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Water Management in Mexico. From Concrete-Heavy Persistence to Community-Based Resistance

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ABSTRACT: According to Mexico's National Water Commission (CONAGUA), after dominating for 50 years, supply-side policies were replaced by demand management in the 1980s, and this focus has been superseded by 'sustainability'-oriented policies since the turn of the century, combined with greater participation in decision-making. Despite a discursive turn to demand management and a recognition of increasing environmental degradation, in this article we argue that a focus on 'concrete-heavy' projects persists, with increased private-sector participation and facing increased resistance from local communities. From the mid-1940s to the mid-1970s, dam construction flourished in Mexico, not only for irrigation but increasingly for hydroelectricity and urban water supply. Since the adoption of neoliberal economic policies, from the late 1980s onward, public investment in hydraulic infrastructure has decreased but we argue that the water management model has not shifted significantly in terms of its penchant for building large dams. We review socio-environmental conflicts resulting from hydraulic infrastructure projects since the turn of the century, and analyse in greater detail the case of the Zapotillo Dam in Jalisco. We argue that these conflicts highlight the reluctance of government water authorities to shift away from water management centred on supply through large infrastructure projects, and linked to ideas of progress and development. These conflicts also highlight the increasing dissonance between official state discourse, with its stress on ecological sustainability and political participation, and the actual orientation of water policies and projects.

KEYWORDS: Water management, dams, socio-environmental conflicts, Mexico

INTRODUCTION

In April 2014, in the face of a Supreme Court decision that blocked raising the Zapotillo Dam to a height of 105 metres, the head of Mexico's Ministry of Environment (SEMARNAT, *Secretaría de Medio Ambiente y Recursos Naturales*), Juan José Guerra, affirmed that, "the worst thing that could be done would be to let the water flow freely to the sea" (Martínez, 2014). This sentiment is one of the key tenets of the 'hydraulic mission' that supported the global boom in dam construction in the 20th century (Allan, 2006; Molle et al., 2009; Wester, 2009). The Zapotillo Dam, which will be discussed in further detail, is located in the Lerma-Chapala-Santiago watershed in central Mexico. Speaking in 1954, Elías González (1956: 104), then coordinator of the Lerma-Chapala-Santiago Study Commission (1950-1970), reported that dam construction in this basin had meant that: "The one billion [cubic metres] that were lost in the sea are generating for Mexico many millions of pesos in gain". This latter statement was expressed during the 'zenith' of the hydraulic mission in Mexico (Wester, 2009: 11), while the more recent statement hails from an era when the paradigms of water management have officially shifted

and, at least in policy documents, the imperative for concrete-heavy strategies, in the name of progress and development, are no longer the guiding principles for government.

According to Mexico's National Water Commission (CONAGUA, *Comisión Nacional del Agua*), there has been a clear evolution of water policy in the country, "from the focus on increasing supply that predominated for more than half a century, through a focus on controlling demand that characterised the 1980s and 1990s, to give way to a focus on sustainability" that supposedly characterises the vision of the 21st century (CONAGUA, 2011a: 10). However, as we will argue in this article, and as attested by a growing number of water-related socio-environmental conflicts throughout the country, neither demand management nor sustainability has guided water policy in Mexico. This is not to argue, of course, that there have not been significant changes since the era of national development, between the mid-1940s and early-1980s. Our aim in this article is precisely to question what has changed and what has remained the same in this scenario, as well as to touch on the main proposals of the local community organisations, non-governmental organisations, and researchers who have opposed some of the more recent concrete-heavy projects, and who are key actors in the related socio-environmental conflicts. We believe that these conflicts are important to examine because they take us beyond the discourse of sustainability, social participation and demand-management, and expose how water policies are put into practice, while pointing to the underlying logic of capital accumulation that drives water management decisions.

What has been the evolution of water policy in Mexico? How have strategies and planning paradigms shifted in the neoliberal era? What does the rise in water-related conflicts reveal about current water management? What types of proposals are being made by the community organisations, together with NGOs and researchers, involved in these conflicts? In an effort to address these questions, this article is divided as follows: in the first section, we seek to frame this discussion in broader debates around shifts in water governance paradigms, and on the global political economic forces that drive large water infrastructure projects with private-sector participation in the neoliberal era. From there, we review the history of hydraulic infrastructure development in Mexico, from the era of dam construction for irrigation after the Mexican Revolution (1910-1917) to the flourishing of dam construction from mid-1940s to the mid-1970s, and including changes till the mid- to late-1980s, as infrastructure development slowed and increasingly shifted from irrigation projects to hydroelectricity and urban water supply. In the following section, we focus on the period since the late-1980s, when CONAGUA was created and neoliberal policies were implemented across diverse sectors affecting natural resources, and analyse how investment in large water infrastructure projects has changed and social protest has increased, particularly in the past 15 years. To delve into further detail, in the final section we explore a case involving an interbasin transfer for urban and industrial water supply, the Zapotillo Dam in Jalisco, and the coalition of local residents, NGOs and national and international networks that have opposed its construction. Finally, we conclude the article with reflections on how conflicts surrounding dam and aqueduct projects highlight the reluctance of government water authorities to shift away from concrete-heavy, supply-oriented water management, linked to ideas of progress and development. These conflicts also highlight the increasing dissonance between the official discourse of sustainability and participation, and the actual orientation of water policies and projects.

DAMS, PRIVATISATION AND DISPOSSESSION

Mexican water historian, Luis Aboites, defines the period following the abandonment of the developmentalist state, starting in the mid-1980s, as the era of 'mercantile-environmental' water management. Despite new environmental laws and regulations and the incorporation of the concept of sustainability in water policy, however, Aboites (2009: 100-101) also notes the lack of progress on key environmental indicators such as aquifer depletion and water pollution. In a similar vein, Wilder (2010) highlights "marketisation, decentralisation, and sustainability" as the three key elements of the strategy

to modernise Mexico's water sector, while concluding that reforms related to decentralisation and sustainability "have been implemented on paper but not in practice" (21-22). This triad of policy changes corresponds with policies promoted by the World Bank, based on the Dublin Principle of establishing the economic value of water, while also introducing an ecological principle in water management, calling for participation-decentralisation, and underscoring the role of women.

While asserting that in the Global North water policy paradigms have shifted in recent decades to incorporate environmental awareness, the economic valuation of water and approaches to integrated water resources management (IWRM), Allan (2006: 52) affirms that the Global South "is still very much involved in its hydraulic mission", where generally water professionals and users "have successfully resisted the adoption" of new policy paradigms. Moreover, the economic valuation of water, as noted by Harris (2013: 112), "has frequently (and in practice) been taken to mean that it should be privatised". This is the case in Mexico, as we seek to demonstrate, where the formal adoption of environmental sustainability, IWRM, and social participation in water management, is combined and in stark contrast with projects that reflect a continuance of the 'hydraulic mission', with the new element of public-private partnerships in the development of the country's hydraulic infrastructure.

In distinguishing the 'state hydraulic' paradigm from 'market environmentalism', Bakker (2005: 546) associates the former with "planning for growth and supply-led solutions, with an emphasis on hydraulic development as a means of satisfying water demands", as well as with state ownership and management of infrastructure, and the provision of water "where and when needed, such that economic growth could proceed unconstrained". Market environmentalism, on the other hand, as a "mode of resource regulation that promises both economic and environmental ends via market means", is associated with processes of privatisation, commercialisation and commodification, and with 'managing demand' in lieu of seeking new sources of supply (Bakker, 2005: 547-548). In the case presented, we will argue that the 'state hydraulic' emphasis on new sources of supply remains, while operation and management of hydraulic infrastructure have shifted to the private sector. While Walsh (2011: 55) assumes that in neoliberal Mexico, "the focus of water governance has changed from increasing supply to reducing demand", our case study and brief analysis of dam-building trends in the country support Radonic's (2015: 36) conclusion regarding the Independencia Aqueduct in the northern state of Sonora: that "the modernist confidence in grand hydraulic projects as the solution to risk and the road to prosperity is still alive".

Linton (2014: 117, 118) speaks of the "demise of modern water", associated with conceiving water as a resource and with a focus on increasing supply, as evidenced not only in the defence of the human right to water and opposition to processes of neoliberalisation but also in recognition of social and political implications in the "actual business of water engineering and water management". Similarly, Gleick (2000: 131) observes a shift from an old to a new water paradigm whereby, while infrastructure to increase supply in the 'developing world' may be built to meet basic human needs, the trend will be towards "innovative small-scale approaches, including micro-dams, run-of-river hydro, land management and protection methods, and other locally managed solutions". The Mexican case calls into question the decline of the large-scale dam as representative of a paradigm past its prime, and in apparent opposition with the conservation- and efficiency-oriented neoliberal policies. Following Erensu (2013: 66), who observes in the case of Turkey that the development of small-scale hydroelectric dams is supported by "both new and old water paradigms", we highlight the persistence of the 'old' emphasis on supply-side solutions and the adoption of 'new' policies particularly as relates to private-sector participation in the development of new hydraulic infrastructure.

Debates on privatisation and commercialisation in the water sector have largely focused on the provision of municipal water services (Bakker, 2005, 2010, 2013; Swyngedouw, 2005; Hall et al., 2011; Ioris, 2013). The recent history of privatisation of municipal water supply has been rocky. Following the privatisation of water authorities in England and Wales in 1989, efforts to privatise urban water services expanded particularly in Eastern Europe and Latin America, associated with conditions on loans from

the World Bank and International Monetary Fund, with private sector investment in this sector reaching its peak in 1997 (Bakker, 2010). Investment during the first decade of the 21st century was only half of what it was during the 1990s (Pérard, 2012). The types of project also changed. While 74% of new projects between 1991 and 2000 related to water utilities (mainly concessions and management contracts), this proportion fell to 33% in the period 2001-2010, when sewage treatment plants accounted for 46% of new projects, most of which were build-operate-transfer projects (BOTs) (Pérard, 2012). This is part of the trend noted by Bakker (2013: 255) of private companies towards "lower-risk contracts, with lower or no investment requirements", such as BOTs, which transfer to the private sector the management and control of water infrastructure, thereby creating monopoly conditions to extract rent during an extended period of time. This is the dominant scheme for building aqueducts in Mexico, including the one in our case study.

Different forms of privatisation, marketisation, and commodification in the water sector are related more broadly to the processes of neoliberalisation of nature (McCarthy and Prudham, 2004; Heynen et al., 2007; Castree, 2008, 2010a, 2010b, 2011). These processes are variegated; they do not lead to the production of homogeneous regulatory environments but rather entail the "*systemic* production of geoinstitutional differentiation" (Brenner et al., 2010: 184, emphasis in original). In our case, we are particularly interested in the changing role of the state in the promotion of hydraulic infrastructure, and the shifting relations with economic elites (big capital). Despite the anti-state rhetoric, as Peck (2010: 9) observes, "[n]eoliberalism (…) has always been about the capture and reuse of the state, in the interests of shaping a pro-corporate, freer-trading 'market order'". Ioris (2013: 917) argues that studying these processes in the water sector provides an "emblematic" window into the "dynamic and contradictory processes of state adaptation associated with the advance of neoliberal agendas". Following these leads and from a political ecology perspective, we are interested in analysing power relations surrounding the development of hydraulic infrastructure, in exploring how, in the words of Linton and Budds (2014: 172; see also Swyngedouw, 2009), "water flows increasingly in accordance with flows of capital". This implies, not only tracing flows of water and money, but also exploring power relations in the discursive terrain.

