UfM WATER AGENDA 2030

STRATEGIC FRAMEWORK REPORT

DIGITAL TRANSFORMATION OF WATER SECTOR: STRATEGIC PLANNING AND CAPACITY DEVELOPMENT

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Contents

Executive summary

The Mediterranean region faces a critical water crisis that threatens its economic stability, environmental sustainability, and social cohesion. More than 180 million people currently experience water poverty, and 60 million live under severe water stress. The situation is exacerbated by climate change, rising population numbers, and deteriorating infrastructure.

The framework emphasizes regional cooperation and promotes collaboration and collective efforts to manage water resources. A unified digital strategy using shared data platforms, coordinated early-warning systems, and joint capacity-building efforts will improve transparency while building stronger political trust.

The strategic vision of this framework consists of a digitally empowered Mediterranean water sector that combines data management, technological advancements, and governance systems to protect regional water resources. The framework's goals are:
- Enhance water governance and information access through digitalization.
- Build adaptive capacity for water resilience.
- Promote regional capacity building activities.

The chapter on financing and investment explains how digitalization efforts can be supported through sustainable funding methods. The framework presents existing funding channels alongside climate adaptation funds and possible national budget allocations. The document also reviews different types of funding to identify their potential benefits.

The framework outlines specific regional action steps which will serve as guidance for implementation. The framework proposes establishing a regional financing working group using existing Union for the Mediterranean (UfM) mechanisms, such as the Regional Policy Working Group (RPW), Water Finance Working Group (WATFIN WG), and Water-Energy-Food-Ecosystems for the Mediterranean (WEFE4Med). This group would coordinate investments and lead a multi-year training initiative to build capacity. The document also promotes the Mediterranean Community of Practice for sustained peer learning and innovation activities. The framework suggests "pair" learning exchanges to help countries accelerate the implementation and application of practical knowledge.

The framework proposes the following regional actions:
1. **Explore integrating a regional financing dialogue on digitalization into existing UfM mechanisms,** such as WATFIN WG or RPW to align with their current mandates on financing and digital transformation.
2. **Consider leveraging existing platforms (e.g. UfM, RPW, WEFE WG, WATFIN WG)** to facilitate coordinated engagement with international donors and financiers on shared digital water priorities.
3. **Explore the development of a regional training programme** that may include foundational and advanced digital skills workshops in areas such as Internet of Things (IoT) based monitoring, Geographic Information Systems (GIS), data analytics, and cybersecurity.

4. **Consider options to establish and facilitate a UfM digital water Community of Practice (CoP)** that will promote regular exchange through virtual events, expert forums, and resource sharing.
5. **Explore opportunities for regional "pair" learning exchanges** that could involve peer-study visits where countries collaborate on evaluating and supporting digital transformation progress, with lessons disseminated across the region.

To illustrate the diverse progress and tailored national strategies across the region, the following country-by-country facts highlight the most important current digitalization efforts, scaling approaches, and policy integrations. While the regional strategy applies to all UfM member states, the country-specific assessments were only conducted for Mediterranean riparian countries, plus Jordan, North Macedonia, Mauritania, and Portugal.

- **Albania**: Digital water initiatives focus on piloting IoT leak detection and smart meters in a few utilities, with plans to scale nationally through the European Union's (EU) pre-accession funds.
- **Algeria:** Early-stage IoT pilots target major urban centers, aiming for broader rollout via national budgets and climate financing. Updates to national Artificial Intelligence (AI) strategies align digitalization with new water governance frameworks.
- **Bosnia and Herzegovina:** The SMARTWATER project promotes cloud-based and IoT solutions in agriculture, with strong university-led collaborations. These efforts align with the national agricultural development strategy and leverage EU candidate status.
- **Croatia:** The digital twin implementation in Zagreb is driving national momentum and a municipal consortium and EU funding support it.
- **Cyprus:** Projects like the OCEANOS digital twin in Limassol and ZENON early warning in Larnaca highlight tailored solutions for a water-scarce island context. These are coordinated through KIOS Research and Innovation Center partnerships and integrated into national digital and municipal plans.
- **Egypt:** AI-driven smart irrigation pilots in the Nile Delta focus on optimizing water and nutrient use. These efforts are coordinated with the farming unions and the Ministry of Agriculture and are integrated into Vision 2030 and the National Water Resources Plan 2037.
- **France:** The strong innovation ecosystem supports nationwide smart water technologies, with INNOV EAU providing dedicated support for digitalization projects.
- **Greece:** The digital twin project in Kozani stands out as an excellent example, supported by research partnerships and EU recovery funds and integrated into national resilience plans.
- **Israel:** Advanced cybersecurity solutions like SigaGuard protect water infrastructure, complemented by machine learning-based anomaly detection. Supported by the Israel Governmental Authority for Water and Sewage (Israel Water Authority), these initiatives are integrated into critical infrastructure laws and regional cooperation frameworks.
- **Italy:** IoT sensor deployment across utilities is driven by partnerships like Italgas-TaKaDu and reinforced by the Italian Regulatory Authority for Energy, Networks and Environment (ARERA) regulatory incentives. Integration is prioritized through the National Recovery and Resilience Plan and regulatory reforms. Among the most advanced initiatives, the Digital Twin project developed by AUBAC provides a real-time, geo-referenced digital replica of the river basin, supporting continuous monitoring,

