head of the hydrocracy, amongst others since he lacked political support in the hydrocracy. This weakened the role of the senior hydrocrats, who lost their direct link with the president.

What did not change was the organisational structure of the hydrocracy as an autonomous commission of the federal government. Thus, the water policy agenda remained centralised at the federal bureaucratic level, where the use of the sector budget is determined. Strikingly, many of the senior hydrocrats with strong ties with the PRI were not immediately replaced when Fox became president, as he was hesitant to make too drastic changes in the federal administration. It was only after a few years that former PRI-hydrocrats were removed from, or demoted in, the CNA, with new directors coming from outside the water sector. What has changed is that high-level CNA positions are no longer allocated on the basis of technocratic qualifications, but are now largely dependent on political networks. Until 2000, hydrocrats had to have good relations with the state party, but all senior positions were filled with highly qualified water professionals. Under PAN rule, with its strong roots in business and its fondness for change management, technical expertise is regarded as less important

and political connections as crucial. As a result, many qualified water professionals have left the CNA, weakening its capacity.

During Fox's *sexenio* much effort went into reforming the 1992 water law. The main reason Fox pushed for this reform was to circumscribe the power of the CNA, based on the argument that the 1992 water law was difficult to implement and did not sufficiently address responsibilities for regulating water quality and the registration of water concessions. Both the ministries of environment and agriculture strongly supported the law reform process, with Usabiaga arguing that irrigation and rural water management should be moved to the ministry of agriculture. In 2002 and 2003, the Water Resources Commission of the Senate held extensive consultations to gather ideas for a new law. This process largely bypassed the CNA, which developed its own version of the new law. In CNA's version, the role of the CNA as the federal authority in water affairs was reinforced and the competencies of the executive basin agencies and river basin councils were reduced. This attempt at re-centralisation was rejected by the President's Office, as was the version of the Senate, which gave more autonomy and authority to the river basin councils as decision-making bodies. In the end, the President's Office drafted a new version of the law. The end result was a compromise between the proposals of the Senate and the CNA, approved by Congress in April 2004. This shows that the hydrocracy's autonomy became more circumscribed under Fox and that the push for decentralisation had become stronger.

In 2006, the "*sexenio* of change" came to an end, in tremendous political turmoil. The presidential elections were very competitive and tense, with hardly any difference between the results. After much heated debate, the PAN candidate, Felipe Calderón, was named president by the electoral commission, but many felt that the election result was improper and demanded a recount. As a result, the administration of Calderón started off with large political debts to its supporters, which also had consequences for the hydrocracy. A well-known PAN politician, José Luis Luege-Tamargo, was appointed as the new DG of CNA. The appointment of a PAN politician with no background in water affairs as CNA's DG is a strong rupture with the tradition of the hydrocracy to be led by qualified engineers, although it is too early to tell how this will impact on the hydrocrats' drive for autonomy. One marked change has been the sharp reduction in the number of CNA staff, from 34,000 in 1989 to 14,000 in 2007. While most members of the staff that left were not engineers, in recent years more and more qualified water professionals have also left the CNA. This institutional decline indicates a further ' politicisation ' of formerly technocratic (but not apolitical) positions, which implies a loss of power for the hydrocracy, the deterioration of the CNA's position within the government and the decline of importance of water on the political agenda.

In 2007, the CNA began implementing the changes contained in the 2004 water law at the federal level but not at the regional level. The hydrocracy has consistently resisted losing control over decision-making and over budgets. While in name its regional offices have now been converted into *organismos de cuenca* (executive basin agencies), decisions on budgets and water concessions are still made at the federal level. The resistance of the federal hydrocracy to further decentralisation became apparent in how it dealt with the overall amendment of the national water law approved in April 2004. The 2004 version of the law had stipulated that the 13 CNA regional offices would become autonomous *organismos de cuenca* and that they would serve as technical agencies in support of the river-basin councils. The councils were given a larger mandate and role in water resources management, although not in budgetary authority (Ortiz-Rendón, 2008). The CNA was given 18 months from April 2004 onwards to formulate and publish the regulations of the new water law and to form the 13 executive basin agencies (Scott and Banister, 2008). However, it dragged its feet, and by 2009 the CNA had still not published the regulations of the 2004 water law, making it difficult to implement the law in the Mexican context.

