11 Promises under construction

The evolving paradigm for water governance and the case of Northern Mexico

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Introduction

The evolving international paradigm for water governance is, in its essence, about transforming the social relations of power over water. It is about new relationships between states and citizens as water users; between markets and states; between markets and citizens; and among interest groups. It is about new sets of actors relating to one another at the local water policy-making table or in planning long-term strategies for watersheds. In the flattened and participatory hierarchy envisioned, it is about the voices of marginalized groups – the colonia or favela dweller, the indigenous tribe, the small-scale communal farmer, the factory worker, the housewife – influencing the plans of policy makers. In the dreams of those with a particular vision who have led the development of this new paradigm, it is perhaps not reaching to say the new water agenda is fundamentally about the goal of democracy itself. Yet as Helen Ingram (Ingram 2008) has suggested, experience is teaching us that universal prescriptions for achieving this goal of a democratized water policy have not worked, and that we must look to context-specific construction of problems and their solutions. In this spirit, then, we turn to the specific case of Mexico.

Mexico has been seen as an important developing world leader at the forefront of national water policy transition. In 2006, Mexico hosted the Fourth World Water Forum and proudly displayed its modernized water sector and achievements to the global community. Fifteen years after its sweeping transition to a new water policy based on the international paradigm, Mexico finds itself in a mature phase in which the honeymoon has faded, and the country now faces the ever more urgent prospect of consolidating the decentralization and sustainability principles embedded within its water governance framework.

In the context of food and agricultural production, Mexico's development strategy in the twentieth century gave rise to diverse agricultural models that privileged the northern region over other parts of the country. Due to Mexico's massive land reform programs of the twentieth century, small-scale communal farms known as *ejidos* or agrarian communities occupy half the cultivable land in Mexico. In the center and southern regions of Mexico, small-scale rainfed production of corn and beans for subsistence use and regional sale predominates on communal (ejido or

agrarian community) farms. Much attention has appropriately been paid to the food security and rural livelihood challenges of traditional corn producers in southern Mexico under the ravages of the North American Free Trade Agreement that opened the domestic market to cheap corn imports and caused hundreds of thousands of small farmers to choose to migrate (Leichenko and O'Brien 2008; Nadal 2000; de Janvry et al. 1995). By contrast, in the north and northwest regions, irrigated, commercial production of high-value agro-exports is the dominant agricultural model, and less attention has been paid to the impacts of agricultural and neoliberal reforms on small-scale communal farmers there.

Within irrigated agriculture in the northwest state of Sonora, ejido farmers on small parcels represent about 70 percent of total producers, though controlling only 15 percent of cultivated land, and occupy unique productive niches linking into the global agricultural economy (INEGI 1991). These ejido farmers bear close analysis because they are operating in a modernized and technologically sophisticated environment of production that should in theory be a promising crucible for the success of the new water-and-agriculture model. Nevertheless, the water governance and other neoliberal reforms introduced in the mid-1990s have led to mixed but predominantly negative consequences for ejido farmers. Irrigation management transfer led to an increase in decision-making and self-empowerment for ejido farmers. But the exposure of ejido farmers to a broad range of free trade agreements and market arrangements led to an economic squeeze on ejido farmers who are losing their access to land and water, giving rise to concerns about the equity of the reform package and the prospects for the ejido sector. Drought and climate change are expected to reduce water supply further and make the race for water access in the irrigated desert northwest even more intensive in the coming decades.

This chapter takes the pulse of Mexico's water policy transition today. The analysis utilizes five key indicators associated with successful water policy reform – efficiency and decentralized administration; participation; equity and sustainability – and evaluates them in the context of two specific sectors: irrigation districts and urban water management in northwest Mexico. The chapter advances three main arguments: first, that Mexico's wedding of marketization and decentralization has been an uneasy marriage that must be constantly mediated and negotiated if Mexico is serious in wanting to achieve the desired goals of efficiency in company with equity, sustainability, and participation. In the post-transition phase, Mexico has functioning market institutions such as formal water markets for trading surplus irrigation rights, a public registry of water rights, and moving water to more efficient, higher value uses, but has stalled out in its equity and sustainability initiatives such as management to achieve water conservation and effective participatory mechanisms. Second, that Mexico's democratic transition has, paradoxically, led to a more fragmented national and regional politics – and especially, party politics – that has made it more difficult to push a unified decentralization and sustainability agenda forward (Wilder 2009). In this sense, the Mexican case underscores the admonition that more attention must be paid to "the politics of water" (Ingram

2008: 15). And, third, as Mexico's experiment with marketization and decentralization enters a more mature phase, it bears witness to the temporal and spatial challenges of water transition – that it is more difficult to sustain a multi-faceted transition over decades and across regions than to launch the transition in the first place. Since market mechanisms are notoriously poor at addressing social and distributional inequities, developing countries like Mexico must strive to get the balance right – to develop decentralized management and sustainable processes not only as a counter to the excesses of the market, but representative of a substantive and fundamental democratizing shift in the social relations of power and control over water. The fundamental question at this moment is whether Mexico – especially the Mexican state – has the will and the capacity to fulfill these "promises under construction,"[1] or whether the full promise of the national water policy transition will remain unfulfilled as it is currently.