While government authorities attribute water conflicts to increasing levels of water scarcity, where the market can presumably act as an effective mechanism of redistribution, activists and critical researchers centre the debate on the commodification of water and the dispossession of water rights, sources and infrastructure formally under the public or common domain. This latter discourse draws from a synthesis of Marxian and Polanyian-inspired analyses of social environmental conflicts which frame market incursions into the management of water and other elements of the earth's biosphere as a historically resurgent form of enclosing the commons, which in turn creates conditions for the rise of a counter-movement in defence of the commons (Roberts, 2008; Castree 2008, 2010a, 2010b, 2011; Joy et al., 2014; Navarro, 2015).

The official discourse in Mexico has an ecological spin to justify the need to build large dams, which takes as its point of departure biophysical scarcity and goes on to argue that interbasin water transfers are needed for environmental protection in the receiving region. This discursive framing rests on the naturalisation of scarcity and 'environmental benefits', or what Crow-Miller (2015: 174) calls "discourses of deflection" with respect to the South-North Water Transfer Project in China, which serve to divert attention from the anthropogenic and political economic causes of water degradation and relative scarcity, and from how the costs and benefits of hydraulic interventions are distributed between different social groups and regions. Conversely, socio-environmental conflicts sparked by hydraulic works (interbasin transfers, dams, aquifers, etc) call attention to the political nature of these projects and to their social implications. From an environmental justice perspective, this requires paying attention, not only to issues of material distribution, but also to those of political participation and cultural recognition (Schlosberg, 2007; Joy et al., 2014). This is part of an approach that we seek to employ in our analysis of the social movement against the Zapotillo Dam. Before presenting our case

study and to contextualise it, in the following two sections we present a historical analysis of the evolution of dam-building policies and trends in Mexico.

FROM CENTRALISATION TO NATIONAL DEVELOPMENT

During the colonial period and until the end of the 19th century, control over water in Mexico remained largely in the hands of local communities and authorities, as well as large landowners (*hacendados*) (Aboites et al., 2010; Talledos, 2011). This started to change with a push to greater federal jurisdiction over water during the regime of Porfirio Díaz (1876-1911) – known as the Porfiriato – particularly with the approval of several laws, starting with the *Ley sobre Vías Generales de Comunicación* (General Law on Communication Routes) in 1888, which extended federal jurisdiction to lakes and navigable rivers, as well as to waters establishing national or state borders. Although the law extended legal jurisdiction, it did not stipulate that these water bodies were national property (Aboites et al., 2010). This extension of federal government control, and thus the loss of local autonomy, did not go unchallenged. Talledos (2011: 277; see also Aboites et al., 2010) notes that many indigenous and mestizo communities resisted this new form of water management, that involved the 'dispossession' of natural resources, as the federal government concentrated control over land and water.

After 1890, landowners, entrepreneurs, and local authorities took advantage of new dam technology to build hydraulic works, and foreign investment was promoted through government concessions to build hydraulic and communications infrastructure (Aboites et al., 2010). Larger-scale hydraulic works were undertaken for both irrigation projects and hydroelectric dams; however, the emphasis in this period was on hydroelectricity (Talledos, 2011).

After the Mexican Revolution (1910-1917), Article 27 of the Constitution of 1917 established the nation's water as federal property, with access to private parties governed through a system of concessions. The 1920s saw dam construction bolstered with a programme focused on irrigation in the arid north launched by President Calles (Wester, 2009), and the founding of the National Irrigation Commission (CNI, *Comisión Nacional de Irrigación*) in 1926. Initially, the CNI focused its resources in areas of large private property, or creating new private landholdings through colonisation schemes (Warman, 2001). Real change towards the revolutionary call for 'land and liberty', came with the agrarian reform instituted under Lázaro Cárdenas (1934-1940), whose government redistributed some of the country's most productive lands, including irrigated lands. By the end of the Cárdenas administration, at least half of national irrigated lands were held by the *ejido* sector.[1] In fact, Cárdenas redistributed almost twice as much irrigated land as would the administrations of the following three decades combined (1940-1970) (Tetreault, 2009: 191).

Nonetheless, levels of investment in irrigation works continued to rise after 1940, absorbing up to 15% of public investment between 1941 and 1946 (Esteva, 1984). In 1946, the CNI was replaced by the Ministry of Hydraulic Resources (SRH, *Secretaría de Recursos Hidráulicos*). This also coincided with the shift in government policy after World War II to actively promote industrialisation via import substitution (Cárdenas, 2000; Guillén, 2013). The SRH continued the promotion of large irrigation works, absorbing 80% of funds for agricultural development between 1946 and 1970. As mentioned, this massive investment was focused mainly in the north of the country, particularly in three states: Sinaloa, Tamaulipas and Sonora (Warman, 2001). As highlighted by Warman, "the states with the largest irrigated areas are deserts or almost deserts; they were also quite uninhabited when the works were built, without pressures on the land or agrarian conflicts" (Warman, 2001: 156). In general, post-Cárdenas irrigation works benefited large private landowners. To gauge the growth in irrigation,

[1] The *ejido* is the collective property regime that was used for redistributing land to landless peasants in the aftermath of the Mexican Revolution.

Aboites (2009: 25) notes that from an estimated 700,000 hectares (ha) prior to 1910, census information for 1950 reported 1.2 million ha, which rose to 3.6 million in 1970 and to 6.6 million in 1991.

The SRH (1946-1976) thus oversaw a major boom in dam construction. The SRH built approximately 34 dams per year between 1947 and 1976 (a total of 1,040 dams), increasing water storage capacity by 109.2 billion cubic meters (Bm^3) (Olvera, 253). At the time when the SRH was formed, the first basin commissions were created (Papaloapan and Tepalcatepec in 1947), based on the Tennessee Valley Authority (TVA) model (Barkin and King, 1986). The goal was to centralise control of all projects in federal hands, where "investments in hydroelectric works and irrigation infrastructure took place as complements to regional development programmes" (Dávila, 2006: 50). Beyond irrigation, dam construction also began to diversify after 1960, with increasing investment in works to supply growing urban centres with water and in the construction of hydroelectric dams under the control of the Federal Electricity Commission (CFE, *Comisión Federal de Electricidad*) (Aboites et al., 2010). This also coincided with the nationalisation of the electricity sector in 1960.

The diversification in the types of dams built meant a shift from projects in the north of the country to large hydroelectric dams in the southeast (Dávila, 2006; Olvera, 2011). It also saw notorious cases of mass displacement of indigenous peoples. The first project of the Papaloapan Commission, the Miguel Alemán or Temascal Dam on the Tonto River in Oaxaca, completed in 1955, caused the displacement of 22,000 Mazatec people. When they refused to leave their homes in 1954, "the Commission provided a taste of its power by opening the dam's floodgates. This was complemented with the Commission's police setting fire to the huts of the most resistant" (Barabas and Bartolomé, 1973: 7). A second dam built by the Commission in the same region, the Miguel de la Madrid or Cerro de Oro Dam, displaced 26,000 Chinanteco people, who decades after construction started in 1972, continue to seek compensation and government response to their demands (Olvera, 2011).

During the post-WWII period, "large-scale hydraulic works required broad state intervention, large investments, international loans, and a centralised administration" (Olvera, 2011: 253). Although the works were designed and managed by government engineers, private companies have participated in their construction since the times of the CNI (Peña, 2012: 76). In this way, the energy generation capacity from hydroelectric dams increased more than tenfold from 2,121 Gwh in 1947 to 23,333 Gwh in 1990 (Aboites, 2009: 27). Energy generated from hydroelectricity in 2014, according to the CFE, was 37,491 Gwh (CFE, 2014a: 35). Some of the major hydroelectric dams built between 1960 and 1988 (the year before the Salinas administration began extending neoliberal reforms to the water sector), include the country's three largest dams in terms of storage capacity, all in the southeast: Malpaso, in the state of Chiapas, and Infiernillo in Guerrero, both inaugurated in 1964; and La Angostura, in Chiapas, completed in 1976. One of the hydroelectric dams built in the 1980s, El Caracol, on the Balsas River in Guerrero, is highlighted by Robinson (2001: 89) as a "transition point" in terms of community mobilisation and the "democratic education" of the engineers from the CFE. When faced with community opposition and legal defence, the CFE started filling the dam without prior notice. Later, community members won a lawsuit – known in Mexico as an *amparo*, which seeks protection of constitutional rights – even though the dam had already been filled. Mistreatment of the affected people damaged the reputation of the CFE with World Bank officials, and led to the creation of a Social Development Department at the Commission (Robinson, 2001: 92).

The other area of diversification was water supply and sewerage for growing urban areas. In 1950, 57.4% of Mexico's population of just under 26 million lived in rural areas. By 1960 the balance had started to shift, with a majority residing in urban areas, and demographic growth has continued to be centred in cities. By 2010, the Mexican population had risen to over 112 million, with 77.7% living in urban areas (CONAGUA, 2014a). This was a key change leading to a shift in investment away from irrigation and towards cities and hydroelectricity. Another factor was the sharp rise in levels of water supply coverage; while in 1950 only 17.1% of homes had piped water, by 1990 that figure had risen to

78.4%, and would continue to increase to 90.9% by 2010 (Aboites, 2009; CONAGUA, 2015a). A similar trend existed for sewerage, although the levels of coverage have remained somewhat lower (61.5% in 1990 and 89.6% in 2010) (CONAGUA, 2015a).

