SPAIN'S WATER CYCLE DIGITALISATION PERTE:

A MODEL FOR LOWER AND MIDDLE-INCOME COUNTRIES

Spain's PERTE for the Digitalisation of the Water Cycle ("Water PERTE") is a pioneering initiative to modernise water management through technology-driven, coordinated public policy. Combining public and private investment, cross-level government collaboration, and performance-based incentives, it offers a comprehensive model for digital transformation that goes beyond infrastructure to include cultural change, institutional capacity-building, and territorial cohesion.

GUSTAVO SALTIEL, STRATEGIC ADVISER FOR WATER SUPPLY AND SANITATION

JEAN-MARTIN BRAULT, SENIOR WATER AND SANITATION SPECIALIST, WORLD BANK

IÑIGO ZÁRRAGA LÓPEZ-QUILES, WATER SUPPLY AND SANITATION CONSULTANT, WORLD BANK

The PERTE for the Digitalisation of the Water Cycle (Water PERTE) aims to transform water management in Spain through the implementation of digital solutions. This program represents an innovative public policy model that offers valuable lessons for the Development Finance Institutions and Lower and Middle-Income Countries (LMICs).

★ *A public policy model for water digitalisation*. The Water PERTE exemplifies how governments can design and implement comprehensive national digitalisation programs backed by important financial resources. Its integrated approach involves coordination across government levels (national, regional, and local) and collaboration with the private sector and other stakeholders. It also establishes performance-based incentives and matching funds mechanisms, which warrant ownership by beneficiaries.

★ *Financing and investment mechanisms*. The Water PERTE mobilises public and private funds, facilitating investments in digital technologies. Its financing model, combining NextGenerationEU funds with national government and private resources, offers insights into designing sustainable funding schemes to accelerate sector transformation in other contexts.

★ *Use of digital technologies in water management*. This program promotes the deployment of digital tools such as smart sensors, predictive models, artificial intelligence, and digital twins to improve water management and utilities efficiency. Spain's strategies provide key learnings on data interoperability and technological standards in the water sector.

★ *Lessons learned and implementation challenges*. The PERTE also offers insights into institutional barriers, resistance to change, capacity gaps, and data integration challenges. These lessons are useful for designing digitalisation strategies in countries with lower technological and regulatory development in water management.

Spain's Water PERTE is a relevant case due to its combination of public-private financing, technological innovation, and a structured public policy approach. Its experience can serve as a valuable reference for countries aiming to enhance water efficiency, modernise infrastructure, and strengthen resilience to climate change through digital transformation.

The PERTE for the Digitalisation of the Water Cycle aims to transform water management in Spain through the implementation of digital solutions

Lessons for water sector development in LMICs

Spain's Water PERTE experience provides important lessons for water sector transformation and institutional development. These include:

Comprehensive integration. Successful transformation requires integrated approaches that address infrastructure, institutional, economic, and social dimensions simultaneously rather than pursuing sectoral improvements in isolation. The synergies created through comprehensive approaches generate greater impact than the sum of individual components while building institutional capacity for continued development.

★ *Adaptive management*. Static program designs are inadequate for complex transformation challenges that require continuous learning and adaptation based on implementation experience and changing circumstances. Successful programs build in systematic learning mechanisms, stakeholder feedback systems, and adaptive policy development capabilities that enhance effectiveness while maintaining strategic coherence.

★ *Incentives architecture*. Transformation success depends critically on incentives structures that address multiple levels of motivation—financial, professional, institutional, and social—while balancing efficiency and equity objectives. It should be noted that incentives that address intrinsic motivation through professional development, recognition, and contribution to meaningful change are oftentimes equally powerful as financial rewards.

Gustavo Saltiel

Jean-Martin Brault

Iñigo Zárraga López-Quiles

The PERTE's integrated approach involves coordination across government levels and collaboration with the private sector and other stakeholders

The PERTE offers insights into institutional barriers, resistance to change, capacity gaps, and data integration challenges

- ★ *Cultural transformation*. Technical solutions and financial resources provide necessary but insufficient conditions for sustainable transformation. Cultural change management, professional development, and innovation culture creation prove essential for generating lasting transformation that extends beyond immediate project implementation to encompass continued adaptation and improvement.
- ★ *Institutional development*. Strategic transformation programs must prioritise institutional capacity building that creates lasting capability for continued development and adaptation rather than temporary project implementation capacity. Investment in human capital, organisational systems, and coordination mechanisms generates long-term benefits that support sustained transformation and competitive advantage.
- ★ *Territorial cohesion*. Successful transformation programs must address regional development disparities and ensure that benefits reach all areas and communities rather than concentrating in economically advantaged or technologically sophisticated locations. Enhanced support for small municipalities, rural areas, and disadvantaged communities is essential for achieving comprehensive transformation and social equity.

A programmatic approach to digitalisation of the water cycle in LMICs

The Water PERTE experience demonstrates that digital transformation or acceleration is achievable when countries commit to comprehensive approaches that address the full complexity of technological transformation while building institutional capacity and cultural change that support sustained advancement. Preparation of a program reflecting PERTE principles should first address institutional capacity, policy frameworks, and stakeholder readiness while building the foundation for effective implementation and sustained transformation. Administrative capacity evaluation should assess government capability for complex program management, multi-stakeholder coordination, performance monitoring and evaluation, and financial management and accountability systems.

