

SUMMARY FOR DECISION MAKERS

Number #74 - April, 2015

Responding to drought in the Mexican irrigation sector

Gustavo Garcia-Lopez,
Universidad Autónoma de Barcelona
Sergio Villamayor-Tomas,
Humboldt Universitat



The long-established Mexican irrigation sector is currently being threatened by the increasing recurrence and duration of drought, coupled with additional disturbances derived from other ecological changes as well as socioeconomic ones. Although drought is not the most frequent extreme weather event faced by Mexican irrigators, in terms of per-event average it is the most damaging.

The situation in Mexico coincides with a growing international concern regarding the ability of many countries to meet existing demands, guarantee food security, and better understand how local farmers respond and adapt to drought and other events, both individually and collectively.

Individual and collective farmer responses: An overview

Factors argued to contribute to farmer adaptation include the availability of economic resources, new technologies, economic diversification, state support, the appropriate division of labor among economic agents, the sharing and framing of information about the nature of disturbances etc., the existence of entrepreneurs and diffusion of innovations, and institutional aspects (Vasquez-Leon et al., 2003; Boyd and Arraran, 2009; Acosta-Michlik et al., 2008).

Evidence regarding the factors contributing to collective adaptations to drought (i.e., in irrigated agriculture) is much

more scattered, and includes external support, leadership, rule compliance, etc. (Boermaier et al., 2009; Murtinho, 2010; Keshavarz & Karami, 2013; Villamayor-Tomas, 2014; Obermaier et al., 2009).

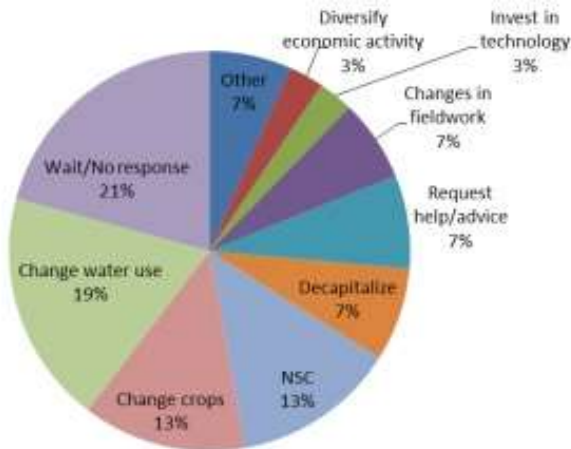
Drought responses in Northern Mexico

To better understand individual and collective responses to drought and other disturbances to irrigation systems, we surveyed 168 farmers from seven Mexican irrigation systems in the Yaqui and Conchos basins (Sonora and Chihuahua), and interviewed irrigation organization leaders, government (CONAGUA) officials and other stakeholders.

Important results include:

- Drought (21% of reports) is just one of several events that farmers must cope with, including freezes (13%), plagues (13%), floods (12%), increased cost of fertilizer (9%), and increased energy prices (6%). (See Figure 1)
- Drought is a similarly salient issue for farmers throughout the Northern basins. This is not the case for other events, such as floods, freezes and price volatility.
- A significant proportion of farmers (21%) do not respond to drought in any specific way.
- Individual responses to drought are relatively varied; changes to water use and crops being the most popular.

Figure 1. Farmer responses to drought (Yaqui and Conchos basins; n=168)



- Collective responses (i.e. coordinated by irrigation organizations) can be classified as (in order of popularity):
 - *Technical*: improvements to canals, leveling of land, water pumps for reuse, water wells.
 - *Institutional*: Strengthening of monitoring and sanctioning, restrictions to number of irrigation turns each farmer does, water transfers from other systems.
 - *Political*: lobbying activities (addressed to the National Water Commission) to secure water use rights and reform crop control regulations.
- Second order organizations directly controlled by resource users can facilitate the development of large-scale drought adaptations (e.g., *Sociedad de Responsabilidad Limitada del Distrito del Rio Yaqui*).
- There are no significant differences in the ability of farmers to satisfactorily respond to drought vs. other disturbances.
- The majority of farmers who do respond to drought are satisfied with their response.
- There is a positive association between the irrigation organizations' performance and the ability of farmers to satisfactorily respond to drought.
- There is a negative association between the dominance of communal land in a given irrigation system and the ability of farmers to satisfactorily respond to drought.
- One of the major concerns among farmers is the existence of externalities that their individual responses may cause to one another.

Percentage of successful farmer responses by group

Variable	All responses	Drought responses
Property in irrigation system*		
Majority communal	53%	45%
Majority private	63%	66%
Rule compliance in organization**		
Full compliance	72%	77%
Partial compliance	46%	37%
Satisfaction with organization**		
More satisfied	67%	69%
Less satisfied	51%	47%

Note: Measurements are based on indicators for satisfaction, effectiveness, timeliness, externalities and unattended effects.

Recommendations

- Drought adaptation policies should consider potential interactions with other socio-ecological events affecting farmers.
- Drought adaptation policies should target the institutional capacity of irrigation organizations.
- Effort should be invested in promoting farmers' proactive strategies in the advent of drought.
- Effort should be invested in better understanding and helping overcome barriers to adaptation in irrigation systems dominated by *ejido* land.

Dr. Gustavo García López is a Marie Curie post-doctoral fellow at the Institute of Environmental Sciences and Technology Autonomous University of Barcelona. His work focuses on community-led and collaborative governance of the commons and socio-ecological movements associated with the protection and recovery of the commons. As a grant holder, this project was supervised by Drs. Juan Robalino and Roger Madrigal.

For further information and other LACEEP funded projects, please access: <http://www.laceep.org>

“This project is a collaborative effort by LACEEP and EFD-CA (Environment for Development Initiative Central America Center) at CATIE (Centro Agronómico Tropical de Investigación y Enseñanza); and CEDE (Center of Economic Development Studies) at the University of Los Andes, Colombia; with financial support from IDRC’s Climate Change and Water program (CCW).”