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Summary Workshop 2: “Water Resources Management in Agriculture and Ecosystems to Improve Climate-Extreme Resilience in Mexico and the USA”

Fall 2023 Workshop at Casa de la Universidad de California

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Objectives

In this two-day workshop the project team aimed to reconvene project partners to: 1) reflect on the insights that emerged from the inaugural project workshop in November 2022; 2) present progress on the various case studies around the four research thrusts, 3) obtain feedback from workshop participants on refining research questions to inform policy recommendations.

1. Resilient Communities

Participants: John Williams (moderator), Marina Mautner (SEI), Jeanette Cobian (UC Merced), Laura Ponce (Ecosur). For presentations access [here \(provided approval\)](#)

Progress: most participants of this group met in this event for the first time so the discussion was focused on new research ideas.

Specific issues and needs:

- Lack of effective fire alert and prevention
- Ways to establish a better understanding and communication with communities from their experience and history
- Needs assessment to face and interact with fire: solidarity, risks, action, prevention
- Resilient communities review:
 - Culture, honesty, hope, joint efforts
 - Climate resiliency: droughts, floods, fires. Socio-environmental responsibility
 - Local community definition of “resiliency” and action associated to it.
 - Including social experts
 - Learning from community historical or ancestral adaptations
 - Technology-based adaptations for Mexico and California.



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Research/Policy Thrusts identified and Potential products:

- i. Access to technological tools to prevent and mitigate fire events and effects.
- ii. Development of mechanisms to facilitate support to communities (“jump the hurdle”)
- iii. Two pages survey for needs assessment in communities (group)
- iv. Cartography interpretation in Meseta Comitec Tojolabal (Chiapas) (group)
- v. Seeking funds for meetings among community committees in charge of Fire Cultural Management (Sep 2024, Laura-Jeanette)
- vi. PRONACOSE: Open mic interview in December: inform about local necessity to adapt local needs to increase resiliency to droughts (Sam-Dante)
- vii. Field day in Copalita river’s Basin (Norma-Sam)
- viii. Outreach through radio/TV spots by local broadcast media in native tribe’s languages (Mexico) and Spanish (California) (Laura-Jeanette-Samuel-Norma).
- ix. Training on Fire Behavior to Fire Fighter Brigades in protected natural areas of Chiapas and California (Laura-Jeanette)
- x. Working on two scientific articles for publication and at least one for UNESCO chairs (Laura, Norma, Jeanette, Sam, Dante)
- xi. Working on academic articles:
 - o Frontiers in Climate: outreach products description
 - o International Journal of Wildland Fire: Cultural use of Fire, multidisciplinary approach.

2. Climate Data Science

Participants: John Abatzoglou (moderator), Carlos Patino (UDLAP), Rene Lobato (IMTA), Sam Sandoval (UC Davis). For presentations access [here](#) (provided approval)

Progress: two on-going case studies were discussed.

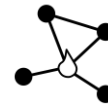
Specific issues and needs:

- Variability in precipitation and evapotranspiration in SW US and NW Mexico suggest research opportunities: Intra and interannual hydroclimate variability changes over the past decades:
 - o Aspects of surface water budget have detectable changes in variability
 - o Changes consistent with anthropogenic climate change?
 - o Can the changes be explained by internal climate variability?
- Climate Observations,Forecasts, Impacts



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- Unmet needs and partnering on funding:
 - What pressing hydroclimate information and risk information is needed but not widely available in Mexico?
 - What funding opportunities exist to partner in expanding the Climate Toolbox into Mexico and incorporating specific needs?
- Understanding of climate extremes and trends (i.e. pp is declining and temperatures rising)
- Drought forecasters can be improved by studying drought indicators: PP, temperature, soil moisture, vegetation, ET
- Including tools in hydroclimatic models: most reliable models for water resources management.
- Access to geographic and water data (quality and quantity)
- Increase resiliency for water supplies and communities
- Colorado River – Water Quantity, Quality and Economic Analysis
 - Water salinity and its effects on soil salinity
 - Research opportunities in Colorado river estuary
 - Impacts of population growth in Colorado river basin (Phoenix, Utah, etc.).
- Rio Grande – Rio Bravo: Resilient Flow Regimes

Research/Policy Thrusts identified and Potential products:

- i. Binational Seminar or Workshop on “Climate Toolbox”: Tech tool that describes past, present and future. Objectives: discussion about pros and cons of the tool, and opportunities to implementing it in Mexico (data collection).
- ii. Proposal: Expansion of University supported climate services through Alianza:
 - a. Growing need to increase access and usability of climate information to improve climate readiness today, tomorrow, and decades into the future
 - b. Corporate world rapidly filling this gap, but often lacks knowledge on climate/hydro and is interested in profits over democratization of information
 - c. Can we leverage infrastructure and lessons with the Climate Toolbox by partnering with knowledge experts in Mexico to offer services into Mexico??
- iii. Catedra UNESCO: joint collaboration for publishing journal articles (Journal “Entorno”, Bulletin, Blogs).
- iv. Tech Tool to provide climate services focused on agricultural management to support farmers decision making.
- v. Use different outreach spaces or means to inform: Blogs, videos, webpages, infographics, etc. on academic platforms and/or Alianza’s
- vi. Scientific papers and policy briefs (i.e. Frontiers on “Water Security”):
 - a. Flood management and correlation analysis between floods and economical losses.
 - b. Reliable multi-scale geographic and hydrological datasets to increase resilience to water scarcity



