www.water-alternatives.org Volume 11 | Issue 3
Tetreault, D. and McCulligh, C. 2018. Water grabbing via institutionalised corruption in Zacatecas, Mexico.
Water Alternatives 11(3): 572-591

Water Grabbing via Institutionalised Corruption in Zacatecas, Mexico

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ABSTRACT: Groundwater overdraft is a growing problem in the central region of Zacatecas. In this high-altitude semiarid region located in the Western Sierra Madre of north central Mexico, the over-exploitation of aquifers is compounded by problems of water contamination and unjust distribution. Most of the water extracted from wells, and the best quality water, is delivered to the private sector: to large- and medium-scale farmers and to industrial producers of beverages. Conversely, water with concentrations of arsenic and fluoride far above permissible limits for human consumption is channelled mostly to the public urban sector. Recently, the government of the state of Zacatecas and the National Water Commission have laid plans to build a large dam on the Milpillas River to the west of the state capital, to increase the supply of water for public, urban and industrial consumption in the central region of the state. What are the political economic forces that have historically shaped and continue to shape the water crisis in the central region of Zacatecas? Why have existing water governance policies and practices been unable to effectively address the crisis? Can an interbasin transfer from the Milpillas Dam deliver on its promise to allow aquifers in this region to recover from over-exploitation? We introduce and employ the concept of institutionalised corruption to explain the modus operandi of infringement on water laws by government agencies and large water consumers and/or polluters, particularly for the purpose of accommodating the needs of extractive capital. Along these lines, we demonstrate that the Milpillas Dam will not allow aquifers to recover and argue that the driving political economic forces behind the project treat it as a vehicle for the realisation of capital through the commodification of produced water, which allows for the extraction of rent.

KEYWORDS: Institutionalised corruption, water grabbing, value grabbing, rent, Zacatecas, Mexico

INTRODUCTION

On 22 March 2016, in commemoration of World War Day, Mexican president Enrique Peña Nieto visited the state of Zacatecas to give a speech on the importance of water and to symbolically inaugurate hydraulic infrastructure and equipment representing a total of 1.3 billion pesos (equal to about USD75 million)[1] in public investment. He also announced 200 additional concessions for farmers to draw water from underground reserves. The modernisation of hydraulic infrastructure is necessary, Peña Nieto asserted, "because to conserve water, to protect it, we need to use it more efficiently". In this discourse, the quest for greater efficiency has translated directly into the need to construct

[1] At that time, the exchange rate was 17.4 Mexican pesos to USD1.

hydraulic infrastructure, which in turn is equated with notions of 'modernisation' and 'progress'. Then governor of Zacatecas, Miguel Alonso Reyes, put it tersely at the same event when he declared that, "modern infrastructure is a condition for attaining development and generating progress". On that note, he went on to thank the President for the federal government's approval of the water concession linked to plans to build a dam on the Milpillas River, at a site located in western Zacatecas near the border with the state of Durango, and an aqueduct to carry water 166 kilometres (km) to the central region of Zacatecas, between Fresnillo and the Metropolitan Area of Zacatecas and Guadalupe (MAZG), where the state's population and industrial activity are concentrated (see Figure 1).

As we have argued elsewhere in relation to historical and recent dam-building trends in the country (McCulligh and Tetreault, 2017), discourses such as the ones mentioned above and the large-scale hydraulic infrastructure projects they seek to promote reflect a lingering of the 'hydraulic mission' that characterised water management in Mexico and elsewhere around the world during the post-WWII period. This is not to say, however, that the orientation of Mexico's water policy has not changed in important ways during the neoliberal era, that is, since structural adjustments were imposed during the debt crisis (1982-1988) and subsequently consolidated. In accordance with the World Bank's policy prescriptions and based on the Dublin Principle of establishing the economic value of water, in the early 1990s sweeping changes were made by introducing Mexico's National Water Law (LAN, *Ley de Aguas Nacionales*) to create markets for exchanging water concessions and to allow for and encourage much greater private-sector participation in the construction and operation of hydraulic infrastructure (Dávila, 2006; Aboites, 2009). Along the same lines of policy prescription, decentralised institutional bodies have been created in Mexico to foster social participation in water management; and a complex of environmental agencies, laws and regulations have been constructed, with regard also to the exploitation of underground water resources. In this article, we draw on the case of Zacatecas to press the argument that, in practice, neither demand management nor sustainability has guided water policy in Mexico, in spite of official discourse to the contrary.

In the first section of this paper, after this introduction, we outline three critical dimensions of the water crisis in the central region of Zacatecas: the over-exploitation of aquifers, contamination of underground water sources, and unjust distribution. Our findings indicate that most of the water extracted from wells, and the best quality water, is delivered to the private sector: to large- and medium-scale farmers and to industrial producers of beverages. Conversely, water with concentrations of arsenic and fluoride far above Mexico's relatively lax permissible limits for human consumption is channelled mostly to the public urban sector.

From this assessment, the central questions for our investigation emerge: What are the political economic forces that have historically shaped and continue to shape the water crisis in the central region of Zacatecas? Why have existing water governance policies and practices been unable to effectively address the crisis? Can an interbasin transfer via the Milpillas Dam deliver on its promise to allow aquifers in the region to recover from over-exploitation? To respond to these questions, we employ an epistemological approach that seeks to combine an historical analysis of material and political economic conditions, with an analysis of the social and discursive construction of environmental threats and problems. Our approach draws from ecological Marxism in its analysis of resource rents, resting on the view that, "[c]apital's metabolic relationship with non-human nature is also always a relationship with the state, and mediated through the state" (Parenti, 2015). This implies tracing the flows of water and money, and examining how power is wielded, not only through policies and actions, but also symbolically in discourse (Swyngedouw, 2009). With this approach, we have carried out ongoing and multidisciplinary field research in Zacatecas since 2012, employing the following techniques: the revision of texts (governmental, academic and journalistic), databases (concerning local groundwater use), and a number of internal documents obtained from the regional office of the National Water Commission (CONAGUA, *Comisión Nacional del Agua*) in Guadalupe, Zacatecas; interviews with local water authorities, and with representatives of industry and agriculture;

and the application of a questionnaire in 2013 to gauge levels of awareness of water issues in MAZG. In addition, in order to reconstruct and interpret the historical and structural origins of the water crisis in the central region of Zacatecas, we have carried out an extensive review of relevant academic texts, the most important of which are listed in the bibliography.

Our analysis and argument proceed as follows. In the third section, we draw on recent scholarship regarding nature-society relations under neoliberal capitalism to theorise the dynamics of water use and governance in the central region of Zacatecas in terms of water grabs and value grabs, the latter related to rent extraction. In this theoretical framework, we introduce the concept of institutionalised corruption to explain routine infringement on water laws and the imposition of policies that give precedence to the economic interests of large firms seeking rent in extractive activities.

In the fourth section, we contextualise our case study in an historical analysis of national- and state-level trends in water management, focusing on the post-WWII period when underground water resources began to be exploited on a massive scale. The fifth section gives continuity to this analysis for the neoliberal era, by examining the structural adjustments that were extended to the water sector from the late 1980s onward in order to recognise the economic value of water and to construct an institutional framework – within a broader private-sector-led development strategy – aimed at decentralising some water management responsibilities to lower levels of government and fostering the participation of water users in a vision of integrated water management that includes laws and norms meant to address ecological sustainability.