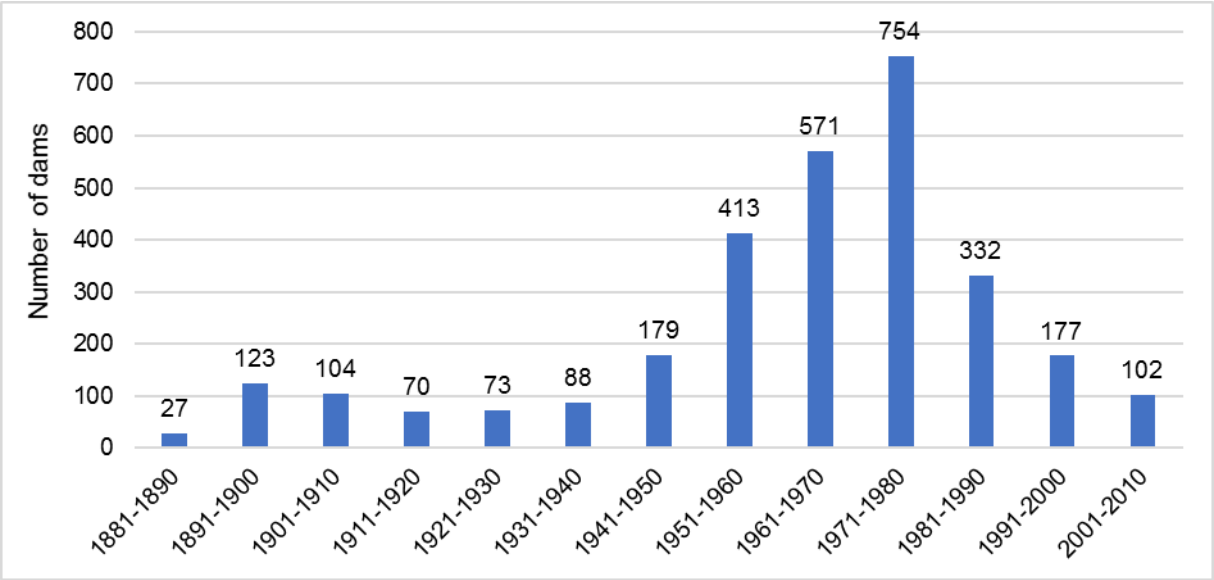
Several of Mexico's largest cities faced the overexploitation of local water sources and, in the case of Mexico City, complex challenges related to the disposal of wastewater. Mexico City expanded extractions from the Lerma watershed, with 230 wells drilled between 1965 and 1975 (Talledos, 2011). When this was insufficient, a further interbasin transfer was initiated with the construction of the Cutzamala System in the 1970s, taking advantage of eight dams in the Balsas Basin that had been built as part of the Miguel Alemán Hydroelectric System (Gómez-Fuentes, 2014). At the same time, a new 68-kilometre (km)-long drainage canal was inaugurated in 1975, as part of strategies to confront land subsidence resulting from excessive water extraction as well as flooding (Aboites, 2009: 41). This continued with the transfer of sewage and rainwater from the Valley of Mexico Basin to the Tula River in the state of Hidalgo, where the Mezquital Valley is "one of the oldest and largest examples worldwide of an agricultural irrigation system using municipal wastewater" (Siemens et al., 2008: 2126). The pressures of rapid urbanisation and industrialisation were felt in other ways as well. In one of the country's most populous urban centres, the northern industrial city of Monterrey, wells of up to 1,000 metres in depth were being drilled by 1950.

Groundwater was not only being exploited by cities, but also for agricultural production in the north and centre of the country and, in cases such as the Costa de Hermosillo, aquifer salinisation was evident as early as 1969-1970 (Aboites, 2009). Widespread water pollution became evident by the 1970s, and a first – largely ineffectual – pollution control law (*Ley Federal para Prevenir y Controlar la Contaminación Ambiental*) was published in 1971. Action on wastewater would take time, though, as evidenced by the fact that as late as 2001 only 15.4% of municipal wastewater was treated nationally (CONAGUA, 2003). At that same time, only 6% of the country's water bodies were considered of 'excellent' quality, based on an 18-parameter water quality index, while 74% were polluted to some extent, and the remaining 20% were classified as of 'acceptable' quality (CONAGUA, 2003: 34).

To close this section, we can highlight some of the changes that took place in the 'hydrocracy' (the term employed by Wester et al., and others to refer to the federal hydraulic bureaucracy) from the late 1970s to the late 1980s (Wester et al., 2009: 395; Molle et al., 2009). In 1976, the SRH was fused with agriculture to form the Ministry of Agriculture and Hydraulic Resources (SARH, *Secretaría de Agricultura y Recursos Hidráulicos*). Wester et al. (2009: 404) called this the end of the "golden era" of the hydrocracy in Mexico. Following this, the financial crises of the 1980s led to a drop in the rhythm of dam construction. Figure 1 provides a gauge of that decrease, and in general the phases of dam construction in Mexico. It is based on data from Arreguín-Cortés et al. (2013) who analyse information from CONAGUA's Dam Security System (SIS, *Sistema de Seguridad de Presas*), which compiles data on all the dams for which information exists on the year that construction was completed. The full SIS database has information for 5,701 dams, and CONAGUA estimates total storage capacity of all dams at 150 Bm^3 (2015a: 101).[2] In the 1980s, the SARH oversaw the construction of 140 dams with a total storage capacity of 20 Bm^3, including irrigation works designed to service 'enclaves' of production for the US market, particularly in the northern state of Sinaloa (Olvera, 2011: 253). Finally, a first important move towards the decentralisation of water management took place in 1983 via the modification of Article 115 of the Constitution devolving responsibility for water supply and sanitation to municipalities without the requisite financial or technical resources (Torregrosa et al., 2010). More significant legal and institutional changes were to come, as discussed in the following section.

[2] http://201.116.60.136/inventario/hinicio.aspx, accessed 5 October 2016.

Figure 1. Number of dams by period in which construction was completed.



Source: Authors' elaboration based on Arreguín-Cortés et al. (2013).

PERSISTENCE AND CHANGE: WATER MANAGEMENT IN NEOLIBERAL MEXICO

Following the 1982 debt crisis, during the presidency of Miguel de la Madrid (1982-1988), several years of struggle ensued between what Cypher and Delgado-Wise refer to as a "dwindling cadre of 'developmental nationalists'" who lobbied for renewed import substation industrialisation (ISI) policies, versus advocates of an export-led strategy who claimed that the ISI model in Mexico had been "exhausted" (2010: 35). By the mid-1980s, it was clear that the latter group would prevail, as evidenced by Mexico's accession to the General Agreement on Tariffs and Trade (GATT) in 1986. The commitment to neoliberal policies was consolidated under President Carlos Salinas (1988-1994), as the economy was unilaterally opened, state-owned companies were privatized, and greater opportunities were provided for private and foreign investment in land, water and other natural resources.

Shortly after Salinas assumed the presidency, in January 1989, CONAGUA was founded as an autonomous agency of the SARH. The National Waters Law (LAN, *Ley de Aguas Nacionales*) of 1992 instituted significant policy changes and opened up new sectors of infrastructure development and water management to private sector participation. Although private companies have a long history in dam construction in Mexico, the new law (Article 102) stipulated that total or partial concessions could be granted to private companies to not only build but also operate, maintain, and expand hydraulic infrastructure. Two new aspects of the LAN were the Public Water Rights Registry (REPDA, *Registro Público de Derechos de Agua*) and the Basin Councils (*Consejos de Cuenca*). As noted by Dávila (2006), tradable water rights, registered in the REPDA, were the basis for the creation of water markets and have led to pressures particularly on farmers to register their water rights, which can later be transferred to industrial and agro-industrial users or municipalities (see also Wilder and Romero Lankao, 2006; Ahlers, 2010). The economic valuation of water would be reinforced in the 2004 reforms of the LAN that considered water a "scarce and vital resource of high economic, social, and environmental value" (Article 9, paragraph XXVI). These reforms also declared integrated water resources management, based on water basins, a "priority and matter of national security" (Article 7, paragraph I).

As Wester et al. (2009: 407) observe, the LAN established CONAGUA as the "country's sole water authority, charged with managing water resources both qualitatively and quantitatively", thus "reestablishing bureaucratic autonomy to a large degree". CONAGUA would leave the agricultural sector after 1994, becoming a decentralised agency of the newly -formed Ministry of the Environment, Natural Resources and Fisheries (SEMARNAP, *Secretaría de Medio Ambiente, Recursos Naturales y Pesca*).[3] According to Dávila (2006: 95), despite the fact that this change during the administration of Ernesto Zedillo (1994-2000) diminished CONAGUA's 'political force', CONAGUA retained the powers granted in the LAN and continued to define the country's National Hydraulic Plan (renamed National Water Plan after 2007), thereby maintaining autonomy vis-à-vis SEMARNAT and becoming a "*superstructure* within the institutional structure" (emphasis in original). One key indicator of CONAGUA's weight relative to SEMARNAT is budget. CONAGUA has for many years received the lion's share of the environment sector's budget; in 2001 it received 67.4% of SEMARNAT's total budget of $14.4 billion pesos, and in 2015 CONAGUA was assigned 74.4% of a total budget for the sector of $68 billion pesos.[4]

Following the approval of the LAN, further steps were taken to decentralise water management, transferring irrigation districts to users through concessions for their operation and administration, creating Groundwater Technical Committees (COTAs, *Comités Técnicos de Aguas Subterráneas*), and state-level water commissions (Wilder and Romero Lankao, 2006; Wilder, 2010). Dávila critically analyses how social participation schemes as instituted through Basin Councils and COTAs have been skewed to favour the participation of the private sector, excluding domestic water consumers and indigenous and peasant communities without registered water rights, as well as establishing a system of unelected user representatives, chosen by the water authorities, who have no communication channels with the sectors they are meant to represent. Dávila (2006: 287) concludes that, "'social participation' (…) has been established to incorporate 'corporate participation' and consolidate the process of privatisation of natural resources in general and water in particular" (see also Scott and Banister, 2008; Wilder, 2010).

With respect to new hydroelectric dams, after the economic crisis of 1995, the Mexican government introduced a new financial arrangement known as Projects with Deferred Impact on the Budget (PIDIREGAS, *Proyectos de Impacto Diferido en el Registro del Gasto*) to facilitate private investment in dam construction. The function of PIDIREGAS is to "triangulate public debt, by obtaining external credit to pay the developers – also external parties – of the [hydroelectric] energy infrastructure" (Lina Montes, 2007: 53). For other types of projects, including dams, aqueducts, and wastewater treatment plants, the norm has become build-operate-transfer (BOT) contracts with both Mexican and foreign corporations.

At CONAGUA, investment has continued to shift away from irrigation-related projects and to focus more on urban water supply and sanitation. Aboites affirms that El Cuchillo, completed in 1994 and with a storage capacity of 1.12 Bm^3, was the first large dam built for urban water supply (2009: 36). Most of the country's major aqueducts, as reported by CONAGUA, have been built since 1990, and all except for the Uxpanapa-La Cangrejera Aqueduct in Veracruz, which supplies 22 industries, provide water to urban areas (CONAGUA, 2015a, 2016). The list of these aqueducts presented in Table 1 includes the Zapotillo-León Aqueduct, which is at the centre of the socio-environmental conflict we discuss below.

[3] This fisheries portfolio would be transferred to the agriculture ministry in 2000, and the environment ministry would be renamed SEMARNAT (*Secretaría de Medio Ambiente y Recursos Naturales*).

[4] http://dgeiawf.semarnat.gob.mx:8080/ibi_apps/wfservlet?ibif_ex=d4_gastos01_03&ibic_user=dgeia_mce&ibic_pass=dgeia_mce (accessed 5 January 2017)

Table 1. Major aqueducts of Mexico.