predictive analytics, and integrated risk management for water resources and territorial protection.

- **Jordan:** Jordan's digital water transformation is driven by the National Water Strategy (2023–2040) and supported by a robust donor landscape. Key projects include Supervisory Control and Data Acquisition (SCADA) system upgrades, a national water information platform, and performance-based digital tools to reduce non-revenue water.
- **Lebanon:** The expansion of digital billing and Enterprise Resource Planning (ERP) systems continues despite economic difficulties and is supported by international aid, which is integrated into the national water strategy.
- **Malta:** The near-universal smart meter coverage sets a regional model. Ongoing partnerships with SUEZ Group support long-term operations and policy integration through the National Energy-Water Nexus Policy.
- **Mauritania:** Projects in the Senegal River Basin, including Geographic Information Systems (GIS) databases and 5G drone monitoring, demonstrate innovation under arid conditions. Coordinated with basin organizations, these are integrated into the National Digital Transformation Agenda and regional frameworks.
- **Monaco:** Digital water management in Monaco is integrated into the national Extended Monaco smart governance agenda. Universal access and advanced infrastructure provide a strong foundation for real-time monitoring, smart metering, and digital drought response.
- **Montenegro:** Digital monitoring projects like SMART-Water for Lake Skadar and EU-funded wastewater digitization drive progress, coordinated through regional partnerships and integrated with the EU accession roadmap.
- **Morocco:** AI demand forecasting and solar-powered water management systems highlight strong national leadership, supported by the National Office of Electricity and Drinking Water (ONEE)-African Development Bank (AfDB) partnership. These initiatives align with the national digital strategy focused on Africa-Mediterranean technology leadership.
- **North Macedonia**: The implementation of cybersecurity projects continues to grow in accordance with Network and Information Systems (NIS) 2 Directive compliance while supporting national protection of critical water infrastructure.
- **Palestine:** Smart metering and GIS pilots are gradually expanding, integrated into a national digital roadmap and supported by international partners.
- **Portugal**: Portugal has made substantial progress in digitalizing its water sector, leveraging strong infrastructure, advanced tools like digital twins, and a supportive regulatory framework.
- **Slovenia:** The deployment of IoT devices continues to progress under the Digital Slovenia 2030.
- **Spain:** The Strategic Project for the Recovery and Economic Transformation (PERTE), with a multi-billion-euro investment, is funding the digital transformation of the water cycle through grants that support digital twins, smart metering, AI, and data platforms in both large cities and smaller municipalities.
- **Tunisia:** Smart water networks are being developed at the national level through the support of renewable energy integration and climate finance, which are feeding into the national smart water strategy.

- **Türkiye:** IoT network deployments in Istanbul illustrate rapid urban digitalization, coordinated through municipal partnerships and supported by the National Smart Cities Strategy.

1 Introduction and context

The Union for the Mediterranean (UfM) recognizes the importance of digitalization in the water sector in order to address present challenges and efficiently manage resources. In the Mediterranean region, more than 180 million people are affected by water poverty, and 60 million are under water stress. These problems are also exacerbated by existing issues, such as poor management of the water resources and climate change, which put increasing pressure on the region's water resources.[1]

In response to these challenges, the UfM is developing a strategic framework for digital transformation to enhance the capacity of UfM countries to implement digital solutions effectively. This initiative is aligned with the UfM water agenda that aims at improving capacities for implementing digital solutions in the water sector, specific to each participating country.[2]

Water scarcity and mismanagement are critical threats to socio-economic welfare and stability and environmental sustainability in the Mediterranean. These challenges are worsened by climate change through increasing water vulnerability, rising frequency of droughts, floods and extreme weather events. Digital transformation can offer innovative solutions to address these threats by promoting smart water management, real-time monitoring and predictive analytics to optimize resource distribution.