The sixth section analyses patterns of official and user action and provides evidence of institutionalised corruption, whereby the regulation of groundwater extraction is continually rendered ineffectual and unsustainable patterns of urban, agricultural and industrial development are sought to be maintained, either via new large-scale hydraulic infrastructure or simply on paper via shifts in the data on water availability or water accounting. The seventh section presents a critical analysis of the Milpillas Dam in order to evaluate its potential for overcoming the multi-dimensional water crisis in the central region of Zacatecas, and it considers alternatives. In the final section, we present a series of conclusions regarding the empirical findings and theoretical arguments put forth in this paper.

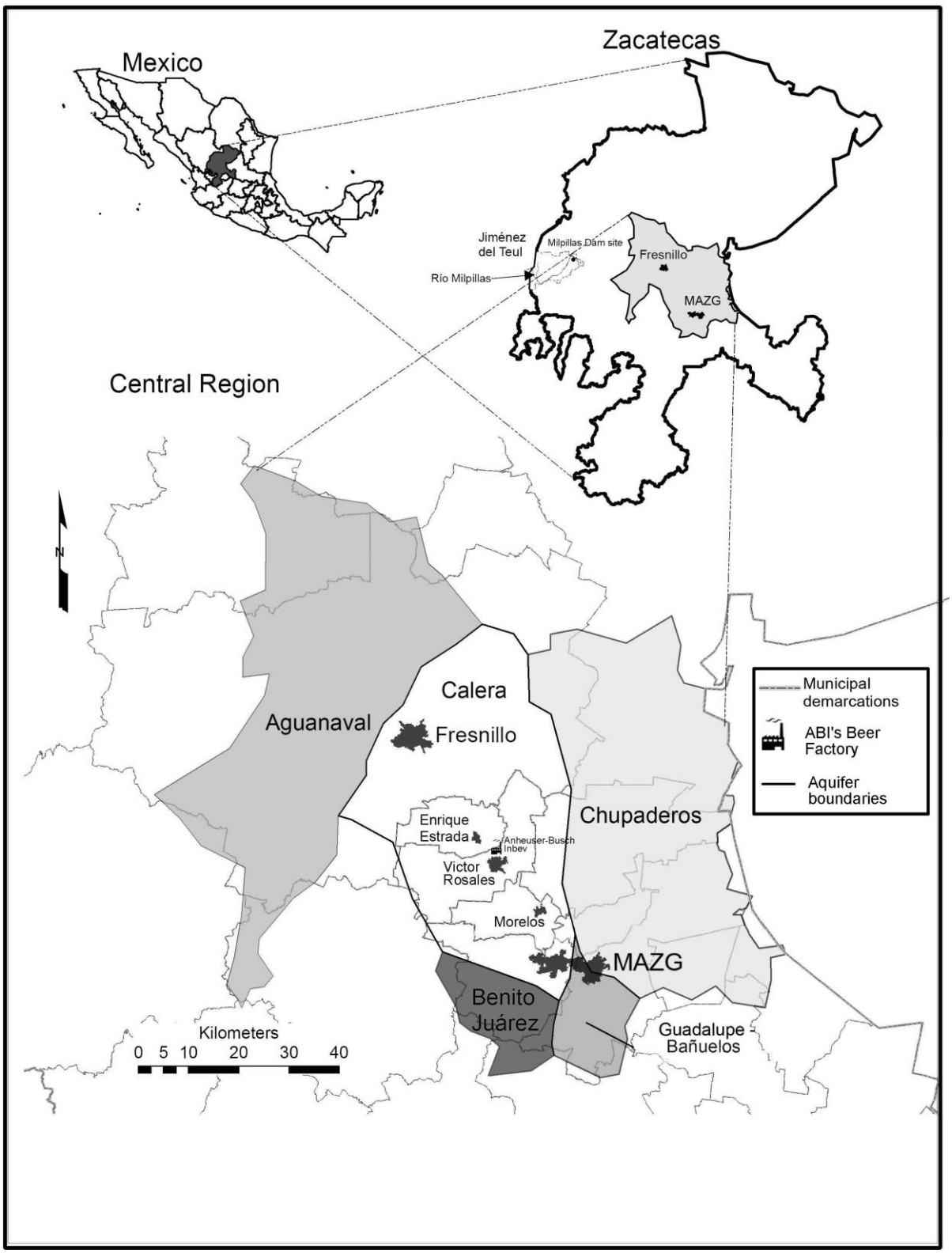
THREE DIMENSIONS OF CRISIS[2]

Groundwater overdraft

There are five aquifers in the central region of the state of Zacatecas: Aguanaval, Benito Juárez, Calera, Chupaderos and Guadalupe Bañuelos (see Figure 1). All five of these aquifers are over-exploited (see Table 1). In global terms, almost half of the groundwater extracted from them is mined: 261.3 million m^3 (Mm^3/y). This is reflected in falling piezometric levels: one meter per year for Calera and Chupaderos, 0.6 m/y for Aguanaval, and 0.4 m/y for Benito Juárez and Guadalupe Bañuelos (CONAGUA, 2015).

[2] This section summarizes data presented in Tetreault (2018).

Figure 1. Aquifers in the Central Region of Zacatecas.



Source: Authors' elaboration with the technical support of Antonio Reyes Cortés.

Table 1. Rates of over-exploitation and sectorial distribution of subterranean water in the central region of Zacatecas, based on CONAGUA concessions.

	Concessions (Mm^3/y)	Natural recharge rate (Mm^3/y)	Over-exploitation rate (Mm^3/y)	Sectorial distribution			
				Agriculture %	Public urban %	Industrial %	Others %
Aguanaval	167.4	84.5	82.9	97.9	1.93	0	0.13
Benito Juárez	21.2	18.1	3.1	57.4	42.5	0	0.1
Calera	164.8	91.1	73.7	82.1	8.96	8.48	0.51
Chupaderos	187.6	86.6	101.0	98.5	1.35	0.03	0.12
Guadalupe-Bañuelos	12.7	12.1	0.6	42.6	55.6	0	1.8
Total	553.7	292.4	261.3	90.6	6.6	2.5	0.3

Source: Authors' elaboration, based on data obtained from the following CONAGUA documents: *Disponibilidad del agua subterránea* (*Diario Oficial de la Federación*, 4 January 2018), for the first three columns; *Plan de manejo integral de los acuíferos Calera, Chupaderos y Aguanaval, Zac.* (2011) for the sectorial distribution of Aguanaval, Calera and Chupaderos; *Registro de usuarios 2012*, *Departamento de Aguas Subterráneas de la Dirección Local Zacatecas* de CONAGUA, for the sectorial distribution of Benito Juárez and Guadalupe Bañuelos.

Contamination

In municipal wells that draw from the Benito Juárez and Guadalupe Bañuelos aquifers, concentrations of fluoride, arsenic and other heavy metals have been detected by CONAGUA at levels far beyond permissible limits for human consumption (CONAGUA, 1998, 2005). Together, these two aquifers supply 70% of the water consumed in MAZG. As CONAGUA observes, concentrations of arsenic and other heavy metals have tended to increase as these aquifers are depleted. Internal documents indicate that the high levels of arsenic are mostly due to geogenic factors (highly mineralised rock formations); while the high levels of lead and mercury found in underground water samples around the Zacatecana Dam southeast of MAZG are attributed to mining contamination (Gobierno del Estado de Zacatecas et al., 2002).

Recent studies carried out by university-based researchers reveal that water samples taken from the public water distribution system at various points in the city of Guadalupe have levels of arsenic and fluoride beyond permissible limits. For example, González Dávila (2011) took samples of water from six zones of the city and found that 100% of them had levels of arsenic above the maximum permissible limit of 0.025 mg/l and that almost half of the samples contained levels of fluoride above the maximum limit of 1.5 mg/l. Likewise, Martínez Acuña et al. (2016) found that in Guadalupe the average level of arsenic is more than three times the maximum permissible limit in Mexico, which is lax compared to the maximum level recommended by the World Health Organisation (0.010 mg/l).