The next section of the chapter provides an overview of Mexico's water situation, national water policy, and the state of the legislation today. The third section analyzes the outcomes of the water governance strategy based on evidence from the irrigation and urban water services sector in Sonora. The final section of the chapter discusses future challenges for Mexico and implications and conclusions of the Mexican case for the developing world.

The water governance paradigm in Mexico

The most significant facet of Mexico's national water policy transition is its embedded nature as part of the broader project of political opening and modernizing of Mexico's economy in the early 1990s (Wilder 2008). From its outset in 1989, Mexico's water policy transition was about markets and efficiency as the country prepared to join the 1994 North American Free Trade Agreement (NAFTA) (Tellez 1993). Within the next dozen years, Mexico would sign a dozen new free trade agreements exposing agricultural producers and corporations to competition and economic pressure from a dozen new national players, at the same time as Mexico itself undertook massive economic restructuring that included privatization of state-owned companies, elimination of subsidies, initiation of market reforms, and a reduced government size and capacity (Wilder and Whiteford 2006). Mexico was also influenced by the emerging international paradigm for water management reflected at the Earth Summit in Rio de Janeiro and the Dublin Principles, by the World Bank's water resources policy and by conditionality requirements (Wilder 2008; Martínez 2007; Whiteford and Melville 2002; Blatter and Ingram 2001). These international influences emphasized decentralized governance, local participation, environmental sustainability and integrated water resources management (Varady *et al.* 2008; Conca 2006; Gleick *et al.* 2002; Blatter and Ingram 2001). Mexico's transition to a new water management framework was additionally influenced by a range of exogenous and endogenous factors, including the country's political opening, its turn to neoliberal economic restructuring, a greatly retrenched role for the state vis-à-vis markets, and the emergence of civil society actors demanding more voice over

water allocation, services, pricing, and quality (Wilder 2008; Castro 2006; Whiteford and Melville 2002; Liverman and Merideth 2002; Bennet 1995).[2]

Mexico's transition to a new water policy is reflected in the National Water Law (Ley de Aguas Nacionales, or LAN) of December 1992, modified in April 2004. The LAN mirrored the major features of World Bank water resources policy (World Bank 1993, 2003) for developing countries, including:

a establishment of a public registry of water rights to provide secure water rights;
b establishment of formal markets for trading surpluses;
c reduction or elimination of subsidies and initiation of full-cost recovery ("consumer pays") water pricing;
d irrigation management transfer for major irrigation districts;
e municipal and state management of urban water and sanitation services;
f allowance of private sector management of water services via government concession; and
g integrated water resources management to institutionalize local participation through the creation of a network of major river basin councils (consejos de cuenca).

In 1989, the National Water Commission (Comisión Nacional del Agua, CONAGUA) was created to develop and implement the water policy and transition processes. Under the new law, CONAGUA was formally given a policy-making and oversight role, although in practice it has maintained a great deal of influence over operations and retained key strategic functions within its jurisdiction (Wilder and Romero Lankao 2006).

In 2004, a bill modifying the national water law was presented to strengthen the decentralization and sustainability aspects of the water law, but was vetoed by President Vicente Fox, who objected to the extent of decentralized administrative and fiscal authority proposed (Wilder 2008; *Crónica Legislativa* 2004). The reforms finally approved in April 2004 represent a watered-down version of the originally proposed modifications, leaving CONAGUA "deconcentrated" into 13 regional headquarters (Organismos de Cuenca) organized around major watersheds but not administratively decentralized (Wilder 2008). The 2004 law specifies the role, membership, and activities of the river basin councils and indicates that the environment itself can be a legitimate water user. Despite these apparent advances of the sustainability agenda, the regulations to implement the 2004 law have never been adopted and are stalled in the halls of the Mexican legislature, leading to a kind of legal and philosophical limbo for the decentralization/sustainability advancements represented by the 2004 law.[3]

Northwest Mexico water supply and demand

Mexico has a total population of 100 million, of whom 75 percent live in urban areas and 25 percent in rural areas (CONAGUA 2008). Mexico has a reasonably ample per capita water supply (4,416 m^3/person/year, between the United States

and Japan/France) but the geography of natural availability of water is disproportionate to the geography of water demand (CONAGUA 2008, Chap. 1: 18). As Sandford (2007) has demonstrated for Canada's mountain west, the western United States and Mexican west also face the challenge of demographic growth, coupled with climate change. CONAGUA (2008) reports that the densely populated center and north zones of Mexico have 77 percent of the population (mostly in urban areas), but only 31 percent of the natural water supply; conversely, the water-wealthy south of Mexico has only 23 percent of the population but 69 percent of supply. Mexico uses 77 percent of water supply for agriculture (85 percent in commercial irrigation districts and 15 percent in smaller irrigation units), 14 percent for urban use and 9 percent for industrial. The north and northwest regions of Mexico are the most drought-prone, arid zones in the country, and one-third of regional aquifers are severely over-exploited. Average annual rainfall in the northwest region (including Sonora and a sliver of western Chihuahua), averages 476 mm/year, roughly half the national average (772 mm/year).