Name	Length (km)	Design flow (l/s)	Year completed	Supplies water to:
Lerma	60	14,000	1975	Mexico City with water from aquifers in the Upper Lerma Basin.
Chicbul-Ciudad del Carmen	122	390	1975	Sabancuy, Isla Aguada and Ciudad del Carmen, Campeche.
Río Colorado- Tijuana	130	4000	1982	Cities of Tijuana and Tecate, Baja California.
Linares-Monterrey	133	5000	1984	Metropolitan Area of Monterrey, with water from the Cerro Prieto Dam.
Uxpanapa-La Cangrejera	40	20,000	1985	22 industries in the eastern part of Veracruz.
Armería- Manzanillo	50	250	1987	Manzanillo, Colima.
Yurivia- Coatzacoalcos and Minatitlán	64	2000	1987	Coatzacoalcos and Minatitlán, Veracruz.
Vizcaíno-Pacífico Norte	206	62	1990	Towns of Bahía Asunción, Bahía Tortugas and Punta Abreojos, Baja California.
Chapala- Guadalajara	42	7500	1991	Metropolitan Area of Guadalajara with water from Lake Chapala.
Vicente Guerrero Dam-Ciudad Victoria	54	1000	1992	Ciudad Victoria, Tamaulipas with water from the Vicente Guerrero Dam.
Cutzamala System	162	19,000	1993 (Third Stage)	Mexico City with water from the Valle de Bravo, Villa Victoria, El Bosque, and other dams.
El Cuchillo- Monterrey	91	5000	1994	Metropolitan Area of Monterrey, Nuevo León, with water from the El Cuchillo Dam.
Huitzilapan River- Xalapa	55	1000	2000	Xalapa-Enríquez, Veracruz
Conejos – Médanos	25	1000	2009	Ciudad Juárez, Chihuahua
Acueducto II Querétaro	122	1500	2011	Santiago de Querétaro, Querétaro
Independencia	135	2380	2013	Hermosillo, Sonora
Chicbul-Ciudad del Carmen Parallel	120	420	2014	Sabancuy, Isla Aguada and Ciudad del Carmen, Campeche
Lomas de Chapultepec	34	1250	2014	Acapulco, Guerrero
El Realito	133	1000	2015 (First stage)	San Luis Potosí, San Luis Potosí
Vicente Guerrero – Cd. Victoria	54.6	750	Started in 2014	Ciudad Victoria, Tamaulipas with water from the Vicente Guerrero Dam.
Third Line of the Cutzamala System	77.6	12,000	Under construction	Mexico City with water from the Valle de Bravo, Villa Victoria, El Bosque, and other dams.
Zapotillo – León Aqueduct	140	3800	Contract assigned	León, Guanajuato

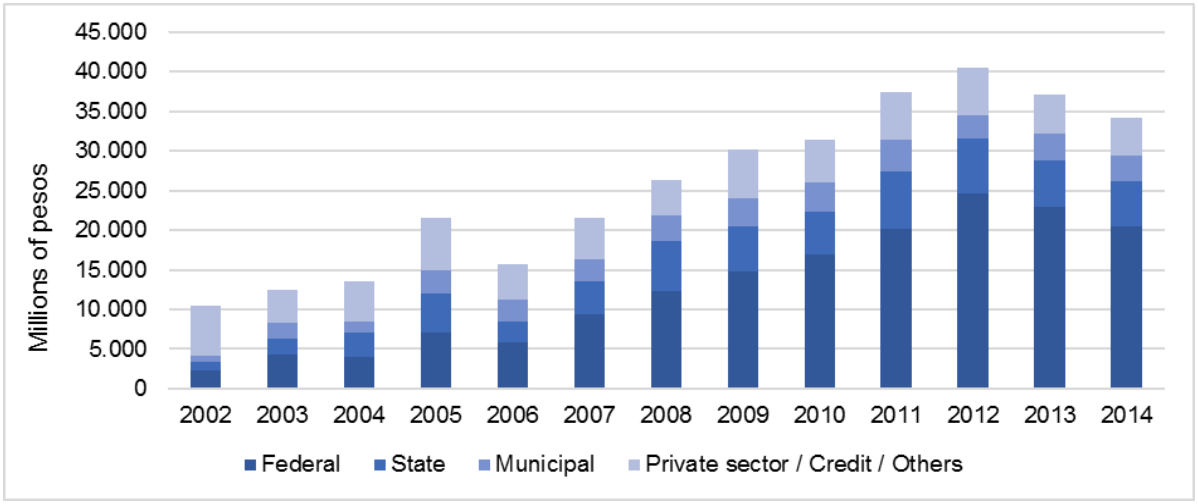
Source: Authors' elaboration based on CONAGUA (2015a, 2016).

Water supply and sanitation (WSS) has been an important destination for investment in hydraulic infrastructure in recent decades. For the period 2008-2012, WSS investment, including dams and aqueducts for urban centres and municipal wastewater treatment plants, accounted for 75.1% of investments in hydraulic infrastructure (Gobernación, 2014; CONAGUA, 2015b).[5] Between 2002 and 2014, total investment in WSS more than tripled, from $10.4 to $34.2 billion pesos. As can be observed in Figure 2, the federal government has been the main source of funds, providing approximately 60% of financing in recent years, with further contributions from state and municipal governments, and about

[5] This does not include investment in hydroelectricity.

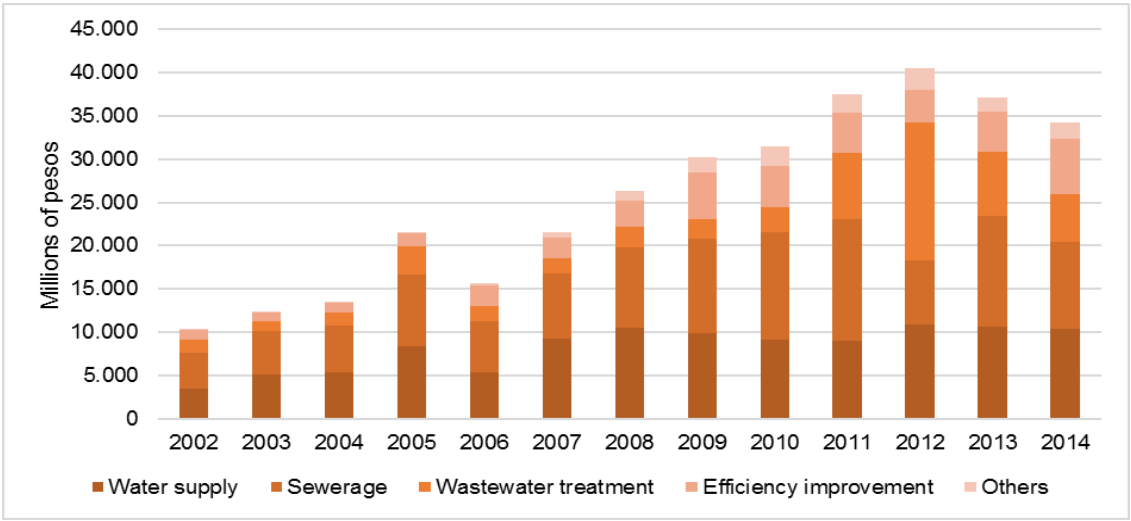
15% from the private sector. Approximately 70% of investment has been in public-urban water supply and sewerage, 15% in wastewater treatment, and 12% in efficiency improvement efforts (see Figure 3). There was a spike in investment in wastewater treatment in 2011 and 2012, related to large treatment plants in Mexico City and Guadalajara. During Felipe Calderón's presidential term (2007-2012, the second for the National Action Party, PAN), the 'hydraulic sector' was the destination of 8.0% of federal infrastructure investment (Gobernación, 2014: 172). Although the discourse of CONAGUA has been that 'water pays for water', with extraction and discharge fees collected exceeding the budget for water 'government and governance' ($15.9 billion pesos in fees in 2014 versus a budget of $12.4 billion), fees collected do not cover infrastructure investments (CONAGUA, 2015a: 139).

Figure 2. Investment in WSS sector by source of financing, 2002-2014.



Source: Authors' elaboration based on information presented by CONAGUA (2015b: 8).

Figure 3. Investment in WSS sector area of investment, 2002-2014.



Source: Authors' elaboration based on information presented by CONAGUA (2015b: 10).

The World Bank's Private Participation in Infrastructure (PPI) Database – while it does not include private participation in dam construction – provides insight into the number and types of WSS projects

involving the private sector. Of a total of 56 projects catalogued for the period 1992-2015, eight refer to concession contracts for municipal water services,[6] three to desalinisation plants, three aqueducts (including El Zapotillo), and 42 water and wastewater treatment plants. Build, operate, transfer (BOT) and build, own, operate (BOO) projects account for 84% of the total. These numbers reflect global trends in private sector participation, away from large concession contracts for water utilities, to smaller, lower-risk contracts, such as BOT contracts for wastewater treatment plants (see Pérard, 2012; Bakker, 2013).

The information and analysis presented thus far, highlighting policy shifts and levels of investment, are still insufficient to determine whether there has been a real change in water management, away from concrete-heavy strategies, and engaging not only with demand management but also with incorporating environmental sustainability and participation in decision-making as key criteria. In our approach, an analysis of current water-related conflicts provides an important window into understanding the dominant water management paradigms in Mexico, as they clash with the alternative visions of local communities and their allies, and become the subject of public debate.

Water conflicts in Mexico: Dams, aqueducts and pollution

Diverse authors in Mexico have noted the increase in socio-environmental conflicts since the turn of the century (Tetreault et al., 2012; Paz, 2014; Toledo et al., 2015; Navarro, 2015), as others have noted for Latin American and the Global South more broadly (Renfrew, 2011; Muradian et al., 2012). These conflicts have been sparked by the construction of dams, aqueducts, highways, and wind farms; by the effects of mining activities, oil and gas extraction, garbage disposal, and tourism projects; by chaotic urbanisation and by the impacts of the industrial pollution of water, land, and air. In this broader panorama, water has been highlighted as the affected resource in a significant proportion of conflicts in Mexico. Paz (2012) analysed 95 socio-environmental conflicts registered between 2009 and 2011 in 21 Mexican states, and found that water was the resource affected in 39% of cases. Pollution was the problem at the heart of 70% of the conflicts around water registered by Paz; the remainder are related to dispossession or water scarcity.

The causes of these conflicts are, of course, a matter of contention. While CONAGUA acknowledges the existence of conflicts, institutional documents emphasise demographic growth and poor geographical distribution of water. In the most recent National Water Plan (*Programa Nacional Hídrico, 2014-2018*), conflicts are described in the following terms:

> Mexico's social, economic and political stability has been compromised by various conflicts that have arisen in several of the country's watersheds due to increasing demand and competition for water between different users (CONAGUA, 2014a: 28).