By turning river basins into domains of governance, through river basin councils (advisory bodies) and executive basin agencies under its tutelage, the CNA is attempting to strengthen its role and to counter the growing role and power of states and water users in water resources management (Scott and Banister, 2008; Wester, 2008). These new actors have challenged the authority of the CNA and

have pushed for further decentralisation. Larger political processes in Mexico, with the election of PAN governors and a PAN president and the transformation of corporatist mechanisms, have further increased the complexity of water resources management. The political playing field has changed dramatically in the past 20 years; increasingly, farmer representatives and state governments can block unilateral decisions by the federal hydrocracy. However, the legacy of the hydraulic mission has precluded a deeper shift from unicentric to polycentric water resources management and the hydrocracy actively seeks to co-opt what nascent trends exist in this direction. Thus, the decentralisation struggle continues and although some space has been created for the participation of water users and state governments in water resources management, the CNA remains in charge.

CONCLUSIONS

The conviction that the state should take the leading role in water resources development and management has strongly influenced water affairs in Mexico over the past 130 years. While the first component of the hydraulic mission (not letting a drop of water run to the ocean) has become less dominant the quest of the hydrocracy to regain and strengthen its autonomy remains strong. The hydraulic mission has strongly contributed to the resilience of the hydrocracy in the face of large political and institutional transitions and long-standing struggles with bureaucratic rivals (such as the ministry of agriculture) and continues to do so at present. Driven by the argument that a single water authority should regulate and control the nation's waters, the hydrocracy has consistently managed to renew its, always precarious, autonomy, particularly during presidential election campaigns and during the transition phase at the start of a new *sexenio*. We have argued that the resilience of the Mexican hydrocracy lies in its historical ability to create, renew and consolidate its autonomy through a direct bond with the president and increasingly with international organisations, and thus exercise, at crucial political moments, an unusual discretion in defining water policy, institutions, and resource flows in its support.

The hydrocracy is not all-powerful, and has often had to settle for less than the hydrocrats had hoped for. Since the dissolution of the SRH in 1976, the hydrocracy has repeatedly argued that a federal ministry of water resources needs to be created to tackle Mexico's water problems. With the creation of the CNA in 1989 the hydrocracy succeeded in regaining its autonomy, and it has managed to remain the sole water authority in the country. However, a commission is not the same as a ministry and the hydrocracy's degree of autonomy is less than during the SRH days. Its position in the federal bureaucracy has become less prominent, and since 2000 many qualified water professionals have left the CNA to be replaced by PAN political operatives. The privileged access to influence that the hydrocracy had until 2000 through its good contacts with successive PRI presidents has changed under the PAN administrations, making it more difficult for the hydrocracy to renew its autonomy. Nonetheless, in water affairs CNA remains the central federal authority, and the leading faction in the hydrocracy continues to push for the creation of a new water ministry. How the hydrocracy confronts social demands, responds to bureaucratic challenges and deals with water conflicts is strongly driven by its quest for autonomy and is deeply informed by its relationships with the political regime.

As many other countries, Mexico is implementing IWRM. This has raised tensions between the centralising tendencies in the hydrocracy and the call for 'deep' decentralisation to the river basin and state levels (Scott and Banister, 2008; Wester, 2008). The legacy of the hydraulic mission in Mexico shows that IWRM can be used as a guise by the hydrocracy to reaffirm its position as the sole water authority and to frustrate a 'deep' transition from state-directed water management to polycentric and adaptive water governance. This paper shows that focussing on the hydraulic mission of the hydrocracy uncovers the deeper driving forces behind the hydrocracy's quest for autonomy, and clarifies why decentralisation and deeper institutional change are elusive.

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