While the average annual growth rate of Sonora in the 1990s was equivalent to that of all of Mexico (about 2 percent per year), its major urban areas grew at a much faster rate, with Hermosillo, the capital, at 3.13 percent and Nogales, Sonora at 4 percent (INEGI 2000; and www.inegi.gob.mx).

Sonora is in Mexico's most drought-prone region. As in the case of Spain (Garrido and Iglesias 2008), Mexico's water managers are struggling to cope with periodic severe droughts. Climate change is projected to create conditions 5 to 10 percent drier by 2050 in northwest Mexico, and temperatures are projected to increase by 2– 3°C over the next 25 to 50 years. Extreme heat events are likely to increase, and summer mean precipitation (when northwest Mexico receives most of its rainfall in a typical year) is projected to decrease. Other climate-related changes include reductions in water supply from snowmelt, higher evapotranspi-

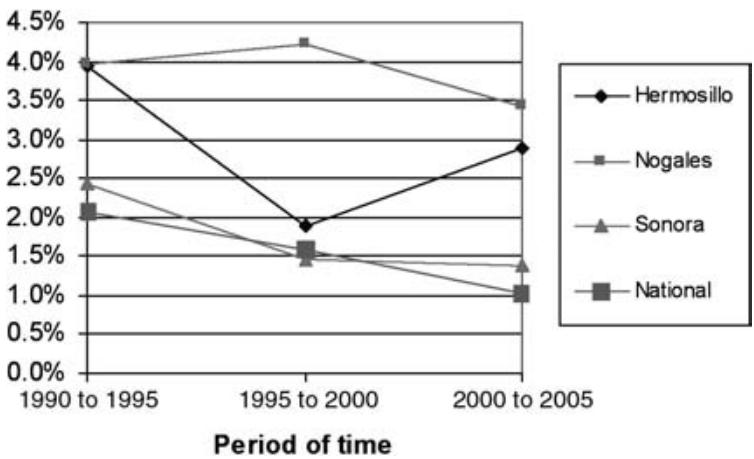

Figure 11.1 Annual growth rate of the largest municipalities, Sonora, Mexico, 1990–2005.

ration rates, decreased soil moisture, and longer, more severe droughts (IPCC Working Group I 2007; Christensen and Lettenmaier 2007; Diffenbaugh *et al.* 2005; Garfin 2006). The converging vectors of water supply, urban growth, and climate change create a pattern of high vulnerability for Mexico's north (Ray *et al.* 2007; Liverman and Merideth 2002; Magaña and Conde 2000). Water supply, intensive water use, urban growth, and climate change all portend future challenges for water resources management in northwestern Mexico.

The next section turns to the key indicators analysis in the context of two significant sectors: irrigated agriculture, and urban water services.

Water policy transition in context

Two sectors are central to Mexico's water governance transition: irrigation districts and urban water services.[4] Irrigation is critical to food supply, producing 3.6 times as much as rainfed production.[5] Although agriculture's contribution to national gross domestic product (GDP) is less than 4 percent, irrigated agriculture generates 50 percent of the value of total production, and represents 70 percent of agricultural exports and 80 percent of agricultural employment (Contijoch Escontria 1999: 1). Sonora's irrigation systems use more than 77 percent of available water supply, and cities use 14 percent. With 6.3 million hectares under irrigation, Mexico is the seventh-largest irrigator in the world, and Sonora, with seven major irrigation districts, is the state with the most area under irrigation (CONAGUA 2008: 22). Irrigated agriculture is a predominant economic activity in northwest Mexico, generating 12 percent of Sonora's GDP and employing 21 percent of the economically active population, and the region is Mexico's agricultural powerhouse producing wheat, cotton, melons, citrus, asparagus, table grapes, olives, and raisins. Urban growth trends in Sonora have been driven by the acceleration of border industrialization due to adoption of the North American Free Trade Agreement (NAFTA).[6] The loss of agricultural subsidies, trade protections, and price supports under NAFTA disrupted southern, rural livelihoods, and contributed to an annual migration stream to northern industrialized cities; an estimated 500,000 annually are unauthorized migrants to the United States (Passel and Cohn 2008: 2). Water supply issues increasingly involve agriculture-urban transfers and can result in economically difficult tradeoffs (Wilder *et al.* 2010). Cities and irrigation districts are the most significant water users and represent the major economic sectors within Sonora.

Five indicators related to the major goals of Mexico's water governance paradigm are key to an assessment of how institutionalized the changes have become and how well they have worked:

a improved efficiency;
b decentralized administration;
c substantive local participation;
d increased equity (e.g. access, distribution, affordability); and
e improved environmental sustainability.