In this regard, Mehta (2007) notes how academic and policy depictions of water scarcity focus on "volumetric and physical measures, especially with respect to both a growing population and competing demands for water" (654). Along these lines, CONAGUA stresses how per capita water availability in the country has dropped from 18,035 cubic metres per year (m^3/y) in 1950 to 3,736 m^3/y in 2014 (CONAGUA 2014a, 2015). Also emphasised is the fact that 76.9% of the population lives in the arid or semiarid north and centre of the country and contributes 79.3% of GDP, versus the water-rich southeast, home to just 23.1% of the country's inhabitants and contributing only 20.7% of GDP (CONAGUA, 2015a). However, we would argue that focusing on demographics and biophysical scarcity obfuscates the dynamics of power relations, ideology, and – as highlighted by Mehta (2007: 655) – the "politics underlying how technology choices are made".

[6] This database does not include the service contracts for Mexico City. http://ppi.worldbank.org/data, consulted December 2016.

Our argument is that water-related conflicts are not the result of a simple equation of population growth plus urbanisation equals increased scarcity and competition. Firstly, this reading attempts to naturalise scarcity and depoliticise the issue of water distribution and management. Secondly, this conception evades the issue of water quality and the unchecked levels of pollution that are at the heart of many conflicts. A brief look at the issue of water pollution and government inaction in this regard also provides evidence for our assertion and demonstration that the government's discursive commitment to sustainability is not borne out in practice.

According to CONAGUA (2015a: 195), the 21st century inaugurated an era of "water sustainability, in which wastewater treatment is significantly increased" among other actions. The increase in urban wastewater treatment notwithstanding, CONAGUA is far from taking decisive action to protect the country's waters from toxic pollution. Although CONAGUA estimates that industry generates a biological oxygen demand (BOD) equivalent to that of 300 million people (more than 2.5 times the country's population), levels of treatment of industrial wastewater remain low – 31.0% in 2015 (CONAGUA, 2014a and 2015). Enforcement of the national effluent standard governing discharge into 'national waters' (Mexican official standard, NOM-001-SEMARNAT-1996) is also notoriously low. In fact, in an interview, CONAGUA's head of inspection reported in 2015 that with their current level of about 180 inspectors, they are able to inspect each user with an extraction, discharge or other concession, just *once every fifty years* (Rodríguez, 2015). What is more, the national effluent standard has insufficient parameters to protect water resources from toxic contamination, as researchers from the Mexican Institute of Water Technology (IMTA, *Instituto Mexicano de Tecnología del Agua*), a government research centre, have reported. IMTA researchers Saldaña et al. (2006) indicate that effluent may comply with the conventional parameters included in the standard, while still polluting aquatic ecosystems with toxic substances that are not regulated. In this way, pollution not only exacerbates water scarcity, but has also led to significant conflicts, such as along the Lerma, Atoyac, and Santiago rivers, where local organisations call for river clean-up and report severe health effects (McCulligh et al., 2012; Paz, 2014; Navarro, 2015).

Leaving aside the pollution issue, hydroelectric dams have continued to cause conflicts, and have led to national-level organising efforts of affected communities. In 1990, the Federal Electricity Commission (CFE) was prevented from building a dam on the Balsas River, San Juan Tetelcingo, due to the mobilisation and resistance of affected communities who formed the Council for the Development of the Nahua Communities of the Upper Balsas (*Consejo para el Desarrollo de los Pueblos Nahuas del Alto Balsas*) (Talledos, 2011). At the same time, and given the poor track record of relations with communities, the CFE tried to incorporate greater local participation in the construction of two other dams: Zimapan in Hidalgo and Aguamilpa on the Santiago River in Nayarit. Both dams were completed in 1990; however, Olvera (2011: 265) observes that actions to compensate affected communities were "insufficient, inadequate, and incomplete", and in the case of Aguamilpa, affected communities later organised to demand that CFE fulfil unkept promises.

Even the attempt to 'manage' relations with affected communities was absent when, in 2003, the CFE entered communal lands and began work for the construction of the La Parota Dam on the Papagayo River in Guerrero, near the tourist centre of Acapulco. La Parota was projected to flood 17,300 ha, displace 25,000 people and affect a further 75,000 downstream (Chávez Galindo, 2009; Gatica, 2014). Community members organised quickly, forcing CFE workers to leave, and in 2004 forming the Council of Ejidos and Communities Opposed to the La Parota Dam (CECOP, *Consejo de Ejidos y Comunidades Opositores a la Presa La Parota*). In October 2004, CECOP hosted the event where the Mexican Movement of Dam Affected People and in Defence of Rivers (MAPDER, *Movimiento Mexicano de Afectados por las Presas y en Defensa de los Ríos*) was formed, a national coalition that continues to bring together communities opposed to dam construction in many states, including those affected by El Zapotillo in the Highlands of Jalisco.

In their local struggle, CECOP has used legal defence mechanisms to question the environmental impact assessment process and to demonstrate that assemblies held by CFE did not comply with agrarian law, with the use of falsified signatures, and police presence to impede the attendance of those opposed, among other violations (Chávez Galindo, 2009). Four activists have been killed and eleven have been imprisoned since 2003 (CECOP, 2016). In a statement to commemorate 13 years of resistance, the CECOP, which has successfully allied itself with national and international networks and organisations, highlights the legal victories that prevent the CFE from commencing construction, while affirming that "above all they are blocked by the decision of the communities and the strength of the movement" (CECOP, 2016). Nevertheless, the CFE's planning documents and reports continue to declare that work will commence shortly on the La Parota Dam. The most recent investment programme for the electricity sector (2014-2028) indicates that La Parota will begin operations in 2020 (CFE, 2014b: 4-39). The same document states that the Paso de la Reina Dam on the Verde River in Oaxaca, which has faced consistent opposition from the Council of Peoples United in Defence of the Verde River (COPUDEVER, *Consejo de Pueblos Unidos por la Defensa del Río Verde*), will be operating by 2021.

Consistent opposition to hydroelectric dams in states of the southeast (see Table 2) has been cited as a factor leading to recent dam construction in western Mexico. Olvera (2011: 269) affirms that the record with El Caracol, as well as the conflicts surrounding San Juan Tetelcingo and La Parota, "contributed, during the past two administrations [2000-2012], to the federal government concentrating investments in Nayarit and Jalisco, with the construction of the El Cajón and La Yesca dams". This trend has continued to some extent, with the current push to build Las Cruces Dam, also in Nayarit. El Cajón and La Yesca are both in operation, but affected communities have continued to denounce unfulfilled promises by the CFE. Upriver in the same watershed, there is another nucleus of dam construction, although not related to electricity generation. As outlined in more detail in the next section, the dams proposed or under construction on the Santiago or its tributary the Verde River, are all with the purpose of supplying water to the Metropolitan Area of Guadalajara and/or the city of León, Guanajuato. Other conflicts related to urban water supply are outlined in Table 2.

Finally, it is important to point out that the repression of activists in the case of La Parota is not isolated, but rather represents a pattern of threats, arrests, and murders, as documented in a 2015 report by the Mexican Centre for Environmental Law (CEMDA, *Centro Mexicano de Derecho Ambiental*, 2015: 13), which registered 109 attacks against environmental activists between May 2014 and June 2015, including threats, illegal detentions, and physical assaults. Of these registered attacks, 27 are related to aqueducts or water privatisation, and 16 to hydroelectric dams. According to Toledo et al. (2015: 12), at least 35 environmental activists were murdered in Mexico between 2006 and 2013. In the next section, we will mention the forms of repression that have been used against opponents of the Zapotillo Dam.

THE CASE OF EL ZAPOTILLO

"How to explain it to them?", asked José Elias Chedid, CONAGUA's General Director for the Lerma-Santiago-Pacífico Watershed, with reference to the inhabitants of Temacapulín in a public forum held on 21 March 2014, "Jalisco has to be developed and they have to participate in this development". Participation, in this case, refers to acceding to the government of Jalisco's plans to relocate the inhabitants of the town in order to make room for the reservoir to be created by the Zapotillo Dam, in the Highlands of Jalisco, approximately 70 km northeast of Guadalajara. Temacupulín is the largest of three towns threatened with flooding by the dam; the other two are Acasico and Palmarejo. These communities have a combined population of almost one thousand people and as many as three thousand migrants, known as 'absent sons and daughters', who maintain links to their community of origin and visit it periodically. From this population, organised resistance has emerged to contest the

Table 2. Recent conflicts related to dams and aqueducts (partial list).

Name of project	Location	Purpose	Status of conflict/project
Arcediano Dam	Santiago River, north of the Metropolitan Area of Guadalajara (MAG), Jalisco	Supply 10.4 m^3/s to the Metropolitan Area of Guadalajara.	Cancelled in 2009. Opposed by Jalisco Chapter of MAPDER mainly due to health risks related to water pollution.
San Nicolás Dam	Verde River, Highlands region of Jalisco	Supply 3.8 m^3/s to León, Guanajuato	Cancelled in 2005 due to opposition of affected communities and allies.
El Zapotillo Dam	Verde River, Highlands region of Jalisco	Supply 8.6 m^3/s to León, Guanajuato, Metropolitan Area of Guadalajara, and Highlands region of Jalisco	Construction up to 80 m completed. Further construction to 105 m detained by decision of Supreme Court. Opposed by the *Comité Salvemos Temacapulín, Acasico y Palmarejo* and allies.
La Parota	Papagayo River, Guerrero	Electricity generation (CFE) (455 MW) and water supply to Acapulco, Guerrero	Opposed by the *Consejo de Ejidos y Comunidades Opositores a La Parota* (CECOP). Dam would displace 25,000 people. Design studies completed.
Paso de la Reina	Verde River, Oaxaca	Electricity generation (CFE) (543 MW)	Opposed by the *Consejo de Pueblos Unidos por la Defensa del Río Verde* (COPUDEVER). Dam would affect 17,000 people in indigenous and Afro-Mexican communities. Feasibility study completed.
Chicoasén II	Grijalva River, Chiapas	Electricity generation (CFE) (240 MW)	Suspended since 2015 due to legal action of affected community.
Las Cruces	San Pedro Mezquital River, Nayarit	Electricity generation (CFE) (240 MW)	Stalled in late planning stage. Opposed by *Consejo Náyeri* (or *Indígena*) and *Consejo Intercomuintario para el Desarrollo Sustentable del Río San Pedro*, representing 29 threatened communities.
El Naranjal	Blanco River, Veracruz	Electricity generation (ICA and others) (370 MW)	Opposed by *Defensa Verde, Naturaleza Para Siempre*. Would affect 30,000 indigenous and mestizo people.
El Cajón	Santiago River, Nayarit	Electricity generation (CFE) (750 MW)	In operation since 2006. Affected people demand fair compensation from CFE for their lost land and orchards, and proper infrastructure in the relocated community.
La Yesca	Santiago River, Jalisco and Nayarit	Electricity generation (CFE) (750 MW)	In operation since 2012. Group of affected people denounce lack of proper compensation and unfulfilled promises of CFE regarding building of social infrastructure in communities.
Monterrey VI Aqueduct	Confluence of Tampaón and Moctezuma rivers, San Luis Potosí	Supply Metropolitan Area of Monterrey with 5 m^3/s via an aqueduct of 372 km	Cancelled in late 2016. Opposed due to high economic and ecological costs. Bidding process questioned due to participation of a company linked to President Peña Nieto, Grupo Higa.
Cutzamala System (Third line)	System of dams in the states of Mexico and Michoacán	Supply 12 m^3/s to Mexico City	Under construction. Opposed by the *Frente Mazahua*, denouncing lack of provision of drinking water in local communities.
Independencia Aqueduct	From the El Novillo Dam on Yaqui River, Sonora to the Sonora River basin	Supply 2.38 m^3/s to Hermosillo, Sonora	In operation since 2013. Opposed by Yaqui communities and the *Movimiento Ciudadano por el Agua*. Protests ongoing.