Unjust distribution

Unjust distribution can be discerned in at least three patterns of water flow. First, with regards to the massive consumption of Anheuser-Busch Inbev's beer factory, located less than 30 km from the state capital, with concessions to extract 11.9 Mm^3 of water annually from the Calera aquifer, an aquifer with good quality water. This is equal to 1.5 times the volume of water taken from the same aquifer to supply MAZG. The amount that the company pays for this volume of water is, according to CONAGUA,

classified information.[3] In any case, this large-scale water acquisition, and more generally the doling out of water concessions to the private sector in unsustainable volumes, violates Article 14 of the National Water Law (LAN), which establishes that "Domestic use and public urban use will have preference in relation to whatever other use".

Second, water is distributed unequally among farmers. Over half of the water from the Calera aquifer that is assigned in concessions to the agricultural sector is granted to private farmers with over 30 hectares (ha) of land; 29% goes to farmers with between 10 and 30 ha; and just 19% is allotted for those with less than 10 ha (Tetreault, 2018). This in a state where three quarters of agricultural producers have less than 10 ha and only 3.2% have more than 30 ha. From a different angle, it is interesting to note that, in the three municipalities whose limits fit (almost) completely within those defined by the southern part of the Calera Aquifer (the municipalities of Calera, General Enrique Estrada and Morelos), the great majority of agricultural land is held in private tenure (76, 95 and 60%, respectively).

Finally, there is an unequal distribution of water within MAZG, whereby "the population with fewer resources and located in more vulnerable zones pays more and receives poorer quality service and less water" (Rivera and Aguilar, 2015: 139). This is because marginalised neighbourhoods often go for months without piped water, forcing them to depend on an irregular service of water delivery by tanker truck, which on occasion translates into the need to buy water from private distributors that fill up their trucks with water from wells drilled for agricultural purposes (Ríos and De Santiago, 2014).

WATER AND VALUE GRABBING VIA INSTITUTIONALISED CORRUPTION

To theorise the driving forces behind groundwater overdraft and institutionalised corruption, we adopt a dialectical conception of nature-society relations that is informed by ecological Marxism. In Moore's (2011: 1) formulation "Capitalism does not act upon nature so much as develop through nature-society relations", creating "ecological regimes" in successive phases of capital development, such that a natural limit in one phase does not necessarily constitute a limit for another (Benton, 1989, cited by Moore, 2011: 38). In the central region of Zacatecas, the most important natural limit to economic and social development is the scarcity of water. This limit is not absolute; it has been historically determined in a semiarid region that currently sustains a population of over 600,000 people, as well as water-consuming and contaminating activities in irrigated agricultural production, industrial parks and mining.

The Milpillas Dam is a project that seeks to extend the natural limits of water scarcity in the central region of Zacatecas by bringing water from a different watershed to increase supply. In this way, the water from the Milpillas Dam can be considered a form of 'produced nature' (Smith, 2008) or what Andreucci et al. (2017) refer to as a 'pseudo-commodity', which allows for the extraction of rent.

It is well known that the concept of rent was developed by Ricardo and taken up by Marx in the third volume of Capital, with an eye on agriculture and mining. Within the general framework of the labour theory of value, Marx explained with the help of detailed mathematical models how less productive labour in these sectors determine the market value of food and minerals, such that the more fertile and better located farms and mines enjoy surplus profits in the form of differential rent. According to Marx, rent is the "surplus-profit which arises… not due to capital, but to the utilisation of a natural force which can be monopolised", a force that is "bound to – specific natural conditions prevailing in certain portions of land" and therefore "cannot be created by capital out of itself" (Marx cited by Burkett, 2014: 93).

We propose that groundwater is a natural force of this sort, since it can be monopolised through property rights over water concessions and through routinely tolerated infringement (i.e.

[3] CONAGUA's response to a request for information made via Infomex in 2014 (Folio number 1610100224514).

institutionalised corruption). In this way, scarce underground water in the central region of Zacatecas can be utilised for the production of beverages and commercial crops, or for extracting minerals from ore through processes of lixiviation, thereby giving rise to surplus profits in the form of rent. Likewise, we can hypothesise that the construction of dams and aqueducts through public-private partnerships create monopolies over 'produced water', thereby creating the opportunity to extract another form of rent via the operation of water infrastructure over long concession periods, increasingly defined in Mexico and elsewhere by build, operate and transfer schemes (BOTs). Furthermore, the water supplied by large dams gives rise to financial forms of rent that circulate in the stock markets that list water-infrastructure building companies, and also through interest-bearing credit used to finance dam-building projects.

Parenti (2015: 833) suggests that "all the natural forces of production could be read as a type of rent". His view is that "the pre-existing use values of non-human nature, found upon the surface of the earth, are essential to capital, and the institutions that ultimately control the surface of the earth are states". Thus, he argues that, "it is the state, particularly its territorial quality, that delivers extra-human nature's use values to production and the valorisation process" (Parenti, 2015: 830). This implies the need to investigate the ways in which state agencies deliver water to the private sector in specific historical and geographical contexts, something which we strive to do for the case of Zacatecas in the following sections.

Building on Marx's concept of rent and with an eye on the recent surge of large-scale land and water acquisitions in the global South, Andreucci et al. (2017: 4) introduce the concept of value-grabbing, defined as "the appropriation of (surplus) value through rent", a process which they propose is related to, but analytically distinct from, the concept of 'accumulation by dispossession', popularised by David Harvey. According to Andreucci et al. (2017), there is a direct relation between accumulation by dispossession and rent, since "the 'assets' and ownership titles asserted and instituted via accumulation by dispossession are intrinsically constitutive of rent relations". In this distinction, accumulation by dispossession refers to the establishment of exclusive private property rights (either formally or in practice) over assets that were previously in the public or common domain; while value grabbing refers to struggles over the appropriation and distribution of surplus value generated by the rent relation itself. The advantage of focusing on rent, Andreucci et al. (2017: 4) contend, is that it can help to distinguish between these two organically related but analytically distinct moments: dispossession, which in relation to water amounts to 'water grabbing' in the language employed by Mehta et al. (2012) and others; and value (rent) grabbing. The first moment (water grabbing) is defined by Mehta et al. (2012: 197) as "a situation where powerful actors are able to take control of, or reallocate to their own benefits, water resources already used by local communities or feeding aquatic ecosystems on which their livelihoods are based".

Within this conceptual and theoretical framework, we introduce the concept of 'institutionalised corruption' to explain how water- and value-grabbing takes place in Mexico. This concept does not refer to individual acts of corruption by water authorities, but rather to a consistent pattern of "bias in the generation and application of environmental standards that favours private interests over the common good" (McCulligh, 2018: 147; see also McCulligh, 2017). It entails sidestepping environmental laws to provide rent-seeking extractive capital with access to scarce natural resources, including water. Water authorities in Mexico exhibit institutionalised corruption in their inclination to infringe and tolerate infringement regarding the extraction of underground water by private enterprises, and to proffer solutions in the form of projects that provide an avenue for the realisation of capital through the appropriation of rent. This infringement takes many forms. As detailed below, in Zacatecas it includes granting concessions for the extraction of additional volumes of water where it is banned, tolerance of partial transfers of concessions to cover up higher extraction rates in practice, low levels of enforcement on metering requirements, and on-paper changes of water availability in order to get around drilling bans.