While these indicators are not exhaustive, they represent key areas that the emerging water governance scheme had intended to reshape into more democratized spaces. Efficiency is used as a composite term to capture the range of changes that have introduced markets, privatization, and secure water rights, and that focus on water as an economic good. Decentralized administration refers to irrigation management transfer and a new federal-water user relationship in the agricultural sector and to municipal (or state-level) management of urban water services in the urban sector. Participation refers both to the substantive quality of public participatory mechanisms in the conception, design, and implementation of water policy, as well as to the representative and inclusive nature of such mechanisms (Larson and Ribot 2004). Equity is a composite term used to capture two aspects of the concept of equity salient in water policy: "political" equity, referring to the role and quality of local participation in water policy making; and "economic" equity, referring to the availability, accessibility, affordability, and productivity of water, including the question of who benefits from water's generative activities (Wilder 2008). Finally, environmental sustainability in this chapter relies upon the commonly-cited Brundtland Commission (UN 1987: 24) definition of sustainability as "to meet the needs of the present without compromising the ability of future generations to meet their own needs." This definition implies a focus on sustainability of the environment to ensure its healthy continuance into the future, lending an inherent (not merely utilitarian) value to preservation of the environment itself.

Efficiency and decentralization

Irrigation districts

Water users inherited broken-down irrigation systems when districts were transferred to water users, due to a neglect of infrastructure maintenance during the previous decades. By 1980, a World Resources Institute study estimated more than $300 billion pesos were needed in repairs (Cummings *et al.* 1989). Half the irrigation supply never reached the intended fields, salinization was a growing problem in coastal districts, and distribution canals were silting up in areas affected by erosion (Cummings *et al.* 1989; Buras 1996; Yates 1981). Insufficient water supply aggravated conflicts between rural and urban areas. If Mexico wanted to join NAFTA, the water sector had to be modernized, and non-state sources of capital needed to be found to invest in irrigation systems. Mexico adopted an irrigation management transfer program that shifted the huge costs previously borne by the state to water users themselves.

Irrigation districts represent something of a success story for decentralization in Mexico. One World Bank report called Mexico "a successful new globalizer," based upon the smooth and effective transference process it engineered (Easter *et al.* 1998). By July 2001, 98 percent of the surface of the 82 major irrigation districts in Mexico had been transferred to 525,000 water users (CONAGUA 2001: 36). The non-transferred districts are on indigenous lands, and the

transference program has been unsuccessful to date at incorporating indigenous irrigation districts into the modernization program (Galindo 2008; Wilder 2002). The particular transference strategy adopted by Mexico was heavily influenced by the World Bank. CONAGUA carried out the transference program under the auspices of its Program for Investment in Irrigation and Drainage (PIRD), with a total budget of $1.195 billion. The World Bank provided a US$350 million loan – about 30 percent of the total), supplemented by another US$200 million from the Inter-American Development Bank, representing nearly 50 percent of the total projected costs of the transference program (Pineda Blancarte 2000: 167). The Mexican government funded the balance.[7] The transference program was implemented relatively smoothly. In less than ten years, Mexico supplanted an irrigation structure over 100 years old and created a new structure in a variety of settings across a geographically and economically diverse country. A World Bank study concluded that Mexico's transference program was successful enough to cause the Bank to reverse its priorities for irrigation rehabilitation, and modernization, from its traditional emphasis on rehabilitate first and then transfer, to a focus on transfer first, then rehabilitate (Easter *et al.* 1998).[8] In the 20,000-member-strong Rio Yaqui Irrigation District (041) of Sonora, a private corporation, Society of Limited Responsibility (SRL), was formed after the transference to operate the district on behalf of the water users. Most of the original employees contracted for the SRL were hired away from CONAGUA (Wilder 2002), meaning, as water expert Jacinta Palerm-Viqueira (2005: 5) notes, that the same people who used to manage the water under federal jurisdiction are still managing the water, and expansion of local training and knowledge transfer has been limited. Despite the relative autonomy of the irrigation districts after transference, CONAGUA is very involved in advising about operations, policy, training, and exercising oversight. CONAGUA has retained some of important strategic functions to itself, such as approval of groundwater well permits (Wilder and Romero Lankao 2006).

On the positive side, irrigation management transfer gave Sonoran districts needed flexibility to direct their own cropping regimes and to retain revenues to be invested into localized system efficiency improvements. The Rio Yaqui district reports consistent efficiency gains that have slowed system losses. Irrigators within the subdistrict-level "water modules" (small groups of producers within the broader irrigation district) report higher satisfaction after transference, based on the ability to set irrigation fees to invest in efficiency improvements that benefit their own module's fields, such as lining of field-level canals and installation of drip irrigation systems (Wilder 2002; interview with water and agriculture officials, October 2006). Social relations among producer sectors appear positive within the districts. Under transference, ejido and private producers have an annual rotation of the presidency of the water module, giving ejido producers a formalized role within the governance process.

Water rights are now recorded in a Public Registry of Water Rights lending transparency and accountability to water transfer processes. Irrigation districts manage their own water banks to facilitate within-district trades of surplus irrigating

rights in gravity districts, although trades have declined since the ten-year drought. Trades can be done on an annual basis (rental) or a permanent basis (sale).