Source: Authors' elaboration.

Zapotillo Dam, in alliance with NGOs and university groups in Guadalajara, and connected to social movement networks operating on the national and international level.

In this section, we present the case of conflict around the Zapotillo Dam in an effort to illustrate how it has exposed the inclination of Mexican state agencies in charge of managing water to promote the construction of large-scale water infrastructure as a means to increase the supply of water to growing urban industrial centres, without seriously considering 'soft-path' alternatives proposed by civil-society groups. This will be done in three steps. First, we provide a brief description of the project to build the Zapotillo Dam, its history and how it fits into larger infrastructure development plans in Jalisco, by summarising official discourse and data on the technical, hydrological and financial aspects of the project. Second, we sketch out the resistance movement and its interplay with state actors who promote the dam. And third, we present a summary of some of the criticisms that have been levelled against the dam, the alternatives that have been proposed by university and civil-society groups, and the official response to these alternatives.

The data used for this analysis come from multiple sources, among the most important of which are: a systematic and comprehensive review of texts that focus on El Zapotillo Dam and/or the resistance movement, including government documents, academic publications, newspaper articles and declarations made by representatives of the resistance movement; ongoing (albeit intermittent) field research conducted by both authors since the beginning of the conflict in 2005, including periodic visits to Temacapulín, attending and participating in public and academic forums that deal with water issues in and around Guadalajara; participant observation in events organised by the resistance movement to the Zapotillo Dam; the application of (formal and informal) interviews to government officials and to participants in the resistance movement; participation in the Academic Water Council of the Jalisco State Water Commission from 2013 to 2016 (first author); and the exchange of information and ideas with other researchers who have investigated the case. What this amounts to is an actor-oriented ethnographic approach to (re)constructing a 'representative' case, which according to Yin (2009: 48) could be "a typical 'project' among many different projects". For our purposes, the Zapotillo project and conflict is 'typical' insofar as it represents recent trends in water infrastructure development in Mexico during the neoliberal era: increasingly oriented to providing additional water to urban-industrial centres, with private-sector participation; with a surge of activity in the western region of the country, meeting resistance from locally affected people and their allies. For the purposes of exposition, data were selected and interpreted with the criteria of illustrating and critically analysing the official discourse and justification for building the dam, as well as succinctly describing and analysing the main contours and key moments of the resistance movement, its proposed alternatives, and the interplay of power relations among the actors involved in the conflict.

The hydraulic mission in the Highlands of Jalisco

Plans were made in the mid-1940s to construct a series of dams in the Highlands of Jalisco, when the state-level government hired engineer Elías González to carry out a study on the feasibility of building hydraulic infrastructure along the Verde River. Originally conceived to generate electricity and make water available for irrigation, in the 1970s, according to Frajoza (2013), plans to construct a large dam in the Highlands region were reformulated with the purpose of supplying potable water to Guadalajara. In the early 1990s, after various failed initiatives, these plans began to materialise with the termination of two projects: the Calderón Dam, to the east of Guadalajara, on the river of the same name; and the El Salto Dam, on the Valle de Guadalupe River, a tributary of the Verde (Casillas Báez et al., 2010). The Calderón Dam, otherwise known as the Elías González Chávez Dam, has provided water to the Metropolitan Area of Guadalajara (MAG) since it was inaugurated a quarter century ago. Today it provides 8.8% of the water that is consumed in the metropolitan area while the rest comes from Lake Chapala (62%), local aquifers (27%) and springs (3%) (SIAPA, 2016: 5). Together, these two projects were only a presage of the major dam construction planned for the Verde River Basin.

A presidential decree published in the Federation's Official Gazette on 7 April 1995, reserved volumes of water from the Verde River for public urban consumption in the states of Guanajuato and Jalisco: 119.8 Mm^3/y and 384.7 Mm^3/y, respectively. It was later specified, in modifications made in 1997 and 2005, that of the volume of water reserved for Jalisco, 69.4 Mm^3/y are for public-urban consumption in the Highlands of Jalisco and 12.6 Mm^3/y are for agricultural use in the same region.

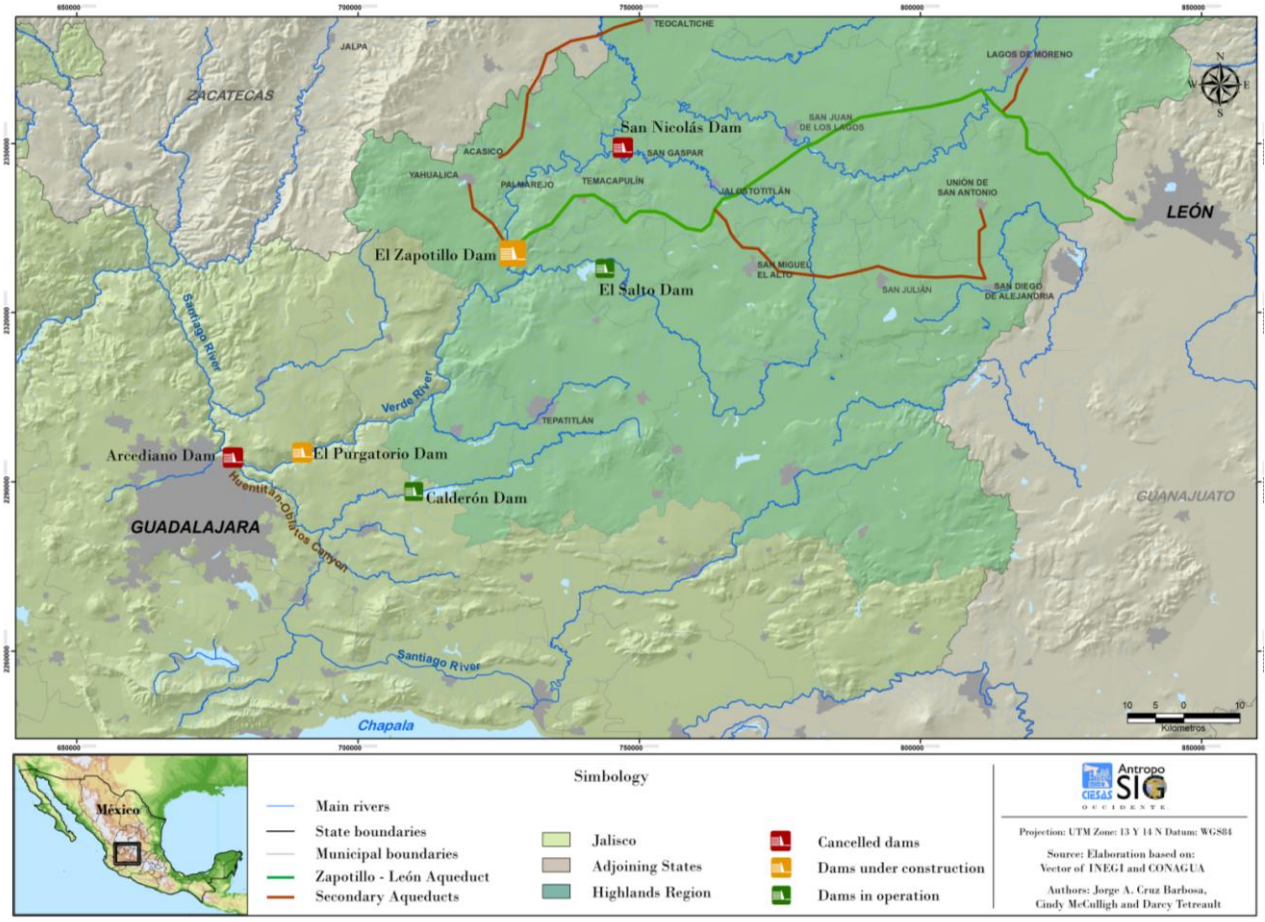
Under these legal parameters, during the first decade of the new millennium, CONAGUA, the executive branch of Jalisco's government and its State Water and Sanitation Commission (CEAS, *Comisión Estatal de Agua y Saneamiento*)[7] promoted the construction of large-scale hydraulic infrastructure to supply additional water to Guadalajara and, in the case of El Zapotillo, to the city of León, Guanajuato, together with authorities from the neighbouring state. With the pro-business National Action Party (PAN) in control of the federal government, and of the state-level governments of Jalisco and Guanajuato, and with Lake Chapala experiencing a dramatic crisis of low water levels, plans to construct two large dams got underway: the Arcediano Dam, in the Huentitán-Oblatos canyon to the north of the MAG, a few hundred metres below the union of the Verde and Santiago rivers; and the San Nicolás Dam on the Verde River, upstream from El Zapotillo, where it was projected to flood the town of San Gaspar.

The Arcediano Dam was projected to have a height of 125 metres and a storage capacity of 404 million cubic metres (Mm^3). The estimated cost varied over the years, but just before the project was cancelled, it was calculated at $15 billion pesos (Partida, 2009). This dam was meant to supply 10.4 m^3/s to the MAG. When water supply options for Guadalajara were being discussed in 2001, 53 proposals were presented to CEAS. The options under analysis were quickly reduced to a dispute between two dams, with Arcediano defended as the better site. For over eight years, university groups and diverse community-based groups and NGOs criticised and opposed the plans to build the Arcediano Dam, among other reasons because of the dangers posed by using highly polluted water from the Santiago River for household consumption. The cancellation of the dam was finally announced in October 2009, citing technical difficulties associated with a geological fault. Shortly thereafter, the El Purgatorio Dam was announced as the alternative, located upstream of Arcediano on the Verde River and with an estimated cost of $5.8 billion pesos (CONAGUA, 2011).

The government's plans to build the San Nicolás Dam in the Highlands of Jalisco also met with resistance. In this case, they ran up against strong social opposition in the town of San Gaspar. Negotiations to buy land from the affected population collapsed and CONAGUA could not proceed with its geological studies (Casillas Baéz et al., 2010). Finally, on 31 May 2005, then governor of Jalisco, Francisco Ramírez Acuña, announced the cancellation of the dam, promising that if another were to be built on the Verde River it would not displace any communities. These declarations notwithstanding, a few weeks later plans were announced to build the Zapotillo Dam, with a height of 80 metres, which would result in a reservoir surface area of 2,051 hectares (ha), implying the need to relocate 344 people from Acasico and 167 from Palmarejo; and the need to build two protection dykes, each 10 metres high and 220 metres long, with the objective of protecting Temacapulín, with a population of 480 inhabitants (CONAGUA, 2012: 20-21). Although this scenario did not convince the residents of Temacapulín, who began staging protests just a few days after the first announcement, even the possibility of living behind dykes vanished on 1 August 2007, when it was announced that Ramírez Acuña's successor as governor of Jalisco, Emilio González Márquez also of the PAN, had petitioned for the height of the dam to be raised to 105 metres, in order to increase storage capacity and use the water not only to supply León, but also Guadalajara. With this modification, the surface area of the

[7] CEAS was created in May, 2001 and renamed *Comisión Estatal del Agua Jalisco* (CEA) in 2006, although in practice it has not abandoned work related to sanitation.