The concept of institutionalised corruption seeks to shed light on the politicised decisions around water distribution and exploitation, going beyond explanations that focus on reduced institutional capacity and/or resources, to underscore how private interests are actively favoured by institutional configurations that give preponderance to agricultural and industrial activities over strategies to protect resources and water sources in the mid to the long term. This is in line with the arguments of Boelens et al. (2016: 2), in their call for the study of 'hydrosocial territories', for the repoliticisation of analyses, going beyond politically neutral interpretations of water problems which portray solutions in terms of "technical knowledge, 'rational water use' and 'good governance'". In our exploration of institutionalised corruption in the case of groundwater use in Zacatecas, the practices examined below demonstrate how government regulatory action, instead of curbing over-exploitation, rather normalise and make invisible the practices that exacerbate groundwater overdraft.

THE HISTORICAL ROOTS OF WATER SCARCITY IN MEXICO AND ZACATECAS[4]

In 1917, after seven years of revolutionary war, the Mexican Constitution was changed to incorporate the popular demands of the working class and peasants, including mechanisms for breaking up and redistributing hacienda land in the form of *ejidos*. In the new Constitution, water was declared to be federal property, with a system of concessions to give private parties access to it. Underground water, however, was not specifically mentioned in the Constitution, leaving intact the 1884 Civil Code that gave landowners complete liberty to extract the water under their properties (Aboites, 1998 cited in Marañón, 2010).

In Zacatecas, General Enrique Estrada promoted breaking up the haciendas not through the creation of *ejidos*, but rather by encouraging hacienda owners to sell parcels of land through a process called *fraccionamiento*. In this scheme, irrigated lands were exempt, there were no restrictions on selling to family members, and the maximum landholding was initially set at 2,000 ha (Colmenares López et al., 1992: 102-106). This initiative set in motion a process that would continue in subsequent decades, leaving an indelible mark on the state's agrarian structure, where some municipalities ended up having very little land transferred to the *ejidal* sector, especially in the central region of the state.

In the 1920s, the Mexican state began directing large sums of public financing to the construction of hydraulic infrastructure in order to increase agricultural production, especially in the northwest of the country. In 1926, the National Irrigation Commission (CNI, *Comisión National de Irrigación*) was created for this purpose. The vast majority of its resources were directed toward capturing surface water in large dams, in order to extend the frontier of irrigated land (Wester, 2009). Underground water remained unregulated and the right of landowners to freely extract from aquifers was reaffirmed in 1929 by the National Property Water Law (*Ley de Aguas de Propiedad Nacional*). This would remain so until 1945, when increasing demand for underground water led the federal government to modify Article 27 of the Constitution in order to give itself faculties to regulate its use and to establish bans where aquifers were already over-exploited (Marañón, 2010: 29-30). Before 1940, very little water was extracted from aquifers in the state of Zacatecas, although explorations had gotten underway in the central region (Ramírez Miranda et al., 1990: 61).

In 1946, CNI was replaced by the Ministry of Hydraulic Resources (SRH, *Secretaría de Recursos Hidráulicos*), marking the beginning of the golden era for the Mexican 'hydrocracy' (1946-1976), that is, the powerful centralised bureaucracy that emerged in the federal government with the mission to capture as much water as possible for human uses through the construction of hydraulic infrastructure (Wester et al., 2009: 396). Ten years later, Article 27 of the Constitution was modified to give the SRH the responsibility of regulating the extraction of underground water and establishing bans on further

[4] Fragments of this section and the next have been taken from Tetreault (2018).

drilling where need be. However, the corresponding regulations were never emitted and little was done in practice to curb groundwater consumption (Marañón, 2010: 30).

According to Aboites and his collaborators, 1947 marked the beginning of new trends in water management in Mexico, with public investment not only for irrigation projects, but also for the construction of hydroelectric dams and for the provision of water to urban and industrial centres (Aboites et al., 2010: 31). From that point on, the demand for underground water grew rapidly in response to processes of industrialisation, urbanisation and technological advance. Extraction rates increased from about 5 billion Mm^3/y in 1950 to 30 billion in 1992 (Aboites, 2009: 28). Much of this was for the agricultural sector, where the consumption of groundwater increased due to the development of accessible deep-well drilling technology, the spread of electrification in the countryside, public financing of well drilling, and the granting of additional water concessions to extract water from aquifers.

While water users in irrigation districts were charged quotas, these covered just a small fraction of the costs of constructing and operating hydraulic infrastructure (Wionzcek, 1982: 400). In this way, the recipients of water for agricultural use became beneficiaries of a state subsidy, which from our theoretical perspective assumes the form of rent, derived from greater productivity achieved through irrigation, which translates into "very juicy additional earnings for this small sector of the rural population" (Wionzcek, 1982: 400).

In Zacatecas, public investments in irrigation projects grew impressively during the 1950s and 60s, with groundwater sources playing an increasingly important role, especially in the central region of the state (Martín Ornelas, 1993; Ramírez Miranda et al., 1990). The demand for water increased as governmental agencies promoted agricultural diversification by introducing new cash crops. Credit and technical assistance were used to promote the production of garlic, chilli peppers, barley, sunflower, safflower and a variety of fruits (Ramírez Miranda et al., 1990: 136-143).

On 16 May 1960, a presidential decree was published in the Official Gazette of the Nation (DOF, *Diario Oficial de la Federación*) placing a ban on additional withdrawals of water from a number of aquifers in the central region of Zacatecas. The decree states that "for some time there has been groundwater overdraft" and assumes that this is "as much because of domestic use and public services, as for agricultural purposes". However, our analysis reveals that domestic and public urban consumption of water had relatively little to do with overdraft, then and now. In any case, the decree was completely ignored in practice. During the 1960s and 70s, hundreds of wells were drilled for the purpose of irrigation with subsidised credits from government banks (Ramírez Miranda et al., 1990: 132-134). By 1970, there were 30,562 thousand ha of land under irrigation in Zacatecas, 5,965 of which drew from subterranean reservoirs. Over the course of the next decade, the total area under irrigation in the state tripled, reaching 90,253 ha in 1980, and the part of this area relying on deep wells increased by a factor of ten (Ramírez Miranda et al., 1990: 180).

On the national level, the golden era of the Mexican hydrocracy reached its high-water mark in 1972, with the promulgation of a new Federal Waters Law (*Ley Federal de Aguas*), giving the SRH full responsibility for planning and carrying out the development of irrigation districts (Wester et al., 2009: 402). The 1970s was the most active decade for dam building in Mexican history, with the completion of 754 dams (McCulligh and Tetreault, 2017: 358). In the same period, however, the nation's water model, and more generally the import-substituting-industrialisation model of state-led capitalist development, entered into crisis.

When López Portillo became president in 1976 he merged the Ministry of Hydraulic Resources with that of agriculture to create the Ministry of Agriculture and Hydraulic Resources (SARH, *Secretaría de Agricultura y Recursos Hidráulicos*). According to Wester et al. (2009: 404), this signified an abrupt end to the golden era of the Mexican hydrocracy, which lost its autonomy as a federal ministry and its privileged control over resources. This was compounded by large cuts to the budget of the hydraulic

department of the SARH in the face of the debt crisis (1982-1988), leading to a dramatic drop in dam-building activity during the 1980s and setting the stage for the implementation of the World Bank's policy prescriptions for water management and governance.