Currently, the adoption of digital technologies in the Mediterranean region is uneven, with several countries pioneering digitalization in the water sector, facing institutional, governance, financial and infrastructural barriers. This strategic framework supports the digitalization effort by establishing a regional approach that supports UfM member states in developing tailored digital transformation pathways based on their specific needs, capacities and policy environments.

A structured digitalization transformation approach enhances efficiency in water management, improves coordination among different stakeholders and fosters evidence-based decision-making. The framework guides policy integration, capacity building, financial innovation and governance coordination, ensuring a holistic and inclusive approach to digitalization in the water sector.

2 The case for regional cooperation on digitalization and water transformation

2.1 Overview

Water resources management conditions in the Mediterranean countries are quite diverse, from both a physical and an institutional perspective. A cooperative approach to digitalizing water resources management would have multiple benefits, including the creation of opportunities for joint solutions, learning from neighboring experiences, and potentially sharing data. For instance, during Storm Daniel in 2023, Italy and Slovenia successfully

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[1] Union for the Mediterranean. (2023). Annual report 2023. https://ufmsecretariat.org/wp-content/uploads/2024/05/Annual-Report-2023_Digital.pdf

[2] Aboelnga, H. T. (2024). Digital transformation for water and sustainable development: Final report. Union for the Mediterranean

exchanged real-time flood data via interoperable warning systems, enabling rapid deployment of emergency services and flood control operations. This highlighted the importance of cross-border digital integration in mitigating climate risks.

Algeria and Spain have decided to jointly promote a process, in association with the countries of the 5+5 Dialogue, to develop a water strategy for the western Mediterranean basin (WSWM). The aim of this strategy is to promote sustainable water use at local, regional and national levels, through the adoption of cross-cutting goals, management criteria and operational objectives, in order to harmonise water policies in the Mediterranean.[3]

In the eastern Mediterranean, the SmartWater2020 pilot (in Greece and Cyprus) demonstrated effective regional collaboration on digital water management. Led by the University of Cyprus's KIOS Research and Innovation Center, the project deployed smart monitoring technologies, including sensors, valves, and digital meters alongside an integrated early-warning software platform. These systems supported real-time leak detection and pressure management, and were implemented in cooperation with Greek municipal utilities, highlighting practical cross-border cooperation in Supervisory Control and Data Acquisition (SCADA) integration and smart infrastructure for water loss reduction.[4]

The Union for Mediterranean (UfM) Water Agenda underscores that aligning national actions with a regional digital strategy can enhance water governance and data sharing.[5] By combining each country's resources and knowledge, the Mediterranean countries can develop interoperable systems such as shared drought early-warning platforms or regional water information networks that benefit the entire region. Additionally, the Mediterranean countries can participate in collective capacity building activities (e.g., regional training hubs or exchange best practices) that can help level up the capacity of the region to confront the water challenges. A unified approach enables countries to secure better funding opportunities and negotiate improved terms for technology transfer. For individual countries, digitalization means improved efficiency in water management, reduced operational costs, and enhanced data accuracy for policy and planning. It empowers national agencies to respond more rapidly to droughts or floods, optimize water allocation, and improve service delivery to citizens. Moreover, digitalization tools can attract international investments and technical support, strengthening each country's resilience and economic competitiveness.

In short, the Mediterranean region can achieve faster digital transformation through regional cooperation, as it creates economic advantages while strengthening commitments for an interconnected water system. The framework promotes a collaborative approach, envisioning the Mediterranean countries as a unified community of practice working together to achieve sustainable management of the water sector.