Full-cost pricing of water is viewed as a major highlight of the water policy transition by the World Bank (Easter *et al.* 1998), yet for irrigators it represents the shifting of the predominant financial burden of irrigation systems from the state to water users. Before 1990, CONAGUA was fully responsible for system improvements, and irrigators were responsible for about 30 percent of costs (through fees paid to CONAGUA). By 1997, CONAGUA investment decreased to only 10 percent (Palacios Velez 2000: 128). By 1998, the World Bank reported that water users in 84 percent of transferred irrigation districts were paying 100 percent of operating and maintenance (O and M) costs (Easter *et al.* 1998). The result of the state's self-sufficiency strategy has been a huge increase in water costs borne by irrigators themselves (Wilder and Romero Lankao 2006). Water costs in the two Sonoran irrigation districts mirror the enormous water fee increases documented elsewhere in Mexico after the water reforms (Palacios 2000; Whiteford and Bernal1996). In the Rio Yaqui irrigation district, water fees increased by 257 percent from 1992 to 2000. Added to this fee (or cuota) paid to the CONAGUA and the Society of Limited Responsibility (SRL, the private company that manages the irrigation district on behalf of the irrigators) are the fees charged by individual water modules which ranged from Mex$35 to Mex$120 (roughly US$3.50 to $12) per hectare in 2001. From 2000 to 2006, the basic water fee (cuota) of Mex$50 tripled in the most severe drought year of 2004–2005 to Mex$150.00/$Mm^3$ (Distrito de Riego Rio Yaqui 2006). By 2005–2006, with the increase in rainfall and reservoir levels, the basic water fee was decreased to Mex$105/$Mm^3$. In the Caborca groundwater district, irrigation costs for producing a hectare of wheat increased by 89 percent, and for asparagus by 189 percent, from 1994 to 2004 (Wilder and Whiteford 2006: 352).

Implementation of the water policy transition has resulted in distinct outcomes for ejido producers. While private producers generally have large landholdings, access to private credit and futures markets, state-of-the-art technology, and access to private agricultural consultants, ejido producers operate in a constrained financial credit environment, on small parcels, and with reduced state subsidies and technical assistance. For example, in the Caborca district, ejido producers represent two-thirds of total producers, but own only 14 percent of the district's wells (Wilder and Whiteford 2006: 354). The groundwater pumps in the ejido sector are outdated and in poor repair. Groundwater tables have plunged to new depths in the severely overdrafted aquifers of coastal Sonora. Ejido producers must spend relatively more than private producers on expensive electricity to pump the water out from declining water tables. Pumping costs and increased agricultural production costs have led to massive defaults on bank credit at the government's rural credit bank, accelerated land and water rentals, and growth of accumulated debt across the district. As a result, more than half the producers in the irrigation district had their water cut off during 2001, due to inability to pay their electrical bill (Wilder and Whiteford 2006). Since then, many ejido wells have been retired.

In general, the transference program remains a positive aspect of the water governance paradigm in Mexico by improving system efficiency, formalizing a role for ejido producers within irrigation district institutions, and giving producers more influence over how to prioritize projects supported by revenues. On the negative side, full-cost recovery pricing of irrigation, reduction of state credit and technical assistance, and exposure to a dozen new free trade arrangements within a dozen years has left producers feeling abandoned by the government and exposed to the vicissitudes of global agricultural markets. Ejido producers have been disproportionately affected by these adverse consequences due to their lack of access to credit, inability to deal with elimination of subsidies, and reliance upon government technical assistance, among other factors.

Urban water services

Mexico's cities are burgeoning with unplanned growth, and as colonias spring up on the edges of cities, they often lack residential water and sanitation coverage for decades. As a national average, 89.6 percent have residential water hook-ups (an increase from 78.4 percent in 1990, prior to the transition) and 86 percent have sanitation (an increase from 61.5 percent in 1990) (CONAGUA 2008, Chapter 3: 18). Nationally, only 20 percent of water is treated, and raw sewage and industrial discharges contaminate local water supplies, leading to high consumption rates of bottled water among the poorest neighborhoods (CONAGUA 2008; Blackman 2003). City water systems are plagued by low efficiency, ranging from only 50 to 70 percent (CONAGUA 2008, Chapter 1: 20). Drought has led to water rationing in northwest Mexico during the scorching summer months when temperatures reach well over 100°F (40°C) daily, and water pressure is often so low that even households have unreliable service only a few hours a day (Browning *et al.* 2007). Municipal governments inherit broken infrastructures from the federal government, under decentralization, but lack the financial and technical resources to repair, improve and extend urban water systems, due to insufficient revenue-sharing and lack of autonomous taxation authority (Pineda 2007; 2002). Municipal water officials often lack incentives to undertake the required planning, investments and revenue collection for more efficient services, due to their short three-year terms in office under political patronage systems (Pineda Pablos *et al.* 2007). The new phenomenon, for Mexico, of political alternancia (alternating political parties in power rather than one dominant party) has made the political landscape for water managers more seismic (Pineda Pablos 2006). In urban areas like Hermosillo, the capital of Sonora, residents are unaccustomed to paying water fees and resistant to metering schemes (op. cit.). Municipal governments have in some cases turned to the private sector for relief. Privatization has not only been a panacea but, in many cases, has exacerbated existing problems. Privatization of municipal water systems does not correlate with more effective service, nor is it more accountable than public management; in fact, privatization tends to consolidate power within existing elites (Pineda 2002; Bennet 1995). Private systems require strong state oversight (of a more transparent, accountable

state) to ensure accountability to the public (Wilder and Romero Lankao 2006; Bennet 1995). Summary results from studies of four municipalities[9] with decentralized management (different combinations of municipal, state and private) indicate that none of the cases resulted in efficiency gains or sustainability improvements. Enforcement was often subjugated to political and economic considerations. Privatization strategies were found to have limited capacity to resolve politically charged issues such as water scarcity, redistribution of water rights or environmental sustainability (Wilder and Romero Lankao 2006: 1986).