GOVERNANCE WITH A FAÇADE OF PARTICIPATION AND ENVIRONMENTALISM

As mentioned above, these policy prescriptions were along the lines of a new model of water governance that began to emerge in World Bank discourse in the 1980s and was subsequently codified in the 1992 Dublin Statement on Water and Sustainability. This model is based on the principles of treating water as an economic good, decentralising administrative responsibilities to lower levels of government, creating institutional space for the participation of water users and the private sector, and incorporating considerations for ecological sustainability. As argued elsewhere (McCulligh and Tetreault, 2017), the first of these principles has served as the centrepiece for restructuring Mexico's water laws and related bureaucracies since the 1980s; the others have been institutionalised in an ad hoc and piecemeal fashion (see also Scott and Banister, 2008; Wilder, 2010). The contradictions that arise from treating water primarily as an economic good in practice, while at the same time trying to incorporate institutional space for participation and laws and norms for environmental sustainability, are resolved through diverse mechanisms of institutionalised corruption, as illustrated below.

Mexico saw the return of a single federal agency responsible for water management when the SARH was replaced by the National Water Commission (CONAGUA) in 1989. Shortly after, in 1992, the National Water Law (LAN) was promulgated. For Aboites (2009), the LAN marked the beginning of a new model dubbed 'mercantile-environmental'. In this model, the nation's presence remains established in the administration of water, but its role changes as it seeks greater collaboration from the private sector. Water is seen as possessing economic value, and it is therefore in some ways commodified; for example, through the creation of markets to buy and sell usufruct rights for underground water.

In line with market-oriented policies in water management, since the 1990s there has been a general trend toward building hydraulic infrastructure in Mexico via 'buy, operate and transfer' schemes to promote private-sector participation. In this way, dam- and aqueduct-building construction companies are invited to participate in the construction of infrastructure, and to cover a certain percentage of the costs with a recoverable investment. In exchange, these companies obtain a concession for operating the infrastructure for a period of time, during which they extract rent under monopoly conditions.

Decentralisation is another element of the mercantile-environmental model of water governance in Mexico. The government under Ernesto Zedillo (1994-2000) gave impetus to decentralising diverse responsibilities for the management of water to newly created state-level and regional agencies, including State Water Commissions (CEAs, *Comisiones Estatales del Agua*), Basin Councils (*Consejos de Cuenca*), and Groundwater Technical Committees (COTAS, *Comités Técnicos de Aguas Subterráneas*). COTAS are meant to bring together "federal, state and municipal authorities, as well as representatives of diverse uses of water, to coordinate actions and to agree on objectives and plans to find solutions to the problems associated with the exploitation and use of the resource" (CONAGUA, 2006: 78). In this scheme, the stakeholders are limited to those who have usufruct rights to extract water from aquifers, designated as 'users' (*usuarios*), who are distinguished from 'consumers' (i.e. the rest of the population) by having representation in the COTAS. These bodies do not have the power to emit legally binding decisions and their real purpose is evidently "to legitimise the implantation of [neoliberal] water management policies, and to promote the 'participation' of some and restrict that of others" (Dávila, 2006: 284); the 'some' referring mostly to the private sector and the 'others' including public-water consumers and small farmers without rights to water for irrigation.

Within this institutional framework, groundwater exploitation has continued to increase. Of the country's 653 aquifers, the number of over-exploited ones rose from 32 in 1975 to 105 in 2015. The five states with the greatest deficit in groundwater are Chihuahua, Guanajuato, Baja California, Mexico City, and Zacatecas (CONAGUA, 2015). Over the past decade, groundwater use has been increasing faster than for surface water; it currently provides 36% of water for agriculture, 59% for public-urban supply, and 77% for industrial use (CONAGUA, 2016).

In Zacatecas, in the context of the debt crisis (1982 to 1988), underground water resources began being extracted at faster rates as a means to increase agricultural production and to give continuity to the process of diversification towards cash crops, and as a way to help cushion the impacts of the crisis. By 1988, there were 146,494 ha of irrigated land in the state of Zacatecas, with deep wells accounting for 108,455 thousand ha (Ramírez Miranda et al., 1990: 180). Since then, the area of land under irrigation has continued to grow, albeit at a slower rate, reaching 198,470 ha in 2007, 47% of which is in the *ejidal* sector (INEGI, 2012: 52).

Farmers do not have to pay for the water they consume, although they do pay for at least part of energy and mechanical costs of extracting it from progressively greater depths. Moreover, between 70 and 84% of the agricultural producers in the central region of Zacatecas apply traditional agricultural methods of irrigation (flood or furrow irrigation) resulting in inefficient use of water and "losses of between 40 and 60%" (Mojarro Dávila et al., 2013: 49). To be sure, CONAGUA has promoted programmes to increase the plot-level efficiency of water consumption in the agricultural sector of Zacatecas, especially in the central region, via inter alia the introduction of drip irrigation and more water-efficient crops (CONAGUA, 2011). However, these programmes have so far been ineffective, among other reasons because in this region: "Even when a certain level of hydro-agricultural technology exists, it has not spread sufficiently to diminish the rate of over-exploitation, given that the freed volumes of water are transformed into increases in the area that is irrigated" (CONAGUA, 2011: 7). Furthermore, efforts to introduce water-saving crops have been overshadowed by the more lucrative state-level programme of encouraging farmers to produce barley for Anheuser-Busch Inbev's giant beer factory. Even though barley consumes more water than traditional crops such as maize and beans, 52,000 ha were seeded with it in Zacatecas in the Spring of 2015.

Demographic growth, albeit a secondary factor, constitutes another source of pressure on local aquifers, combined with lifestyle changes associated with urbanisation and the spread of indoor plumbing, which have translated into increased per capita consumption of water (Aboites, 2009). The population of the six municipalities of the central region of the state that would receive water from the proposed Milpillas Dam (Calera, Fresnillo, General Enrique Estrada, Guadalupe, Morelos, and Zacatecas) grew from 301,560 in 1980 to 628,813 in 2015. This population directly consumes 6.6% of the water extracted from aquifers in the central region (see Table 1).

On 24 November 2000, three COTAS were created in the central region of Zacatecas, one for each of the three largest aquifers (Aguanaval, Calera and Chupaderos). According to the president of the COTAS for Calera, it was not until the end of 2005 that resources were made available.

> At that time, there was not much impact. A few studies were carried out, whose results we do not know; some work was done, but for some reason, there was a kind of divorce between the authorities and the members of the COTAS, which caused it to stop operating.

Since more resources were made available in 2011, the COTAS for the Calera aquifer "has tried to work especially on raising awareness among the users, and to participate in sharing [information] about the rights and obligations that are acquired with a concession".[5]

[5] Interview conducted by Dr. Angela Ixkic Bastian Duarte in August of 2014.

THE PRACTICES OF INSTITUTIONALISED CORRUPTION

Partial transfers of water concessions

Since the 1960s, different decrees have been issued restricting rights to drill new wells in Zacatecas (*zonas de veda*), and some form of restriction exists for all municipalities in the state (World Bank, 2012: 23). In practice, however, this has led to the splitting, and thereby multiplication, of existing water concessions through the practice of partial transfers of titles (LAN, article 33). Both farmers and CONAGUA personnel interviewed coincide in describing how this works in practice. For instance, the president of Agricultural Producers with Irrigation Wells in the state of Zacatecas (*Productores de Pozos de Riego Agropecuarios*), describes how he transferred partial title of his own concession:

> In my case, not to speak of others, [my concession] was for 300,000 cubic meters [annually], of which I made six concessions. Now they are extracting 1,800,000 cubic meters instead of the 300,000 at the beginning. They're already being charged the energy quota, each one of them for three hundred thousand cubic meters, because CONAGUA, CFE and SAGARPA do not have the capacity nor the personnel to supervise this.[6]

While this means, in his words, that "there are six of us committing a crime", this continues given the awareness that, "CONAGUA has lost control over everything. It does not have the least bit of control over the concessions or the exploitation [of groundwater], not only in Zacatecas, but all over the country (…)".

