

X. SUSTAINABLE GROUNDWATER MANAGEMENT: HAVE PROPERTY RIGHTS REFORMS HELPED IN MEXICO?

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Sustained groundwater overdraft in Mexico poses serious challenges for social and economic development. One hundred of Mexico's principal aquifers are over-exploited, up from 38 in 1975. In the state of Guanajuato, which has over 12% of the wells and consumes 17% of agricultural electrical energy in Mexico, 16 of 19 aquifers are over-exploited and static water levels are dropping on average 2 m/year. Over two-thirds of groundwater pumped in the state is for irrigation. A series of institutional reforms is underway to address overdraft, including efforts to register wells with an annual volumetric concession and the formation of aquifer management councils (COTAS). However, groundwater demand management goals remain elusive for a combination of financial, social and institutional reasons.

Electrical energy supply and pricing are primary driving forces behind groundwater pumping for irrigation; policies to address groundwater overdraft must focus on energy-water linkages. With comparatively low per kilowatt-hour tariffs and readily available connections even for unregistered wells the financial disincentives for farmers to limit pumping are low. The minimum consumption slab agricultural energy tariff rose an annual 4.9% from 2001 to 2002 (8.1% in the average slab in Guanajuato); however, water still represents a small share of agricultural input costs. This paper reviews energy use for irrigation in Mexico with a particular focus on Guanajuato. The policy implications of linking electrical power pricing and supply with ongoing groundwater concessioning and user-based management in Mexico are explored. The recently adopted Rural Energy Law (December 2002), while intended to support Mexican farmers' competitiveness in the North American Free Trade Agreement, will have profound and

negative impacts on groundwater overdraft if it indeed reduces energy prices as envisioned.

Groundwater management is a key challenge that requires regulatory and participatory approaches coupled with changes in demand behavior of pumpers. Where groundwater use is largely agricultural, cropping changes and water demand may be influenced by commodity prices; however, energy pricing and supply can be determinants of pumping behavior. Price must be high enough to be in the elastic range of demand response, while supply options can face social and political challenges.

In Mexico, regulatory approaches to groundwater management have been in place and have been largely unsuccessful for over 50 years. The current well concessioning and licensing drive is important and should be continued; it is only after this process has been completed that users and regulators (whether government agencies or farmers' self-regulatory bodies) will have the information and access required to address overdraft.

The recently passed Rural Energy Law will not ease groundwater pumping; in fact, it is likely to have the opposite effect. While the law may meet its primary objective of supporting the competitiveness of Mexican farmers, the medium and long-term sustainability of groundwater resources are not addressed (or the agricultural competitiveness based on dwindling groundwater resources in the key production areas). The silver lining in the cloud is perhaps represented in the projected tariff increases; however, whether these will submit to political compulsions remains to be seen.

Figure 15