Figure 3. El Zapatillo Dam and Aqueduct.



reservoir would be 4,816 hectares and put Temacapulín under water, without the possibility of protecting the town with dykes.

The cost of the Zapotillo Dam and the Zapotillo-León Aqueduct is estimated at $13.1 billion pesos, including $3.8 billion in private investment in the aqueduct to be recuperated via a BOT scheme (CONAGUA, 2016). In September 2009, it was announced that the winner of the bidding process to build the dam wall was a consortium comprising Peninsular Constructura, the financial branch of Grupo Hermes, owned by Mexican businessman Carlos Hank Rhon; and the Spanish company Fomento de Construcciones y Contratas (FCC), which was bought by Mexican billionaire Carlos Slim in 2016. In the tendering process for the 144-km aqueduct from El Zapotillo to León, the Spanish company Abengoa was awarded the contract in September 2011, securing the right to operate it upon completion for a period of 25 years. From this endeavour, it anticipates generating a profit of USD1.3 billion (Abengoa cited in Ocho García et al., 2015: 20), equivalent to more than twice the total cost of the Zapotillo project.

Organised resistance to El Zapotillo

The first public act of protest against El Zapotillo took place on 16 June 2005, when children from the primary school in Temacapulín carried signs with messages of rejection in front of the media, while adults from the community requested support and information from state-level congressmen. On 20 September 2005, when representatives of CONAGUA, the Government of Jalisco, and its recently

created State Water and Sanitation Commission (CEAS) attended a meeting in Temacapulín in order to provide a technical explanation of the project, they found the streets filled with banners and messages against the dam. Two and a half years later, after contacts had been made with civil-society groups in Guadalajara and MAPDER, community-based rejection persisted. Faced with this situation, the regional head of CONAGUA at the time, Raúl Iglesias Benítez, made a comment reflecting the persistence of authoritarianism in the Mexican hydrocracy: "We're going to buy them life jackets and boats so they don't have to worry" (cited in Partida, 2008).

Grassroots organised resistance to the dam was initially led informally by a Catholic priest with family roots in Temacapulín, Gabriel Espinoza Íñiguez, who was serving in a parish in the Metropolitan Area of Guadalajara (MAG) when the project was announced. He warned local residents from the pulpit of the local Basilica, among other spaces, of the implications of the project for Temacapulín and encouraged organised resistance, much to the chagrin of his superiors in the Church, in particular Cardinal Juan Sandoval Íñiguez in Guadalajara. Eventually, Father Gabriel had to submit his resignation from the priesthood and assume a lower profile role as one of several local leaders of the resistance movement, including women who are active in the local parish. In this way, the Catholic faith has continued to permeate the organisational and symbolic expressions of the struggle against the Zapotillo Dam (Gómez Fuentes, 2013), as evidenced, for example, by the parading of religious figures during protests marches and the 51-hour 'marathon of prayers' held outside the governor of Jalisco's residence in May 2010.

Community organisation was given a boost in June 2008, when MAPDER held its Fifth National Meeting in Temacapulín, during which local residents opposed to the Zapotillo Dam created the Committee to Save Temacapulín, Acasico, and Palmarejo (CSTAP, *Comité Salvemos Temacapulín, Acasico y Palmarejo*). Representatives from two Guadalajaran-based NGOs were present at this meeting: the Mexican Institute for Community Development (IMDEC, *Instituto Mexicano para el Desarrollo Comunitario*), staffed by urban professionals who had participated in the struggles against the Arcediano Dam and to clean up the Santiago River; and Colectiva Coa,[8] a group of lawyers with experience assisting Huichol indigenous communities in defence of their territories in the northern part of Jalisco.

Over the years, IMDEC has provided various forms of support to the affected population, co-producing critical knowledge, and serving as a link to broader networks of resistance and alternatives that operate on the national and international level, most importantly MAPDER and International Rivers. Through these connections, Temacapulín was designated as the site for the Third International Meeting of Dam-Affected People and Their Allies, Rivers for Life 3, which took place in October 2010. During several days, 320 delegates from 54 countries exchanged experiences, discussed alternatives, and expressed their solidarity with the struggle against El Zapotillo.

For its part, Colectiva Coa has played a key role in the legal defence of the affected communities. Between 2008 and 2014, it presented 63 legal actions in federal- and state-level courts, in an effort to prevent dam construction and to protect the rights of the affected population, as well as five actions to contest related-court decisions (Gómez Godoy and Espinoza Sauceda, 2015: 91). Ironically, the decisive legal action that eventually led to the Supreme Court decision to halt construction of the dam was initiated by the LIX Legislature of the Congress of Jalisco, on 10 September 2012. The struggle against the Zapotillo Dam has also been supported by groups of researchers at the University of Guadalajara and the Jesuit University of Guadalajara (ITESO).

It is worth emphasising that grassroots organised resistance has emerged not only from the dissident residents of the affected towns, especially Temacapulín, but also from the 'absent sons and

[8] In 2011, its name was changed to Colectivo de Abogad@s.

daughters', who have organised committees based in Guadajalara, Monterrey, and León, as well as in the United States, most importantly in Los Angeles and San Francisco. The committee in Guadalajara, which is led by women, is especially active in the innumerable meetings and events that have taken place in the state capital, and it serves as a communication and logistical link to the community. The committees in Los Angeles and Monterrey stand out for having collected funds and contributed much to financing protest actions against the dam and to supporting the town's annual festivities, complementing in this way a long tradition of sending remittances to family members living in the community. Finally, the CSTAP, also led by a woman (Abigail Agredano), has acted as a coordinating body and serves to formalise demands and to make public declarations on behalf of the affected population.

In sum, the main collective actors that conform and give agency to the social movement against the Zapotillo Dam[9] are: the CSTAP and the committees of absent sons and daughters (grassroots organisations); IMDEC, Colectiva Coa, and researchers from the University of Guadalajara and the ITESO (Guadalajaran-based civil society groups and researchers); and MAPDER and International Rivers (network organisations that operate on the national and international levels, respectively). Since 2005, these actors have collaborated in various ways to carry out actions aimed at preventing the Zapotillo Dam from flooding affected communities, for example: marches (in Guadalajara, León and Mexico City), the dissemination of materials (texts, photos, pamphlets, musical discs and videos); the organisation of events that bring water activists from other parts of the country and world to Temacapulín; legal action to stop the dam's construction and to prevent it from being filled; direct action to block the construction of the dam and that of the relocation settlement (Talicoyunque), and entering into dialogue and negotiation with public officials.

The most cogent action taken by the resistance movement to El Zapotillo began on 27 March 2011, when members of the CSTAP and their allies took over the dam construction site and blocked access. In immediate response, CONAGUA and the consortium in charge of construction laid criminal charges. A week later, an agreement was reached whereby the blockade would be lifted on condition that the criminal charges be dropped, that no more aggressive action be taken against the protestors, and that a series of negotiations take place. These discussions consisted of four sessions within a two-month period. At the end of the process, the CSTAP concluded that they were "a media charade of supposed dialogue (…) in order to justify in the end continuing with the construction of El Zapotillo" (CSTAP, 2011).

Various members of the CSTAP and allied activists have received threats. This was denounced in 2009 by Jalisco's State Human Rights Commission (CEDHJ, *Comisión Estatal de los Derechos Humanos Jalisco*), but the threats and acts of intimidation continued and escalated in the following months. For example, on 3 April 2010, three unidentified men in Temacapulín threatened two members of the community, a representative of IMDEC, and a journalist, saying, "You're going to die for all the trouble you're causing" (cited in Covarrubias, 2010). Two weeks later, during a visit to the community to express solidarity by ex-presidential candidate Andrés Manuel López Obrador, together with 10

[9] Social movements have been defined in multiple ways. Here, we suggest that organized resistance to the Zapotillo Dam reflects key characteristics of definitions put forth by leading theorists of resource-mobilization and political-opportunities approaches; for example Tarrow (1998: 4) who defines social movements as "collective challenges, based on common purposes and social solidarity, in sustained interaction with elites, opponents, and authorities"; or Charles Tilly (2004:7), who defines social movements as political complexes that combine three elements: 1) campaigns of collective claims on target authorities; 2) public representation of the cause's worthiness, unity, numbers and commitment; and 3) claim-making performances that draw from a 'social movement repertoire' of political action, including for example demonstrations, rallies, pamphleteering, and statements to and in the public media. It is also worth noting that local resistance to the Zapotillo Dam forms part of a broader social (environmental) movement against large-scale dams and to protect rivers on the national and international levels.

senators and 16 federal congressmen, 28 state-level policemen showed up on board seven pickup trucks without license plates. This was interpreted as an act of intimidation and they were asked to leave. Incursions into the community by police and military continued, however, some of them making reference to the dam and reportedly telling community members that, "You must accept the Zapotillo Dam; you must leave, because soon they will fill it" (CSTAP, 2010).

In August 2013, the Second Chamber of Mexico's Supreme Court of Justice issued a judgment that frustrated plans to increase the height of the dam to 105 metres. Construction was subsequently stopped when the dam wall reached a height of 80 metres. In January 2013, the governor-elect of Jalisco, Aristóteles Sandoval Díaz of the PRI, declared in his Twitter account: "We are not going to flood Temacapulín". After that, he was silent about the matter, refusing petitions for dialogue from members of the CSTAP until April 2014, when he announced that the resolution of the conflict was no longer in his hands, but was rather in the hands of the Supreme Court. While the head of the State Water Commission, Felipe Tito Lugo, has labelled opponents of El Zapotillo 'oposi-todos' (people who are opposed to everything),[10] the status of the project remains at an impasse and the affected communities live in uncertainty.

Challenges to official discourse

"The population grows and the demand for water increases" (CONAGUA, 2014b: 4). This is the gist of CONAGUA's analysis of water issues in the MAG and León and its point of departure for justifying the construction and utilisation of the Zapotillo Dam. In a document subtitled, "A future vision for the supply of water for the Metropolitan Area of Guadalajara", the Commission points out that the project to build the Zapotillo Dam does not stand alone, but rather forms part of an Integral Hydrological System of Works on the Verde River (*Sistema Integral Hídrica de Obras del Río Verde*), whose principal objective is to "avoid further depleting the level of Lake Chapala" (CONAGUA, 2014b: 3), while at the same time providing 'hydrological security' to the MAG, the city of León and 14 municipalities in the Highlands of Jalisco. In this document, we see the discursive framing of large-scale water infrastructure development in Malthusian terms of having to keep pace with not only growing demand, which ultimately stems from population growth, but also the spin on ecological sustainability.