The head of the legal department at the state offices of CONAGUA considers these partial transfers "the most damaging thing for CONAGUA and for the aquifers", also acknowledging that, "we don't have the technical or human resources to verify that they extract the volume they should".[7] The prevalence of these partial transfers of title is also underscored by the head of the Water Bank in Zacatecas, an entity established in the state in 2011. CONAGUA operates the Water Banks in the country, which are meant to regulate transfers of water titles between users. According to the manager in Zacatecas, "we are the second or third state in the number of partial transfers, due to the fact that the majority of, or all, the aquifers have bans" on new well perforations.[8] The multiplication of wells through partial transfers of title translates into a situation where the actual volume being extracted is unknown. The unregulated nature of water in the agricultural sector is also evident in that, for instance, among the 4,266 water 'users' with concessions to extract water from the Benito Juárez, Calera, Chupaderos and Guadalupe Bañuelos aquifers, only 11% have meters on their wells, even though by law they are obliged to have them.[9]

Low levels of enforcement

Since calculations of extraction are based on concessions, the lack of oversight means that real rates of overexploitation are likely far greater than the estimates. CONAGUA lacks inspection capacity, which is evident in the number of inspectors and inspections undertaken when compared with the number of users with a concession to extract surface water or groundwater, to discharge to national waters, or to occupy areas along waterways. The total number of registered concessions nationally is nearly half a

[6] CFE is the acronym for the Federal Electricity Commission (*Comisión Federal de Electricidad*) and SAGARPA is the acronym for the federal Ministry of Agriculture (*Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación*). This excerpt comes from an interview conducted by Dr. Angela Ixkic Bastian Duarte in August 2014.
[7] Interview conducted by Dr. Angela Ixkic Bastian Duarte in August 2014.
[8] Interview conducted by Dr. Angela Ixkic Bastian Duarte in August 2014.
[9] Authors' calculations, using data from the CONAGUA's Registry of Users (*Registro de Usuarios*), year 2012, obtained from the *Gerencia Estatal de Zacatecas, Departamento de Aguas Subterráneas*. The database for the Aguanaval aquifer was not obtained.

million (491,362 in February 2016), and CONAGUA has about 180 inspectors.[10] Based on the average number of CONAGUA inspections undertaken per year between 2011 and 2015 (8,337), one can estimate that CONAGUA would require 59 years to inspect each permit-holder.

The head of the legal department at CONAGUA in Zacatecas – and a former inspector – highlights a further problem with the inspections that are actually undertaken. With reference to inspection campaigns undertaken between 2010 and 2012 for wells extracting from the Chupaderos and Calera aquifers, this bureaucrat explains that despite many wells being officially shut down, procedural errors in the inspections meant that these closures were mostly overturned in subsequent legal actions. Less than 5% of approximately 290 sanctions were maintained after legal battles. She explains: "The [inspections] weren't done properly, whether it was problems with the visit, the documentation, etc. If you ask me about all the cases I had, 95% were lost because of problems with the inspection visits".[11] A former head of personnel at the CONAGUA central offices in Mexico City identifies this pattern of action, wherein enforcement is weakened, in this manner: "In the procedural aspect (…) if in preparing the inspection report you make 'a mistake' in some part of the report, and then you inform the user that you made that mistake, then you give them the full opportunity to defend themselves and you don't take any action against them". In his experience, this can only be explained in terms of (institutionalised) "corruption".[12]

The generalised lack of oversight and enforcement is recognised by the president of the COTAS for Chupaderos and Calera aquifers, who indicates that in the agricultural sector, a significant proportion of users "violate the law and become used to the fact that these regulations have no consequences". In practice, this translates into a lack of control and measurement of the volumes of water extracted for irrigation. Users will say to themselves, in the president's words: "Why do I want to keep track of volumes if no one comes to check up on me? If I've consumed my volume and my crop isn't mature, what do I do? Do I keep irrigating? It's best if I forget about that and ensure my crop, anyhow no one comes to say anything to me".[13] The head of the COTAS considers that this lack of oversight is so entrenched that if water authorities were to actually attempt to enforce regulations, the result would be social conflict.

This is in line with the sentiment of the leader of the Association of Agricultural Producers with Irrigation Wells in Zacatecas, who states that, "when they touch the first of us, we're going to come and wallop them, because half of the blame is CONAGUA's (…) since they've had the tolerance to play dumb".[14] This is a clear example of the 'weak state' exemplified by Aboites (2009: 46) through several cases of water depredation by industrialists and farmers in which he highlights "the inability or open complicity of the state to subject these groups to any non-entrepreneurial logic, seeking some equity or a criteria of long-term conservation". We call it institutionalised corruption.

Apparent data manipulation

Another important practice that serves to ensure water availability for economic interests involves the actual manipulation and/or misrepresentation of water data. A very clear case comes from the north of Zacatecas, where official numbers for the natural recharge of the Cedros aquifer multiplied manifold in the run up to the installation of Canadian-based Goldcorp's huge open-pit mine in the municipality of Mazapil (Garibay et al., 2014). In 2007, CONAGUA put out a study on water availability for the Cedros aquifer stating the natural recharge was 10.1 Mm^3/y, while the volume committed in extraction

[10] Interview with Manager of Inspection and Measurement at CONAGUA, May 2015.
[11] Interview conducted by Dr. Angela Ixkic Bastian Duarte in August 2014.
[12] Interview with then Head of Basins and Sustainability of the Jalisco State Water Commission and former Head of Personnel at CONAGUA, February 2013.
[13] Interview conducted by Dr. Angela Ixkic Bastian Duarte in August 2014.
[14] Interview conducted by Dr. Angela Ixkic Bastian Duarte in August 2014.

concessions was 4.45 Mm^3/y. Two years later, CONAGUA published information in the country's Official Gazette indicating that the recharge for the Cedros aquifer was 54.4 Mm^3/y, an increase of 435% (DOF, 2009). As Garibay et al. (2014: 130) affirm in their detailed analysis, this was something "amazing, even magical: creating water by government decree!" At present, Goldcorp's Peñasquito mine in Zacatecas, considered to be the largest gold mine in the country, has concessions to extract over 38 Mm^3/y from 60 wells in the Cedros aquifer, as well as a further 6 Mm^3/y from the overexploited Guadalupe Garzarón aquifer. In this case, water authorities have both falsified studies and committed acts of omission in permitting the continued mining of water from the aquifer (Garibay et al., 2014).

THE MILPILLAS DAM AND ALTERNATIVES

The Milpillas River was not mentioned explicitly by Miguel Alonso Reyes on 8 September 2015, when he announced plans to build a large dam to transfer water to the central region of the state, during the presentation of his government's fifth annual report. All that was said on that occasion was that CONAGUA had carried out studies at his request, which determined that 100 Mm^3/y of water were available for transfer to the central region of the state, and that he had already secured authorisation from president Enrique Peña Nieto to build a dam to capture 47 Mm^3/y of this water for said purpose. The dam, he declared, would "guarantee for the next 50 years the viability of life and economic development in the great metropolitan Fresnillo-Zacatecas-Guadalupe area, the most populated in the state". In the following weeks, Alma Fabiola Rivera Salinas, then director of the state-level Ministry of Water and Environment (SAMA, *Secretaría del Agua y Medio Ambiente*), explained that the dam was meant to be built on the Milpillas River, suggesting that it would be the first of two dams on the same river, with the second pending authorisation to transfer what remained of the estimated 100 Mm^3/y of water available (SAMA, 2015: 50).