Participation

In the transition to a new water policy, Mexico created multiple institutions to formalize and institutionalize water user and public participation. Torregrosa states that there is "a growing social demand to participate" but that "the participation allowed by the National Water Commission is delimited, and is limited to definite forms in a top-down fashion" (Martínez, interview with Maria Luisa Torregrosa 2007). She states,

> It excludes autonomous social and citizen organization forms that are concerned and struggle for an equitable and more sustainable access to the resource [e.g. water]. For instance, the parties represented [on the consejos de cuenca] are informed about government decisions taken with respect to the basin, but they are impeded from taking part in those decisions
>
> (Martínez interview with Torregrosa 2007: 64)

Irrigation districts

In irrigation districts, there is in place an effective participatory arrangement that seems satisfactory to water users studied (Wilder and Romero Lankao 2006; Wilder and Whiteford 2006). At the upper organizational levels, the "hydraulic committee" brings together CONAGUA and district management with the directors of all the modules (numbering, in the case of the Rio Yaqui district, for example, 42 modules representing 20,000 irrigators). Between CONAGUA and water users is the SRL company, which operates the irrigation district and is accountable to the irrigators. At the ground level are the water modules themselves, which have "civil associations" (asociaciones civiles). The modules hold annual elections of officers, and the presidency must rotate amongst three land-tenure sectors: private producers, ejidatarios, and colonists (small-scale private farmers). In some cases, it is reported that some ejidatarios, when serving their term as president, are simply the "puppet" of a large landowner within their module who was directing the action from behind the scenes; however, this seemed not to be a general concern among the interviewed irrigators (Wilder 2002). On balance, irrigation management transfer has led to a formalized means of participation in water policy-making processes that used to be the province of government engineers and powerful producers' associations.

Urban water services

With regard to the goal of public participation in urban water management, there is some evidence that the 2004 modifications of the National Water Law could lead to increased public consultation. The 2004 law states that CONAGUA should institutionalize and formalize public participation in decision making at the national, state, and municipal levels.[10] A 2006 Sonora state water law, in turn, requires each municipal water service provider to establish an advisory group (consejo consultivo) whose membership and responsibilities are detailed within the law.[11] Since its passage, municipalities such as Navojoa and Obregón have established municipal advisory councils and Hermosillo, the state capital, already has a well-functioning municipal advisory group. [12] Although there is evidence that states have institutionalized some means of public participation, the quality and representativeness of the participatory processes are the key to substantive participation. It is likely that the requirement for participation, and the related aspects of transparency and accountability to the public, will become more rooted expectations over time, as has proved the case in areas like the United States-Mexico border, where public participation processes have become entrenched over the last 15 years (Lemos and Luna 1999).

Equity and Sustainability

Equity and sustainability are the final major indicators to assess vis-à-vis Mexico's national water policy transition. Have the changes over the last 15 years enhanced equity or increased sustainability? This indicator is the area in which the least progress has been achieved of any examined in this analysis.

Irrigation districts

Irrigation districts have spent much of the last decade grappling with the challenge of increasing and diversifying agricultural production, due to the pressures exerted by liberalized trade, while at the same time living through an extended ten-year drought (1994–2004). In terms of sustainability, irrigation districts managed by water users have arguably been better at coping with drought and water shortage than the federal government agency (SARH) that managed the districts prior to transference. For example, in the Caborca irrigation district, water users immediately imposed a water reduction program upon themselves after transference, and required every irrigator to pull a planted area out of production each year. They successfully lobbied Mexico City for the resources to install nearly universal drip irrigation systems for more efficient water use (Wilder and Whiteford 2006). The water reduction plan has proved insufficient to halt the serious groundwater depletion rate; however, in recent years, the irrigation district has retired wells in order to slow depletion rates. None of these water-saving processes is intended to benefit the groundwater aquifer long-term, but only to allow area irrigators to continue the most valuable agricultural production for high-value exports like fresh grapes and

asparagus – crops produced only by private producers, not ejidatarios (Wilder and Whiteford 2006). It has created a veneer of short-term sustainability (conserve so we can irrigate next year), while leaving the long-term challenge of sustainability (conserve so the aquifer can replenish itself) unfulfilled.