Challenging this discourse, Ochoa García and his collaborators (2015: 16) point out that the information disclosed by the government has been imprecise; the authorities have not made public projects to recharge and protect aquifers; nor have they revealed the specific areas that will be supplied with water in the interior of the cities that stand to benefit; the projected savings in extracting water from Lake Chapala have not been quantified, and projects to build water infrastructure to provide water for the Highlands of Jalisco have not been elaborated or assigned a budget.

In this scenario, the opponents to El Zapotillo have pointed out that the water destined for León, Guanajuato, will benefit, in the first place, the agro-industrial producers and large landowners close to León, including Vicente Fox, who was president of Mexico between 2000 and 2006, when the federal government pushed for the construction of the Zapotillo Dam; and Javier Usabiaga Arroyo, Minister of Agriculture during Fox's administration, nicknamed 'the king of garlic' for his agricultural empire in Guanajuato. In addition, critics have pointed out that El Zapotillo will help to guarantee the supply of water for the large and growing industrial sector in León, including several tanneries that stand out for their contribution to contaminating local water resources with heavy metals (Estrada, 2010; Peña, 2012; Pacheco Vega, 2014).[11]

[10] Felipe Tito Lugo's speech, during the event, Foro del Agua 2014, Jalisco: Agua y Desarrollo, 21 March, 2014.

[11] León has a population of almost 1.6 million people. The Palote Dam provides 4.7% of the water consumed in the city; the rest comes from underground sources, most importantly the Valle de León Aquifer (SAPAL, 2009), which has a deficit of 177.7 Mm^3/yr (CONAGUA, 2015c), equal to almost 50% more than the volume of water promised by the Zapotillo Dam. About 80%

From a regional development perspective, the Zapotillo Dam has been questioned because it implies transferring water from the Upper Santiago watershed in the Highlands of Jalisco, which currently has a water deficit of 180 Mm^3/y to the Middle Lerma watershed where León is located, with an even greater deficit of 1,270 Mm^3/y (Ochoa García et al., 2015: 34). In this way, the project is designed to shift the problem of water shortage in León to the Highlands region of Jalisco, where pressure on water resources has increased in recent years, among other reasons due to the presence and growth of highly capitalised industrial units of agricultural production, especially eggs, poultry, dairy, hogs, and beef; and because of population increases and urbanisation (Ochoa García et al., 2015). The region is semiarid and has a long history of droughts. The worst in 70 years occurred in 2011. Climate change is likely to make these occurrences more frequent and severe. Nevertheless, in accordance with the decrees mentioned above, only 16% of the water from the Verde River is reserved for the Highlands of Jalisco.

Beyond these regional distributional matters, critics of the Zapotillo Dam have questioned CONAGUA's and the state-level water authorities' insistence on building large-scale infrastructure to increase the volume of water available for public-urban and industrial consumption, without seriously considering alternatives along the lines of what Wolff and Gleick (2002) call 'the soft path' for water. This path seeks to reduce the demand for water, make consumption more efficient and diversify supply sources, according to local hydrological, economic, and cultural circumstances and possibilities. As sketched out and promoted by the Guadalajaran-based Collective of Citizens' Organisations for Water (COLOCA, *Colectivo de organizaciones ciudadanas por el agua*), which brought together a number of Guadalajaran-based NGOs,[12] these alternatives include measures such as: reducing leakage in the municipal water systems, accounting for an estimated 40% of the volume consumed in the MAG; treating municipal wastewater and using it for irrigation; rainwater capture, recycling grey water, and using more water from streams, springs and small dams; escalating tariffs to discourage profligate water consumption; regulation, measurement, and control of water used in agriculture, and prevention and control of pollution (McCulligh and Tetreault, 2011).

Proposals along these lines, however, have been mostly ignored or dismissed by the promoters of El Zapotillo and Arcediano, who have insisted on pursuing concrete-heavy strategies. For example, CONAGUA (2014b: 3) recognises that opposition groups have "sustained that it would be convenient to capture rainwater" but argues that "dams are precisely the most important way to capture and regulate large quantities of water that today, without any use whatsoever, go to the sea via rivers or runoff". Likewise, with regard to reducing leakage in the distribution network, CONAGUA suggests that these "actions correspond more to the responsibility of water utilities" and argues that "although they could partially help to make water available in the short run", they "do not guarantee the supply of water to the MAG and the Highlands region; nor do they contribute to avoiding the deterioration of Lake Chapala and the overexploitation of aquifers" (CONAGUA, 2014b: 9). Ecological sustainability in these terms depends on the construction of large dams and associated infrastructure, since efforts to reduce demand are ultimately seen as futile.

of the water extracted from the Valle de León is used for irrigation, 17% for public-urban consumption, and 2% for industry (Peña, 2012: 126).

[12] COLOCA was active from 2007 to 2009 and comprised the following organizations: Congreso Ciudadano de Jalisco, IMDEC, the Union of Public Employees of SIAPA (which is the Spanish acronym for the MAG's Intermunicipal Potable Water and Sewer Services, Fundación Cuenca Lerma-Chapala-Santiago, Asociación Jalisciense de Apoyo a Grupos Indígenas (AJAGI), MAPDER Jalisco, and researchers from the University of Guadalajara, ITESO and Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS) Occidente.

CONCLUSIONS

Speaking at a water, energy, and climate conference held by the International Water Association and CONAGUA in May 2014, Víctor Bourgett, then Director of the Mexican Institute of Water Technology (IMTA), expressed frustration with new trends in water management. After the 'great tradition' of dam building in the country, Bourgett lamented that, "unfortunately (…) now ecology matters a lot and, what is worse for us, we have to take social participation into consideration. Which, in a country as immature as ours, means that things get paralysed".[13] Hydraulic infrastructure projects that Bourgett considered "necessary for the social development of many regions", were currently blocked. "Social participation terrifies me", he stated, "and we engineers had to include it in the National Water Plan [2014-2018], because it's pretty, it's fashionable, that's the reality". The panorama he presented was one of an 'immature' society irrationally contesting necessary projects, and a hydrocracy yoked with the unnecessary obligations of social participation and ecological concern. In line with our argument, these comments reflect a dissonance between policy documents highlighting shifts over time in approaches to water management and an increasing number of conflicts that make evident a refusal to engage with demand management, and the willingness of state actors to impose projects opposed by potentially displaced communities.

In this paper, we have traced the history of hydraulic infrastructure development since the Porfiriato era in order to distil changes and continuities. From this exercise, we can conclude that the federal government has maintained control over the nation's waters throughout the 20th century and until the present. Reforms to decentralise to municipalities the responsibility for water supply and sanitation, and the creation of state-level water authorities notwithstanding; federal control over water resources is exercised during the neoliberal era through CONAGUA, a federal agency with far-reaching constitutional and legal jurisdiction and a disproportionately large share of SEMARNAT's budget. Likewise, through the CFE, the federal government exercises control over hydroelectrical dams. Our case study of El Zapotillo illustrates how CONAGUA and state-level authorities work together to build large-scale infrastructure with the objective of increasing the supply of water to urban centres and industries, without seriously considering 'soft path' alternatives like demand management.

Our historical analysis made note of a period of rapid dam construction under the SRH (1946-1976), followed by a period of continuous decline since the beginning of the debt crisis. We would hypothesise that this is due not only to the reduction in public spending that characterises the neoliberal era, but also because the best dam sites in technical and hydrological terms have already been exploited. Our analysis also made note of shifts over time pertaining to the purpose and geographic location of dams; from large-scale irrigation projects concentrated in the north of the country during the early and middle parts of the 20th century, to increasing diversification after 1960 towards hydroelectric dams in the south, as well as to works to increase water supply to growing urban centres, increasingly so in the neoliberal era, during which dam construction has been concentrated to a certain extent in the western part of the country. This is where our case study seeks to be illustrative of recent trends.

Although dam-building activity has dropped off during the neoliberal era, we observe an increase in spending on water supply and sanitation (WSS) since the beginning of the new millennium. This has occurred under an institutional arrangement that allows for and encourages private-sector investment in building and operating this infrastructure. Our argument is that, under these conditions, concrete-heavy options continue to predominate for urban water supply. At the same time, we recognise that significant changes in water policy and practice have taken place since the period of ascendency of the hydraulic mission, including with respect to environmental laws. However, we argue that the discourse of sustainability and integrated water resources management is not reflected in actual water policy.

[13] Part of the speech by Víctor Javier Bourgett during the Water, Energy and Climate Conference, Mexico City, May 21st, 2014.

This is evident in the realm of water quality where – large wastewater treatment plants notwithstanding – pollution problems remain pervasive. It is also evident in the development of hydroelectric and water supply infrastructure.

Our case study of El Zapotillo sought to illustrate this by pointing to the ecologically irrational transfer of water from the Highlands region of Jalisco, which is already experiencing water stress, to urban zones with even greater water stress and problems of industrial contamination, without implementing demand management strategies or engaging with civil society proposals. Our case study also sought to shed light on the authoritarian way that these projects are being imposed on affected communities. In the case of El Zapotillo, the principal promoters of the project (CONAGUA, CEA, and the executive branch of the government of Jalisco under the PAN) revealed in their dealings with oppositional groups a flat refusal to abandon concrete-heavy strategies. In addition, state-level police forces were employed to intimidate local residents, while unidentified agents made death threats. In Mexico, where dozens of environmental activists have been murdered in recent years, these threats cannot be taken lightly. All of this points to some of the limitations of the social participation schemes managed by CONAGUA.

On a higher level of abstraction, we would argue that the underlying logic of capital accumulation, the goal of maximising economic growth rates, and the discourse of modernisation and progress, have all remained essentially the same since the post-World War II period; and that water policy changes are to be found in national development strategies that are meant to adapt to changing structural conditions on the global level, basically moving from state-led development to market-led development in the context of neoliberal globalisation. In this transition, the role of the state has changed vis-à-vis the financing, managing, and operating of water infrastructure, giving way to greater collaboration with private firms, which ultimately seek to maximise profits. In this scenario, large-scale water infrastructure projects serve as a vehicle for the realisation of capital through construction contracts and rent-seeking in operating infrastructure. The role of the state remains key as the promoter, manager and public face of the projects, responsible for resolving or repressing conflicts with communities, while build-operate-transfer (BOT) contracts with private companies seek to ensure profits and shield these actors from risk. At the same time, water and hydroelectric infrastructure is developed, not only with an eye on demographic growth, but also in response to market signals; that is, to the needs of housing developers, manufacturing industries, large-scale agricultural producers, tourist resort developers, and extractive industries. In our case study of El Zapotillo, the water needs of politically powerful large-scale farmers and industrialists in and around León, Guanajuato, have been given precedence over those of the agricultural producers in the Highlands of Jalisco.

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