The method used to come up with this estimated volume of available water is not included in the project's Environmental Impact Assessment (MIA, *Manifestación de Impacto Ambiental*),[15] elaborated by the Government of Zacatecas and CONAGUA in 2015 at a cost 16,362,098 pesos (equal to over USD1 million with the exchange rate at that time).[16] In fact, as noted in a technical opinion emitted by the Mexican Institute of Water Technology (*Instituto Mexicano de Tecnología del Agua*, a government research centre), the 542-page MIA is missing some basic information, including an estimate for the amount of water that flows in the Milpillas River at different times of the year, the height and breadth of the dam wall, the volume of water that it is meant to retain and the quality of that water.[17] Further, we note that, while the MIA repeatedly affirms that the project will serve to alleviate pressure on over-exploited aquifers in the central region in the state, asserting at one point that by the end of the dam's 50-year life span these aquifers will have "recuperated their water-table levels and be in satisfactory condition to be able to meet the demand for water at that moment" (2015: 29); in no place does it present information and/or calculations to back up this assertion.

According to the data presented in Table 1, the total groundwater overdraft in the central region of the state is 261.3 Mm^3/y. According to SAMA (2015: 50), the aqueduct will have the capacity to transport 42.0 Mm^3 of water annually. If this were to result in an alleviation of the same magnitude in the rate of withdrawing water from aquifers in the central region of the state, then these would still be over-exploited at a rate of 219.3 Mm^3/y. In fact, the increased supply of water from the dam would not

[15] The MIA has two appendices that are not available on the Ministry of Environment's website, which we have been unable to obtain.

[16] CONAGUA's response to a request for information made via Infomex in 2014 (Folio number 1610100124316).

[17] The Ministry of Environment's 'Resolutivo' regarding the Milpillas dam and aqueduct, dated 6 July 2016, indicates that the dam will have a height of 88.85 m, a width of 100 m, and the capacity to retain 60.58 Mm3 (p. 7).

even be enough to cover the current demand for water in the public urban and industrial sectors, which according to Table 1 withdraws 50.4 Mm^3/y.

The MIA indicates that the dam will be built on the Milpillas River, about 5 km from the municipal seat of Jiménez del Teul, on the western edge of the state of Zacatecas (see Figure 1). It proposes building a 42-inch diameter aqueduct to transport the water from the dam a distance of 166 km to the central region, between Fresnillo and the MAZG, as well as pumping stations and a water-treatment plant. This implies an interbasin transfer, from the Bajo Santiago River basin (specifically the Milpillas Subbasin, with an area of 912.5 km^2) to the Alto Aguanaval and El Salado basins in the central region (see Figure 2).

The dam is expected to create a reservoir with an area of 259.8 ha, affecting lands used by smallholder farmers belonging to the *ejidos* Atotonilco and El Potrero, while "avoiding the flooding of localities with human population and infrastructure, specifically El Potrero and La Lagunita" (2015: 260). These communities, the MIA asserts, will benefit from the project because of the opportunities for fishing and tourism afforded by the reservoir, and because more water will be made available on the local and municipal level for public urban consumption and agricultural activities. At the same time, the MIA recognises that downstream from the dam, "the reduction in the volume of flowing water will modify hydrological conditions, with less water available for human consumption and for the irrigation of fluvial terraces along the riverbed" (2015: . 237). However, it does not provide an analysis of these impacts. It bears mentioning that just a few kilometres downstream from the proposed dam site there are two towns with riverside agricultural activity: Atotonilco, with a population of 530 inhabitants; and the municipal seat of Jiménez del Teul, with a population of 1,662 inhabitants. Small-scale ranchers and farmers directly affected by the projected reservoir, particularly from the ejidos Atotonilco and El Potrero, began protesting publically in early 2018.

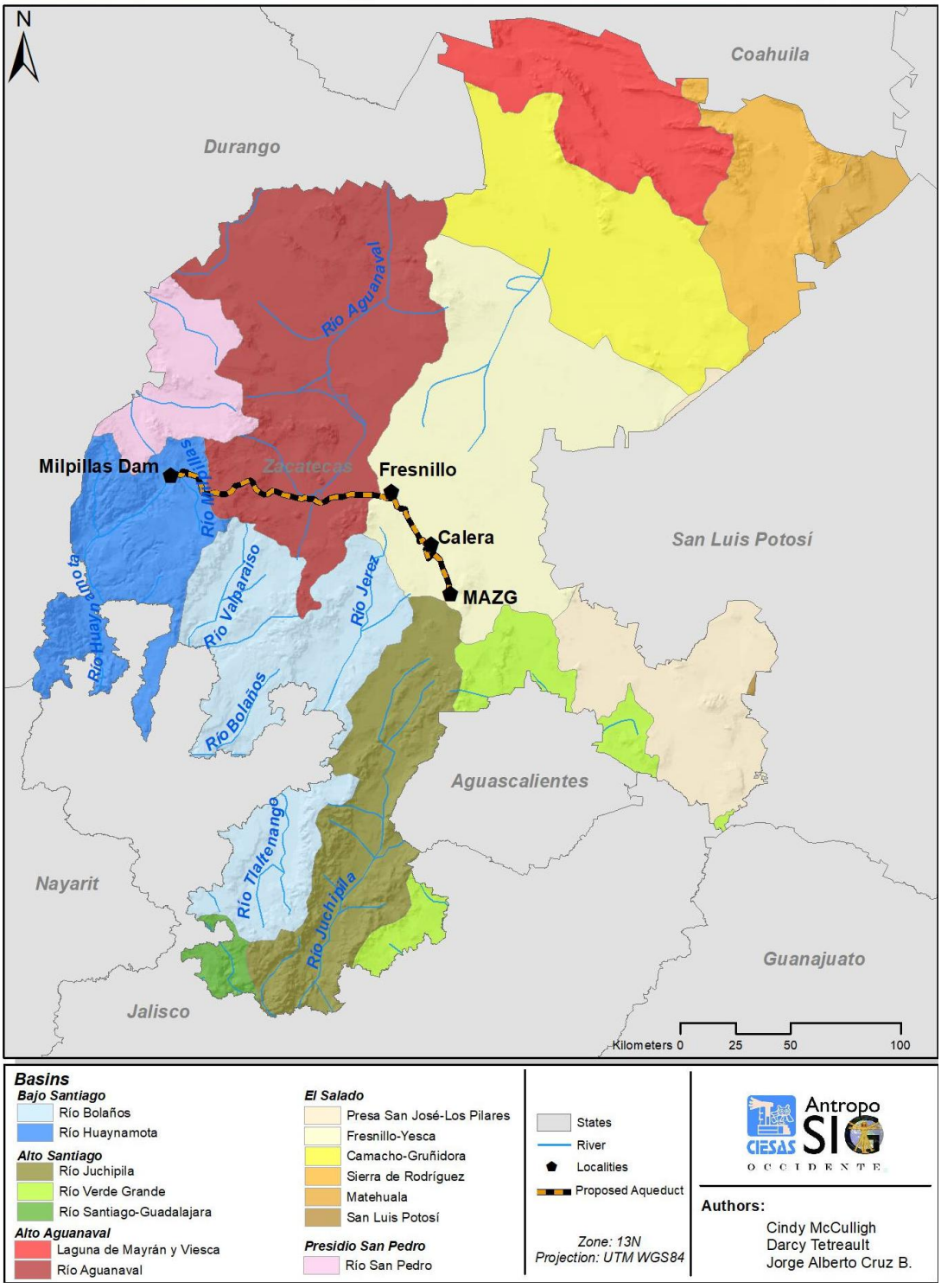
Surprisingly, the MIA does not specify how much water will be transferred from the Milpillas Dam to the central region of the state of Zacatecas. Since the Fall of 2015, state-level government officials have repeatedly mentioned the figure of 42.0 Mm^3/y (among others) in public declarations and interviews. From the information provided in the MIA, it is unclear how much of this water is expected to reach the central region. In some places in the MIA, the document suggests that the entire volume of water made available by the dam is meant to be channelled exclusively to the central region of the state for public urban and industrial consumption; in others, it suggests that the project will benefit all of the eight municipalities crossed by the aqueduct by increasing the availability of water for agricultural activities and public urban consumption.