In the Costa de Hermosillo citrus-exporting groundwater district, Moreno (2006) remained pessimistic about environmental sustainability of the new water management paradigm. Moreno cites water extraction rates that have at times exceeded four times replacement rates; the febrility of the river basin councils and new laws and policies that were intended to improve aquifer health but were prevented by legal ambiguity and economic considerations; and the lack of political will to conduct scientific studies to ascertain actual groundwater levels, due to the political fallout if such information, were definitively known. He concludes that the new water management and agricultural development paradigms privileges economic goals over social and environmental objectives in order to favor a small sector of the population (Moreno 2006: 413).

The water-conserving practices of the irrigation districts raise significant equity issues. The drought and water shortage, combined with intensifying pressures from international markets, have spiked the need for more water within these districts. The formal water markets established as part of the water policy reforms have created pressure on the most vulnerable ejido producers to transfer their "surplus" water rights annually or to lease them out on a long-term basis. Unfortunately, far from being a sale of surplus water rights as a strategic business transaction as argued by the World Bank (see Thobani 1997, for example) most such transfers are basically distress sales, in which ejido producers face accumulated debt or need a quick cash injection to pay a child's medical bills or address another urgent need (Wilder and Whiteford 2006). In company with the Article 27 ejido reforms that allowed the legal sale or rental of ejido parcels to private buyers, adopted the same year (1992) as the new water law, the economic pressures on the water and ejido resources have led to accelerated renting of water and land to the private/corporate producer sector. In the Caborca district, more than half of ejido lands are rented out to private producers (under contract to Dole Inc. or Lee Brand for their asparagus), and fully three-fourths of ejido lands in the Rio Yaqui district are actually controlled and farmed by private producers (Wilder and Romero Lankao 2006; Wilder and Whiteford 2006). In both districts, even before the water policy and ejido reforms, the concentration of resource ownership was dominated by the private sector. The water policy reforms, coupled with market-oriented economic restructuring, have led to inequitable outcomes resulting in widespread ejidal abandonment of active production on their own lands and increased economic vulnerability for the most marginalized agricultural producers in Sonora.

Urban water services

In urban areas, there is a pattern of uneven access to residential water and sanitation services, with networks extended to wealthy subdivisions at the point of construction, while poor colonias resulting from land invasions typically wait

years or decades for hook-up services. While this unevenness was not caused by the water governance transition, neither has the new paradigm been able to address this root issue of unplanned growth and inadequate infrastructure to meet urban demand.

In Sonora, the largest cities are dependent upon severely overdrafted groundwater aquifers and drought-affected surface water supplements for potable water. Groundwater sources are especially important for cities. Of the water delivered to Mexican cities, 70 percent is from groundwater sources, serving approximately 75 million people (three-quarters of the country's population). Aquifer overdrafting has tripled over the last 25 years and the balance between natural recharge and extractions (due to agricultural and urban use) is negative in the most critical arid regions, like Sonora (Wilder and Whiteford 2006). Water managers in Hermosillo, for example, have increasingly relied upon marginalized peri-urban ejidos to augment the water supply of the growing city (Wilder *et al*. 2010). Climate change forecasts for reduced water supply, coupled with intensifying patterns of urban and agricultural use, portend increasing urban-agriculture conflicts over water that are likely to threaten access to water for poor colonias on the edges of big cities like Hermosillo and Nogales, and for ejidos located within the peri-urban regions of these cities.

The evidence is clear that much work remains to be done to approach the positive goals of equity and sustainability that have been and today remain the central focus of Mexico's water policy discourse.[13]

Conclusion and policy implications

As we confront the certain challenges of the future – climate change, sectoral and regional conflicts over shrinking water supplies, increased demand related to growth and development, and changing technologies such as biofuels and desalinization that are redirecting water supply or making available new sources – how can this array of fragile relationships among citizens, states, markets, and the environment itself be made to work, even to thrive, so that water policies especially in the developing world can be made more democratic and sustainable? Mexico's water agenda links democracy and participation to a strange partner, the market and, frankly, these two coexist in an uneasy relationship that must constantly be mediated and negotiated. Each of these partners do some things very well, but each tends to overstep the boundaries of the other. Each has a tendency to absorb all the oxygen in the room and to leave insufficient space for the other partner. The literature suggests that new relationships can lead to creative context specific solutions – for example, pairing of community with markets (private-social participation model) (Lemos and Agrawal 2006). One of the pressing challenges ahead, then, is to sort out this relationship. Mexican policy makers need to ask themselves the fundamental question: what is our water policy really about – market efficiency? Decentralization and local participation? Equity and sustainability? Respected former environment ministers, such as Julia Carabias and Victor Lichtinger, maintain that markets,

the private sector, and efficiency gains must be part of the solution to moving toward a more sustainable, secure water future. However, the experience-to-date of privatization in Mexico, especially in urban water services provision, does not substantiate such positive claims.

Helen Ingram captures the challenge facing Mexico and other developing nations, when she writes:

> The contested terrain of water requires not government or markets, but both; not public or private water enterprises, but both; not expertise or grass-roots knowledge, but both; not water for nature or people, but both; not centralization or decentralization, but both; not river basin or watershed institutions, but both
>
> (Ingram, Chapter 12, this volume)

In the end, we return to the politics of water. Regardless of the party in charge, only a strong and accountable Mexican state that is committed to achieving not just one end of this equation – markets and efficiency – but the other end as well – equity and sustainability – will be able to implement a sustained program of transition to achieve these desired ends. Mexico's democratic transition is embodied within and being realized through its water policy transition, and the promises imagined in the water governance paradigm are incomplete fragments of what they had the potential to be. Are they even still under construction? Mexico's citizens – the water drinkers, the farmers, the colonia dwellers, the indigenous tribes, the housewives, the children – are still waiting to find out.

