United Nations Educational, Scientific and Cultural Organization

CERSHI Regional Centre for Water Security Under the auspices of UNESCO

ONLINE CONFERENCE IWRA 2020

Groundwater governance in Guanajuato, Mexico: towards an effective regulation of the Penjamo-Abasolo aquifer.

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Theme 4: Groundwater Governance, Management and Policy.

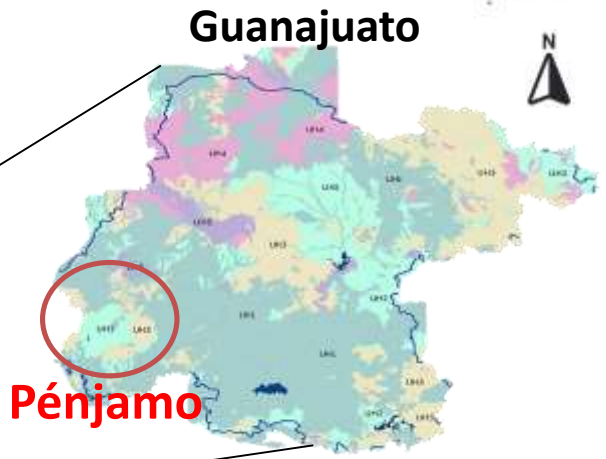
Purpose

Analyze the Mexican **governance system** to identify the elements that inhibit a **sustainable management** of the Penjamo-Abasolo aquifer, discuss a **management plan and to enact a regulation** to enforce its implementation.

Penjamo-Abasolo is one of the most critical aquifers in Mexico

Groundwater experiences the **tragedy of the commons.**

Source: Sistema Nacional de Información del Agua, CONAGUA, 2020
http://sina.conagua.gob.mx/sina/



18 aquifers
14 overexploited

Abstraction: 4000 Mm^3
Recharge: 2236 Mm^3

20,000 deep wells
260,000 ha of irrigation

Key issues

Penjamo-Abasolo is a critical aquifer

- **Intense groundwater use for agriculture.**
  - 550 Mm^3/yr abstracted to irrigate 84,000 ha.
  - Pumping head of 200 m and decreasing water levels of 3 m/yr.
  - Efficiency of irrigation systems less than 50 per cent.
- **Natural and artificial recharge.**
  - Compaction and soil erosion in critical aquifer recharge zone.
  - Artificial recharge has not been implemented.
- **Natural and anthropogenic pollution.**
  - High concentration of NO_3, SO_4, As, Cl, Fe, F.

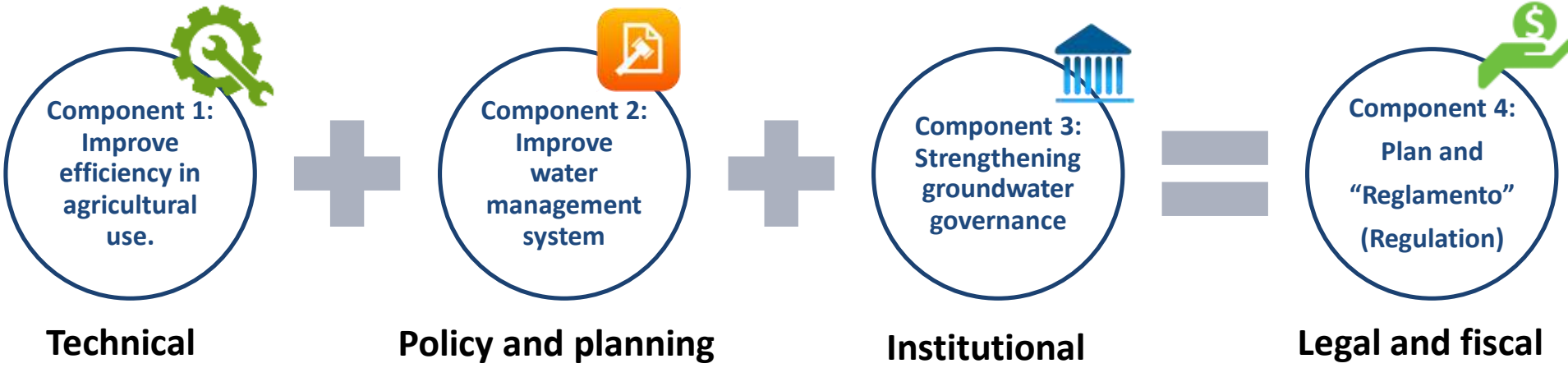
Key issues

Penjamo-Abasolo aquifer

- **Groundwater governance.**
  - Sustainability is not a priority in public policies.
  - No specific budgets for aquifer monitoring and management.
  - Institutional framework centralizes decision-making in federal agencies and limits local governments and user participation (COTAS) in planning and management.

- **Administrative system.**
  - Public Registry of Water Rights (REPDA) reflects neither well positioning nor real abstraction volumes.
  - Aquifer information system needs to be improved to get more credibility among all stakeholders.

Approach


Component 1: Improve efficiency in agricultural use.
Component 2: Improve water management system
Component 3: Strengthening groundwater governance
Component 4: Plan and "Reglamento" (Regulation)
Technical
Policy and planning
Institutional
Legal and fiscal

Four component approach

Technical

Component 1: Improve efficiency in agricultural use.

Maintain or increase production, agricultural employment and water use efficiency. More crop per drop.

Policy and planning

Component 2: Improve water management system.

Achieve sustainable use trough abstraction control and real time monitoring of pumping levels (blockchain and Internet of Things).

Institutional

Component 3: Strengthening groundwater governance.

Reach agreement among all stakeholders to enact a groundwater regulation document and update aquifer model as a decision-making tool.

Results and conclusions for critical aquifers

Component 4: Update the Penjamo aquifer plan and enact regulation

- Transfer the subsidy for electricity “tariff 9” to fund hydrogeological studies and aquifer monitoring and create an abstraction right for irrigation similar to the one used in industry to support efficient water use.
- Strengthening water users participation.
- Update decision support systems including groundwater numerical models.
- Establish a deadline to have a plan and the regulation act to balance withdrawals and recharges in a maximum of 20 years.

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