The MIA indicates that water from the Milpillas Dam will need to be pumped a net vertical distance of 490 meters in its trajectory to the state capital (2015: 24). There are no estimates for the associated energy costs, but the MIA does provide an estimate for the total cost of water from the dam: 8.62 pesos per m^3 (2015: 18). If the aqueduct moves 42.0 Mm^3/y toward the central region of the state, this means that the average annual operating cost will be 362 million pesos (equal to over USD18 million at the current exchange rate of about 20 to 1).

The MIA indicates that the initial cost of the project will be 3.2 billion pesos (equal to USD160.7 million), including the dam, aqueduct and associated infrastructure (2015: 17). It warrants mentioning that this estimate has almost doubled since 2015. According to statements by the head of SAMA to the local press in August 2018, it now stands at 6 billion pesos, including 1.8 billion for the dam itself and 4.2 billion for the aqueduct. Financing is expected to come from both the state and federal governments, and also from the private sector, including Anhueser-Busch Inbev, according to recent press releases. More specifically, financing for the dam wall will come from the Federal Expenditures Budget (*Presupuesto de Egresos de la Federación*) and the National Infrastructure Fund (*Fondo Nacional de Infraestructura*). CONAGUA is responsible for the tendering process to contract a private construction firm to build the dam. The government of Zacatecas is responsible for managing the

budget and the tendering process for the aqueduct, whose financing will come from the National Infrastructure Fund (49%) and 51% from a public-private association which will retain rights to extract rent from the infrastructure through a 25-year contract.

Figure 2. Water basins and rivers in Zacatecas.



In the meantime, the current director of the MAZG water utility (formerly the state delegate for CONAGUA), has hired a private firm called *Agua y Soluciones* to apply a questionnaire to the 122,000 'water users' in MAZG, in order to detect metering problems and clandestine takings, explicitly in preparation for the arrival of water from the Milpillas Dam. After all, as stated in the MIA, one of the expected benefits of the dam is the possibility of generating fiscal revenue from charging (more) for water use (2015: 283).

Some of the alternatives to large dams and concrete heavy projects that seek to increase the supply of water through interbasin transfers turn on the objective of decreasing the demand for water through increased efficiency and diversified water sources. These include: treating municipal wastewater for reuse in agriculture and mining, rainwater capture, reducing leakage in municipal water systems, and full metering of water extraction and use. Some of these are currently being pursued on a small scale in Zacatecas. They correspond to what Wolff and Gleick (2002) call the soft path for water, which seeks to reduce the demand for water, make consumption more efficient and diversify supply, according to local hydrological, economic, and cultural circumstances and possibilities.

As we have argued elsewhere (Tetreault and McCulligh, 2013), the vigour with which soft path alternatives are pursued and their success hinge on broad-based and inclusive citizen participation in water governance. Participation of this sort is also required to redistribute existing underground water resources in accordance with Article 14 of the National Water Law, which prioritises domestic and public urban use. This is consistent with how the 'new water culture' prioritises four functions of water in the following order: 1) water for life, to meet basic human needs; 2) water for the maintenance of sustainable ecosystems; 3) water for activities of general social interest; and 4) water for economic growth and development (Barkin and Klooster, 2006: 4). Ultimately, effective alternatives to the water crisis in Zacatecas must be nested in social struggle aimed at subordinating the interests of rent-seeking extractive capital to those of the common good.

CONCLUSIONS

The Milpillas Dam and accompanying infrastructure will not allow aquifers in the central region of the state to recuperate from overdraft, in spite of official discourse to the contrary. It cannot resolve the water crisis in the central region of Zacatecas, but it can provide a conduit for the realisation of finance and construction capital, and for the capturing of rent in the form of water with exchange value. The shoddy water accounting and specious arguments proffered by public officials in favour of the Milpillas Dam can be seen as manifestations of institutionalised corruption. Others include: granting concessions for the extraction of additional volumes of water where it is banned, tolerance of partial transfers of water concessions to cover up higher extraction rates in practice, low levels of enforcement on metering requirements and on limiting extraction rates, and on-paper changes of water availability in order to circumvent drilling bans where large investments in extractive activities are at stake.

In official discourse, water scarcity is conceived as a natural condition. Our argument is that water scarcity has been historically defined by different phases of capitalist development and shaped by class struggle along the way. While the arid conditions of Zacatecas have posed environmental challenges for agricultural production and for meeting the water needs of the local population since colonial times, it was not until the second half of the 20th century that underground water resources began being exploited at unsustainable rates, due to the combination of factors analysed above. At that historical conjuncture, with the availability of drilling technology, pumps and electricity, and in the context of a national development strategy that sought to increase the productivity of the agricultural sector through the development and dissemination of green revolution technology, multiple state agencies helped private farmers in the central region of Zacatecas to gain access to groundwater resources in order to bolster their production and foster diversification toward cash crops. Water rights were and still are linked to landed property, which evolved through class struggle and agrarian reform in a

peculiar way on the regional level, resulting in the predominance of relatively large private landholdings. In the bureaucratic framework of the Mexican hydrocracy, the SRH was given formal responsibility to administer concessions and impose drilling bans; but in practice, an open-access situation prevailed. This is our first analytic moment of water grabbing.

The second was made possible by the neoliberal reforms that were implemented in the early 1990s in order to create markets for underground water concessions, thereby releasing subterranean water to flow to the most lucrative sectors of the economy, particularly in our case to the beverage industry. In this development strategy, the need to attract and retain private and foreign investment in industrial and extractive activities is primordial, including with respect to water provision. Ecological concerns are projected discursively, but relegated to secondary importance in practice. The same with popular participation, which is limited to promoting a 'water culture' that translates into more efficient water consumption habits at the domestic level and a willingness to pay.

Guided by this policy framework wrought with institutionalised corruption, in the central region of the state of Zacatecas the rate of groundwater overdraft has increased during the neoliberal era, water quality has declined, and unjust distribution has been exacerbated. The Milpillas Dam represents an effort by the Mexican neoliberal state and the private sector to overcome the limits to capital accumulation defined by water scarcity under these conditions. Its technical inability to prevent water tables from further decline speaks of the possibility of capital accumulation and the realisation of surplus profits through variegated forms of rent extraction in the midst of widespread ecological destruction that will ultimately undermine the long-term material conditions for sustainable development and human life in the region, unless organised and sustained resistance emerges along with proposals for democratic and participatory water governance.

ACKNOWLEDGEMENTS

We would like to thank three anonymous reviewers for their constructive criticisms of an earlier version of this article.

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