Notes

1 Phrase suggested in Martínez (2007), Interview with prominent water expert, María Luísa Torregrosa.
2 For an extensive discussion of the developments that led to Mexico's adoption of a new water management paradigm, see M. Wilder (2009).
3 Mexican law requires that regulations (reglamentaria) implementing new laws are to be adopted within 12 months of the passage of the original law.
4 River basin councils are a potentially significant innovation to Mexico's water management landscape; however, full discussion of them is outside the scope of this chapter due to space limitations. Mexico created a network of 25 major river basin councils (*consejos de cuenca*) to promote and develop integrated planning at the watershed level. Three of these are located primarily within Sonora: the Altar-Río Concepción in the northwestern part of the state; the Río Yaqui-Mátape in the southern part of the state; and the Río Mayo in the southeastern area (Wilder 2008). Joined to these are smaller organizations to conduct planning at the sub-watershed level. To encourage public participation about groundwater management, a new institution, Technical Groundwater Councils (*Consejos Técnicos de Aguas Subterráneas,* or COTAs) was created to facilitate water user input into planning processes for groundwater use. The consejos de cuenca have limited authority and large unwieldy memberships, including the governor (of all states within the watershed) and the director of the regional CONAGUA headquarters. Watersheds that cross state boundaries have voting representatives in each sector from each state, leading to a complex

institutional structure. Voting is limited to one elected representative per water use sector, angering agricultural producers in Sonora who use 85 percent of total water in the state. Other represented sectors (each with a single vote) include industry, ranching, hydroelectric, and urban public use. Government agency officials and academics can participate in discussions but have no voting privileges (*voz no voto*). Important social groups are not included within the limited representative structure of the consejos, including, for example, tribal interests (e.g. the Yaqui indigenous pueblos of Sonora), urban residents or colonia dwellers. The consejos de cuenca typically operate with little transparency. For example, there are open meetings with published agendas, and meeting minutes are not publicly available.

In the case of river basin councils, decentralized administration is very limited, since the law designates the director of the regional CONAGUA Organismo de Cuenca (regional headquarters of CONAGUA) as the president of the river basin council. Staff members within CONAGUA are charged with calling meetings, setting agendas, and inviting participants. The river basin councils have very little autonomy and lack jurisdiction to take major decisions, although they can make recommendations to CONAGUA. Finally, as detailed in the above section on participation on the river basin councils, equity and sustainability issues remain a challenge. These consejos de cuenca have limited representation and a heavy government presence (e.g. the governor and the director of CONAGUA). Many marginalized sectors of the population are not represented on the consejos, including indigenous tribes (like the Yaqui), neighborhood associations, or residents of poor colonias. There is no formal representation for the environment itself, although the law stipulates a seat for someone who represents it, and thus no way to advocate for environmental/ecological services themselves. The depth and complexity of current issues, or even crises such as the recent prolonged drought, often obscures the ability of the consejos to take on long-term sustainability planning.

5 Some results of the Sonoran studies are discussed in other publications by M. Wilder, including Wilder 2009; Wilder and Whiteford 2006; and Wilder and Romero Lankao 2006.

6 NAFTA became effective January 1, 1994.

7 The original World Bank loan was for the period 1991 to 1994, and was subsequently extended through June of 2000 (Pineda Blancarte 2000: 66–72). The Bank loan was directed toward three areas: 1) Development and transfer of technology; 2) Capacity-building; and 3) Communication and User participation.

8 The World Bank study on Mexico's transference program found that placing management in the hands of beneficiaries helps establish rehabilitation priorities when funds are limited. Cost sharing for system improvement is negotiated between the state and water users, and users help set priorities for capital works installations (Easter *et al.* 1998:10).

9 The municipalities or states whose privatization experiences were summarized in the study (Wilder and Romero Lankao 2006) are: Aguascalientes, Baja California, Puebla and Mexico D.F.

10 Capitulo III, Articulo 9, Section XIX, p. 27, LAN, April 29, 2004

11 Ley 038 de Aguas de Estado, Articulo 76, 84–89. Other states that require municipal councils include Jalisco, Michoacán, Mexico and San Luís Potosí (based on state water commission websites).

12 The municipal water utility, Aguas de Hermosillo, formed in 2001, established a 15-member advisory group (consejo consultivo) with representation from the water users' union (2), university representatives (3), and the remainder from the business community, women's association, and accounting college. Advisory council members are all volunteers and rely upon the water utility to provide information, set the agenda, and ask for input only on particular issues (Author interview with formal advisory council member, June 27, 2007).

13 See, for example, ample references to sustainability, equity, participation and decentralization in the Plan Hídrico Nacional 2007–2012 (CONAGUA 2008).

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