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[3] Mediterranean Network of Basin Organisations (MENBO). (n.d.). *5+5 Water Strategy for the Western Mediterranean (WSWM)*. REMOC. Retrieved July 29, 2025, from https://remoc.org/wswm/wswm.html

[4] Foundation for Research and Technology – Hellas, Institute of Computer Science (FORTH-ICS). (n.d.). *SmartWater2020: Smart water networks for loss reduction (completed project)*. Signal Processing Laboratory. Retrieved July 29, 2025, from https://spl.ics.forth.gr/research/projects/completed/smartwater-2020.html

[5] European Union Neighbours South. (2024, January). Digital transformation for water sustainable development in the Mediterranean. https://south.euneighbours.eu/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf

2.2 Strategic vision

A digitally empowered Mediterranean water sector needs to combine technology, data and governance in order to achieve sustainable water management and regional cooperation. In this envisioned future, real-time information analytics will support informed decisions. At the same time, water systems are developed with "climate resilience" in mind in order to combat the effects of climate change.

The framework sets several goals that support the UfM Water Agenda:

- **Goal 1: Enhance water governance and information access through digitalization.** The framework promotes the strengthening of policies, institutions and data governance so that digital tools can improve decision-making, and accountability in water management and achieve Sustainable Development Goal (SDG) no. 6.
- **Goal 2: Build adaptive capacity for water resilience.** The framework promotes digital solutions, including Internet of Things (IoT) sensors and Artificial Intelligence (AI) and predictive models, that will help anticipate and respond to water-related risks, including droughts, floods and climate change.
- **Goal 3: Promote regional capacity building activities.** The framework promotes a step-by-step capacity building plan focused on water digitalization.

2.2.1 Goal 1: Enhance water governance through digitalization

Good governance is the backbone of digital water transformation. The institutional framework, together with legal guidelines and monitoring systems, enables secure and effective integration of new technologies. This goal requires ministries to enhance water governance through policy and regulatory updates, which support digital tool implementation, in line with the national circumstances and policies The establishment of data governance frameworks represents a key action that defines data ownership rights, sharing protocols, privacy measures and interoperability standards to support secure data exchange among local and national agencies and across international borders. Countries need to review their water laws to see if their current strategies support digital innovations. Digitalization initiative accountability requires governance reforms to establish clear institutional roles for the new information systems, e.g. recognizing electronic metering data in regulatory compliance, binding commitments for data sharing, including transboundary water dialogue in accordance with national laws and mutually agreed protocols.

Governance cooperation at the regional level requires the alignment of policies whenever possible. For example, UfM states are encouraged to align on common data standards for water information systems and adopt compatible cybersecurity norms. The alignment with the best international practices will simplify technology transfer and integration processes. Another aspect is inclusive governance: engaging all stakeholders (e.g. utilities, farmers, civil society, tech providers), as appropriate, in planning and overseeing digital programs is a critical step since it will ensure that diverse needs and priorities are addressed from the outset, leading to greater acceptance, ownership, and long-term sustainability of digital initiatives. The implementation of participatory digital governance models through stakeholder forums and public data portals helps build transparency and trust. This goal promotes a policy environment that supports innovation and, at the same time, protects public interests. Inclusive governance frameworks should explicitly incorporate gender and youth representation in decision-making processes. Engaging women and young professionals in governance and data oversight

structures can enhance transparency, ensure diverse perspectives, and improve public trust in digital water initiatives.

2.2.2   Goal 2: Build adaptive capacity for water resilience

Modern infrastructure acts as the driving force behind the digitalization of the water sector. The goal of implementing new technologies is to enable countries to establish and enhance their digital platforms required for smart water management systems.

The essential components of this goal include:

- **Smart water devices:** The installation of smart water devices, including IoT sensors, smart meters and telemetry systems. Real-time data collection through these systems can improve the decision-making process.
- **Data systems, analytics and Artificial Intelligence:** Establishing robust data platforms, GIS-based information systems and advanced analytics tools to transform the newly generated data into actionable insights. This includes cloud databases, modeling software (e.g., digital twins of utilities or aquifers) and interactive dashboards for operators and policymakers. Countries will also need to integrate AI and machine learning (ML) to analyze large datasets and remote sensing information (e.g., satellite or drone imagery) for forecasting consumption, predicting leaks or failures, optimizing irrigation and planning maintenance. These AI-powered tools help utilities save money by targeting investments more precisely and avoiding unnecessary repairs, while enabling faster, more informed decisions. For example, Artificial Intelligence-based prediction models can recommend proactive maintenance schedules that prevent catastrophic failures and reduce emergency repair costs.
- **Cybersecurity:** Water infrastructure protection from digital threats requires cybersecurity measures to be implemented. Interconnected systems become vulnerable to cyberattacks. Each country needs cybersecurity protocols that follow broader critical infrastructure protection rules (such as the European Union's Directive on security of network and information systems).