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3. Groundwater Sustainability

Participants: Tom Harmon (moderator), Francisco Flores (DWR), Graciela Herrera (UNAM). For presentations access [here](#) (provided approval)

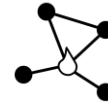
- **Progress:** MAR Playbook Case study (UCM-UNAM)
- **Specific issues and needs:**
 - MLRP implementation and possible tech tool for aquifer recharge: evaluate feasibility and chances of success
 - Identify MLRP suitability features
 - Identify data and create maps for features
 - Understand stakeholders priorities
 - Add cost-benefit analysis
 - Effects of MAR on water quality: uncertainty?
 - Empowering communities to monitor domestic well water
 - Aquifer overdraft in both, CA and Mexico: practices and strategies must be designed according to particular local conditions in order to be successful
- **Research/Policy Thrusts identified and Potential products:**
 - i. Catedras Conahcyt (Dr Herrera)
 - ii. MAR Playbook: continuous work on a “Live” document that is fed by new experiences and knowledge. Next steps
 - iii. Papers and Policy briefs:
 - Methodologies and protocols
 - Include special issue in Frontiers “Water Security” (Tom Harmon)
 - iv. Academic exchange (Mario Hernandez and Graciela Herrera visiting UC Merced on Feb 2024)
 - v. Book with four Alianza’s core groups as chapters
 - vi. Pilot project on artificial aquifer recharge in native communities (Manatiales, Mexico)

4. Integrated Water Management



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Participants: Marc Beutel (moderator), Leopoldo Mendoza (UABC), Aldo ramirez (TM). For presentations access [here](#) (provided approval)

Progress: Case study (UCM-UABC) Article “Achieving Responsible Reclaimed Water Reuse for Vineyard Irrigation: Lessons from Napa Valley, California and Valle de Guadalupe, Baja California” final review for submission to Frontiers in Water

Specific issues and needs:

- Water issues in Guadalupe (Mendoza-Beutel-Hansen):
 - Water scarcity
 - Cities produce large amounts of wastewater
 - Water quality is variable due to lack of reliable treatments

- Lessons from Napa: same issues and wastewater treatment and use in agriculture but 40 years ago.
- Key questions to implement water reuse:
 - No information on emerging contaminants that could affect grape quality
 - Effect of reclaimed water on soil composition
 - Large volumes of water
 - Social, economic and legal aspects no addressed yet.
- Empowering communities to monitor domestic well water
- Aquifer overdraft in both, CA and Mexico: practices and strategies must be designed according to particular local conditions in order to be successful
- Infrastructure for water storage and distribution in Monterrey (A. Ramirez):
 - Assessment of climate threats and water supply vulnerability
 - Studying and evaluating plans and policies that have failed to meet results as expected
 - Needs to estimate operation cost, water rates, technical feasibility and optimization of methodologies to transport and store water
 - Aquifer monitoring in Monterrey: no recovery reported when they switc to surface water

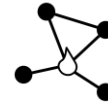
- Research/Policy Thrusts identified and Potential products:

- i. Water reuse in winegrapes: (Dr Mendoza)
 - Determination of quality of treated water according to Mexican legislation
 - Determination of 5 emerging contaminants of concern
 - Comparison of water quality standards (Tijuana and California)



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- Establishment of a pilot scale irrigation scheme in Guadalupe
- Assess potential accumulation of contaminants in soils
- Assess legal, economic and social aspects in Guadalupe and compare to California's
- Policy brief: proposed strategies to secure viability and sustainability of the water reuse scheme.
- Oxygenation in Bravo valley: implement technique in water bodies as a sustainable mechanism to purify water

ii. Water infrastructure

- Optimizing operation and sources
- Conducting hydrogeological studies to enhance the understanding of groundwater flow systems
- Developing strategies for reducing surface and groundwater pollution
- Promoting decentralization of wastewater treatment and reuse
- Implementing demand management programs that effectively promote water conservation
- Promote the use of technology and innovative schemes in all subsectors
- Evaluating the possible redistribution of water resources with the agricultural sector and incorporating new water supply sources, the recovery, treatment, and conveyance of water from agricultural returns, and desalination.
- Developing an anthropogenic urban drought index
- Mission of above: delivering tools to decision makers and the population

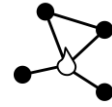
Working plan for each research group

- Scheduling a group meeting with all interested Workshop participants in that particular research group led by the participants of each technical session.
- Group will meet to discuss a working plan, including timeline with activities and deliverables
- Among the outcomes of the meeting are:
 - List of products and deliverables to work on.
 - List of specific roles for group members
 - Timeline
 - Identify location(s) for each project (if applies)
 - Schedule biweekly meetings for follow up



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