A programmatic approach to designing a digitalisation program reflecting PERTE principles could be structured around a series of phases, whose length and content would depend on the specific context.

The initial implementation phase would create the incentives for participation through demonstration of government commitment, provision of immediate technical and financial support, recognition of early adopters and innovation leaders, and building of professional networks and communities of practice that provide ongoing value and support. This phase would develop basic digital capacity and demonstrate feasibility while building stakeholder confidence and political support for continued development and expansion. Institutional establishment creates dedicated program management capacity with clear authority and adequate resources while building coordination mechanisms and stakeholder engagement systems.

As program implementation progresses, institutional development and sophistication would build advanced capability for complex program management while creating a foundation for continued transformation and leadership development that support sustained advancement and international contribution.

Scale-up phases would then provide incentives for excellence and innovation through competitive funding for advanced projects, recognition for transformational leadership and best practice development, opportunities for knowledge sharing, and support for technology development and commercialisation that create lasting competitive advantages.

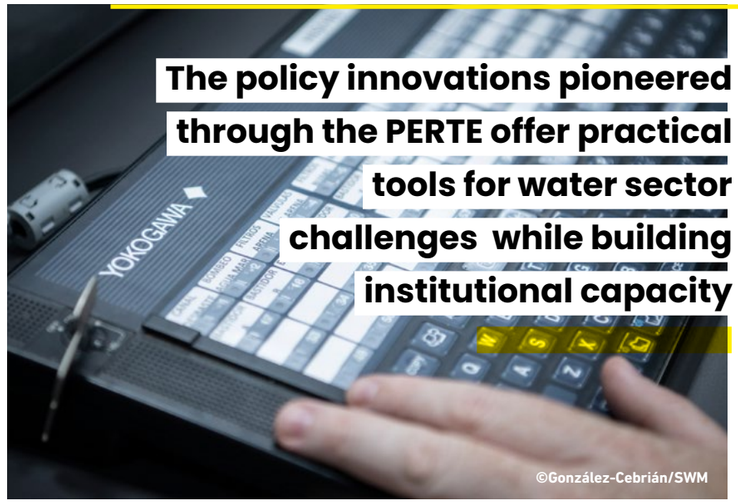

©González-Cebrián/SWM

A new paradigm for water sector transformation

The policy innovations pioneered through the Water PERTE, namely performance-based resource allocation, adaptive implementation through evolutionary learning, organisational culture transformation, and comprehensive territorial development, offer practical tools for addressing water sector challenges while building institutional capacity for continued adaptation and improvement.

One of the Water PERTE's most important contributions is the demonstration that successful transformation requires incentive structures that address different levels of motivation while balancing efficiency and equity objectives through carefully designed financial, professional, institutional, and social rewards.

While the Water PERTE's success and challenges provide important lessons for countries seeking to develop digital transformation programs, a careful analysis of its replication potential in LMICs is needed. Direct replication may not be feasible or appropriate given fundamental differences in institutional capacity, resource availability, and development context that characterise LMIC environments. LMICs typically face governance systems with limited experience in complex program management, making sophisticated coordination mechanisms difficult to implement effectively. Technical expertise gaps require systematic capacity-building approaches that address both immediate implementation needs and long-term institutional development. Financial management capabilities often need strengthening before handling sophisticated blended finance mechanisms that combine multiple funding sources and performance-based disbursement systems. Political economy dynamics in many LMICs emphasise short-term visible results over long-term institutional development, creating pressure for rapid implementation that may compromise sustainability and effectiveness. Resource constraints limit both the scale of initial investment and the capacity for ongoing operational support that digital infrastructure requires.



Successful LMIC adaptation requires a comprehensive framework development that preserves the Water PERTE's transformative potential while addressing capacity constraints and resource limitations through carefully designed modifications and enhancements. Implementation timelines should allow adequate time for capacity building, institutional development, and quality implementation while maintaining momentum and political support through visible progress and stakeholder engagement. Programmatic approaches -such as those envisaged under the World Bank's Multiphase Programmatic Approach (MPA)s- would enable systematic learning and adaptation while managing complexity and risk through staged scaling that builds capability and confidence.

Institutional development strategies should emphasise capacity building that addresses both immediate program needs and long-term transformation requirements through systematic approaches that build lasting capability rather than temporary project implementation capacity. Simplified coordination mechanisms avoid complex inter-governmental arrangements while ensuring adequate oversight and strategic coherence.

The incentive structure for LMIC implementation should balance transformation ambitions with realistic capacity and resource constraints while creating powerful motivation for participation and excellence that supports both immediate implementation and long-term sustainability. Financial incentives should emphasise equity while requiring ownership and accountability. Higher subsidies for small municipalities and rural areas—potentially reaching 90-100%—would ensure universal participation, while capacity-based co-financing requirements would create appropriate accountability without excluding eligible participants.

The implementation roadmap developed through the Water PERTE experience—foundation building, scaling and integration, innovation leadership—provides practical guidance for designing programmatic approaches that phase transformation efforts while building institutional capacity and maintaining political support through visible progress and stakeholder engagement.