2.2.3   Goal 3: Promote regional capacity building activities

Even the best technology is futile without human capacity to use and maintain it. The main objective of this goal involves developing digitalization skills of water professionals, utility staff, engineers and decision-makers from the Mediterranean region.

An initial capacity building program for 2025-2026 will be developed and initiated by UfM´s "Digital Transformation of Water Sector: Strategic Planning & Capacity Development" consultant. The program is structured around six core modules, as shown in Figure 1, covering both foundational and advanced digital skills. The capacity building program will also provide guidance for medium- and long-term actions. During June-December 2025, the program will focus on understanding the strategic governance of AI in water management.

During January-December 2026, training emphasis will shift toward providing knowledge for embedding digital approaches into national systems, knowledge for establishing structures like digital water units and training future trainers. Advanced training modules will cover aspects of AI analytics, cybersecurity, digital twin technology and smart irrigation systems.
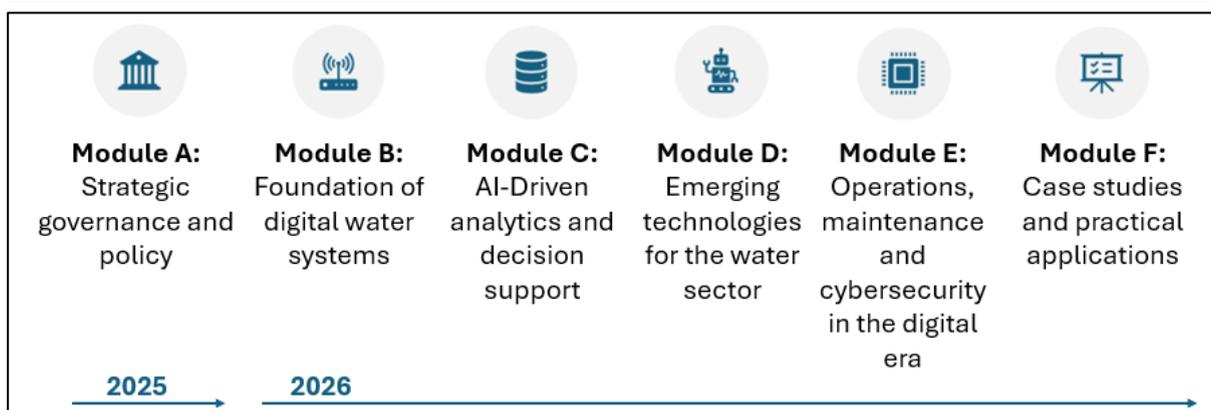
Figure 1: Capacity building modules

Following the initial trainings and under the framework of the capacity building program the countries are encouraged to continue building their capacities as needed, as well as to expand their cooperation and coordination, and move from pilots to widespread deployment of digital solutions, including scaling AI-powered decision support tools, rolling out national-level digital water strategies, harmonizing processes, and integrating cross-border data sharing mechanisms. Approaches should be relevant and empowering, considering the various tiers of involved people from farm-level to decision makers. The UfM will encourage and promote regional cooperation through its existing mechanisms, including the Regional Policy Working Group.

> **Countries are encouraged to engage in the dedicated Community of Practice (CoP) on digitalization. This CoP functions as a knowledge-sharing and capacity-building mechanism, bringing together practitioners, policymakers, and technical experts from across the Mediterranean countries. The platform can be used for technical mentorship, facilitate peer-to-peer learning and document lessons from early adopters. The CoP, focused on water digitalization, embedded within the WEFE4Med platform (https://wefe4med.eu/wefe/home), ensures integration with ongoing efforts on Water-Energy-Food-Ecosystems Nexus implementation. The dedicated section on digitalization serves as a collaborative hub for case studies, tools, guidance documents, and stakeholder exchanges, helping countries adapt and scale effective digital water solutions.**

3 Finance for investments in digitalization

3.1 Funding sources and the need for a finance strategy

A mix of funding sources is required in order to support the digital water transformation in the Mediterranean region. This approach minimizes the risk of overreliance on a single funding stream and financial shortfalls during implementation and also expands the "pool" of financial resources for investments.

