INTERNATIONAL CALL

TO IDENTIFY 23 UNSOLVED HYDROLOGICAL PROBLEMS IN LATIN AMERICA AND THE CARIBBEAN

The Water Security Head Office of the Mexican Institute of Water Technology (IMTA) and the UNESCO Chair in Sustainable Water Security at the Institute of Environment at Florida International University, in collaboration with the Regional Coordination for Latin America and the Caribbean (LAC) of the International Flood Initiative (IFI).

CALL FOR

Researchers, experts, academic groups, research centers, and water professionals to participate in the identification of the 23 Unresolved Hydrological Problems in Latin America and the Caribbean. The scientific agenda of this initiative aims to promote applied research, technical cooperation, and regional knowledge generation to address water challenges.

Objective

To bring together a multidisciplinary scientific community to discuss and identify the 23 main hydrological problems contextualized to the present water, climate, social, political, and environmental reality of the LAC region, through the engagement of *Thematic Working Groups*.

Motivation

The article *Twenty-three Unsolved Problems in Hydrology* https://doi.org/10.1080/02626667.2019.1620507 was written with the participation of 205 researchers, mainly from North America and Europe. Only three participants from the LAC region were invited. The aim of the present initiative is to revisit the spirit of this article carrying out an analysis from the perspective, reality, and context of the LAC region.

¿Who participates?

- Researchers from the LAC region with experience in hydrology, climatology, modeling, water management, climate change, public water policies, hydrological ecology, and related areas.
- Higher education institutions, research centers, government agencies, and international organizations with a presence or interest in the LAC region.
- Young researchers and graduate students with institutional support.
- International researchers with work carried out in the LAC region.

Procedure

To facilitate coordination between countries and institutions, it is proposed to start with thematic groups to identify an initial list of problems. Subsequently, the necessary rounds of meetings will be held until the 23 unresolved problems for the LAC region are identified. The methodology to be used is based on the approach proposed by Hilbert, D., (1902) https://www.ams.org/journals/bull/1902-08-10/S0002-9904-1902-00923-3/. The groups will be led by a specialist from Mexico as the host country and by a specialist from the LAC region.

Schedule

Activity	Date
Call for applications launched	November 1, 2025
Deadline for registration of participating researchers	December 1, 2025
Publication of list of members by topic	December 15, 2025
Methodological training for focal points	January 2026
First phase: start of activities of thematic working groups	February 2026
Second phase: presentation of partial results and consolidation of groups	May 2026
Third phase: presentation of partial results and consolidation of groups	Jun 2026
Plenary presentation of results	July 2026
Submission of manuscript to selected journal	August 7, 2026
Expected date of publication of article	December 2026

Expected results

i. Identification of 23 hydrological problems in the LAC context.
ii. Formation of collaborative networks by thematic areas.
iii. Publication of a scientific paper with all participants in this call.
iv. Joint scientific dissemination publications; by topic, by region, and by results.
v. Technical documents and public policy proposals for the LAC region.
vi. Strengthening of regional capacities.

How to apply?

Interested candidates should send an email to: **proyectoslac@tlaloc.imta.mx** with the following information (*free format*):

1. Full name / Institution / Area of research-specialty
2. Country / Thematic group of interest
3. One-page biography
4. Motivation / Brief outline of hydrological problems in your region

General Coordination

Alfonso Gutierrez	Water Security Head Office, Mexican Institute of Water Technology, Mexico. IFI-LAC Regional Coordination
Maria Donoso	UNESCO Chair on Sustainable Water Security Director, Institute of Environment, Florida International University, USA
Fernando Nardi	Department of Civil Engineering and Computer Science, University of Rome Tor Vergata, Italy
Roberto Pizarro	UNESCO Chair Surface Hydrology, University of Talca, Chile. Faculty of Forestry and Nature Conservation Sciences, University of Chile.
Francisco Peña*	International Committee Association of State Floodplain Managers, USA ** Will be the corresponding author for the publication of the paper*

Thematic Task Group Management

Patricia Herrera	Director of Mexican Institute of Water Technology, Mexico
Olivia Rodriguez	Mexican Institute of Water Technology, Mexico
Susana Ortega	Mexican Institute of Water Technology, Mexico
Fernando Zetina	Mexican Institute of Water Technology, Mexico
IFI-LAC	Regional Group of the International Flood Initiative

Manuscript preparation logistics

Edith Bonilla	Aqua-LAC PHI-UNESCO Journal, Mexico-Uruguay
Felix Aguilar	UNESCO Chair for Water Resources Sustainability, Guatemala
Carlos Paoli	National Water Institute, Santa Fe, Argentina
José Vargas	University of Concepción, Chile (*in retreat*)

Methodological coordination

Luis Alfaro	Regional School of Sanitary Engineering and Water Resources (ERIS), University of San Carlos, Guatemala
Ivan Gonzalez	Mathematics Department. Faculty of Engineering, Autonomous University of Queretaro

Follow-up on activities and accreditations LAC

Kevin Contreras	Mexican Institute of Water Technology , IMTA

Follow-up on activities and accreditations beyond the LAC region

Rosalinda Monreal	Mexican Institute of Water Technology , IMTA

Promotion and logistics of virtual meetings

Indira Franco	UNESCO-IMTA Chair Water in the knowledge society

Marco A. Sanchez UNESCO-IMTA Chair Water in the knowledge society

Thematic Groups

1. Water and agriculture: irrigation, drainage, and food security
2. Transboundary water: binational and trinational watersheds and international cooperation
3. Water quality, emerging contaminants, and water treatment
4. Open science, citizen science, data ethics, media, and education
5. State of water resources in coastal areas, deltas, estuaries, and saline intrusion
6. Cryosphere: snow, glaciers, and permafrost
7. Hydrological data and big data: infrastructure, metadata, catalogs, assimilation, and fusion
8. Urban drainage, stormwater management, and SuDS
9. Ecohydrology, eco-engineering, and environmental flow
10. Economics, financing, and management tools
11. Slope stability and landslides
12. Hydrological extremes and compound events
13. Disaster risk management, multi-hazard analysis, and forensic hydrology
14. Water governance, regulations, and laws
15. River hydraulics, sediments, and morphodynamics
16. Hydropower
17. Forest hydrology
18. Tropical hydrometeorology: cyclones, storm surges, and coastal flooding
19. Uncertainty, water balances, data series, and multi-criteria metrics
20. Interfaces and groundwater: coupling (surface-groundwater), karst, recharge, and management
21. Floods: generation, propagation, and losses
22. Hydrological processes: rainfall-runoff and erosion-sedimentation. Watershed conservation and restoration
23. Hydrological modeling: physical, conceptual, bio-inspired, hybrid, and AI
24. Hydrometeorological prediction, climate variability and change scenarios, and post-processing
25. Dams, dam safety, and decommissioning
26. Resilience and post-disaster socio-psychological scenarios
27. Droughts: onset, persistence, propagation, and impacts
28. Remote sensing: remote sensors, aerial-satellite imagery, radar, drones, and LiDAR
29. Spatial variability and scaling
30. Temporal variability, non-stationarity, and stochastic modeling of time series

Who among us would not be tempted to lift the veil behind which is hidden the future; to gaze at the coming developments of our science and at the secrets of its development in the centuries to come?

Hilbert, 1900