- **Public budgets** - The public sector and public investment plans can provide foundational support for infrastructure and technology upgrades. The majority of the UfM countries will need to allocate budgetary resources or integrate digital water needs into national water investment plans.

- **Internally-generated financial resources -** Water utilities that improve cost recovery can reinvest the surplus into digital and maintenance tools. For example, in countries with cost-reflective tariffs (e.g. some EU members), the water companies can self-fund their digital upgrades.

- **Grants from development and climate funders -** Utilities where tariffs don't cover costs often require external funding for their projects. Climate finance is increasingly relevant, with global funds such as the Green Climate Fund and Adaptation Fund that can be involved in projects that can boost climate resilience through digital water management. Regional dialogues have concluded that climate change requires additional investments in water management.

Private sector capital can be leveraged via loans, bonds and other financing instruments. These are financial resources that will need to be repaid (with interest). When the appropriate guarantees or incentives are in place, local banks and regional investors have started financing water projects. For example, in Jordan, a consortium of 24 local banks (managing around $73 billion in assets) provided approximately $1.4 billion to finance over 700 water projects over five years.[6] This illustrates how blending public support with private finance can mobilize significant capital for water innovation.

Each country is encouraged to map financial resources potentially available through the different funding sources and financing mechanisms and create a finance strategy that closes the finance gap by controlling costs, maximizing synergies between funding sources, and mobilizing private finance, controlling costs, maximizing synergies between funding sources, and mobilizing private finance. Investment planning should also integrate internationally recognized safeguard standards.

> **A key aspect is leveraging European Union financial instruments. Programs like InvestEU 2, the Recovery and Resilience Facility (which has supported water digitalization in countries like Cyprus and Spain), Horizon Europe and the Partnership for Research and Innovation in the Mediterranean Area (PRIMA) initiative offer significant opportunities for grants, loans and guarantees for digital water projects. For example, Spain's water cycle digitalization program Strategic Project for Economic Recovery and Transformation (PERTE) depends largely on funding from Next Generation European Union. Through the Africa Adaptation Acceleration Program countries like Mauritania can obtain essential funding to develop water systems that will resist climate change.**

3.2 Innovative financing models and mechanisms

Given the need for large investments needed to support the digital transformation of the water sector in the Mediterranean, the financial benefits of achieving the digital transformation, and the limits to potential increases in funding from the three finance sources (public budgets, tariff revenues, and development and climate grants), it is worth exploring the potential to mobilise repayable finance to undertake those investments by engaging non-traditional partners in the

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[6] Union for the Mediterranean Secretariat (UfM). (2021, June). UfM Water Investment Report [PDF].
https://ufmsecretariat.org/wp-content/uploads/2021/06/UfM-Water-Investment-Report.pdf

digital water agenda. By diversifying financing models and mechanisms, UfM countries can accelerate investment in digital solutions.

Public-Private Partnerships (PPPs)

The water sector benefits from PPPs because they enable private investors to contribute resources and capabilities to develop projects with specific performance requirements. A PPP enables private firms to finance digital solution implementations, such as smart metering and wastewater treatment upgrades, by recovering costs through long-term contracts and participating in shared savings models. Some UfM countries are piloting this approach. For example, Tunisia recently established its first water-sector PPP in 2023 - a partnership between the national sanitation utility (ONAS) and a private operator (France's Suez) to modernize wastewater services for nearly one million residents.[7] Likewise, Israel's national water company, Mekorot, has partnered with a tech startup to deploy AI-based infrastructure monitoring, improving efficiency and energy savings.[8]

Impact investment and social bonds

Impact investments and social impact bonds focus on investments that produce measurable environmental and social impact together with financial gain. Projects that use digital water solutions present strong investment potential because they can reduce water losses while improving community service delivery. The clear advantages of this approach (e.g. water saved, emissions reduced) can make projects attractive to the financiers. Several Mediterranean utilities have already seen success with green bonds for water infrastructure, which could be extended to digital projects, e.g. 50% of Egypt's green bond is allocated to water investments.[9]

Blended finance

Blended finance combines public or donor funds with private financing to reduce risk and improve project bankability. In practice, this could mean using grants or concessional loans from international donors to co-finance a project alongside commercial lenders or investors. The public portion can absorb initial risks or offer guarantees, making the venture attractive to private capital. A regional example is Jordan's approach of using government guarantees to spur domestic banks to invest in water projects.

Similarly, the EU and bilateral donors often use blending facilities to top-up loan-funded projects with grant components (for equipment, technical assistance, or risk insurance). This approach can be replicated for digital water initiatives. Each UfM country will be encouraged to identify digital pilot projects that could benefit from blended finance and to engage platforms like the EU's InvestEU or Multi-Partner Trust Funds dedicated to water/climate.

Results-based financing

Results-based financing (RBF) is an innovative model where disbursement of funds is contingent on achieving predefined results or performance targets. In the water sector, this

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[7] Suez. (2024). Suez and National Office of Sanitation Tunisia sign Tunisian water industry first private partnership [Press release]. https://www.suez.com/en/news/press-releases/suez-and-national-office-sanitation-tunisia-sign-tunisian-water-industry-first-private-partnership

[8] Smart Energy. (2025). Israeli firms co-develop unique water monitoring system. https://www.smart-energy.com/regional-news/africa-middle-east/israeli-firms-co-develop-unique-water-monitoring-system/

[9] Union for the Mediterranean Secretariat (UfM). (2023, October). Water Finance Report 2023 [PDF]. https://ufmsecretariat.org/wp-content/uploads/2023/10/WaterFinance_Report_2023_num4-06.pdf

could take the form of output-based aid or incentive payments for utilities that meet digital transformation benchmarks. For example, a donor could commit grant funds that are released only when a utility installs a certain number of smart sensors or achieves a 10% reduction in non-revenue water through digital leak detection. Such schemes ensure money is spent effectively and encourage focus on outcomes. By tying funding to results, countries can attract grant funding from climate and innovation sources that emphasize accountability.

3.3 Proposed national strategies for mobilizing investment in digital water transformation

National efforts to attract finance for digital water transformation require both deliberate and strategic approaches:

1. **Countries should establish national digital water investment roadmaps** to define essential projects, funding requirements and specify available financing options. These roadmaps should be in line with the overall national development plans, water sector master plans, and water sector finance strategies.

2. **The project preparation and financial management skills of water ministries**, regulatory bodies, and utilities need to be continuously improved through capacity building. A strong economic model, risk assessment and procurement skills for digital technology solutions are required.

3. **Investors, both public and private, are more likely to commit funds** when there is a stable, transparent and supportive policy and regulatory framework. A stable framework includes rules about data ownership, data sharing, cybersecurity standards and licensing procedures for new technology products and innovative financing models such as PPPs.

The digital water infrastructure development stages are shown in Figure 2.
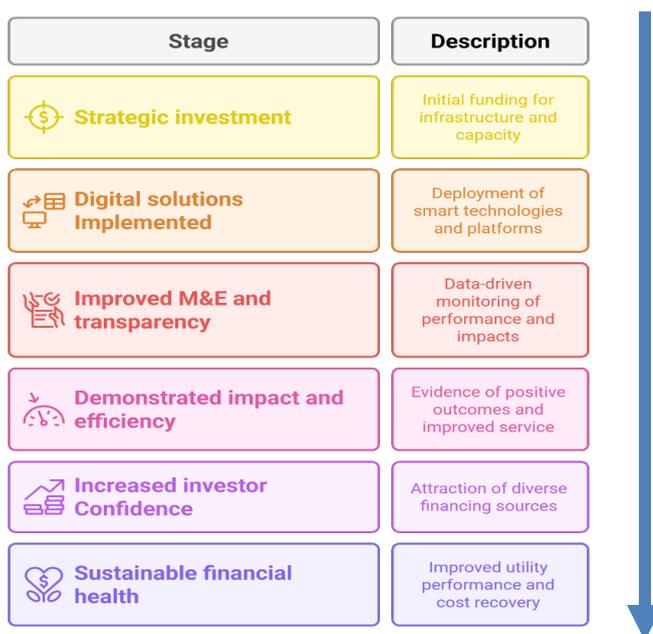

Figure 2: Digital water infrastructure development stages

4 Direction for regional action agenda

This section provides direction for the translation of the strategic vision, goals and analytical discussions of the preceding sections into a concrete set of regional and national priorities. It outlines suggestions for key actions designed to guide the Union for the Mediterranean (UfM) member states towards a more digitally empowered, efficient and resilient water future. These directions for actions form the core of the proposed implementation strategy, guiding a pathway for achieving the framework's objectives over the coming years. The emphasis is on collaborative effort, leveraging regional strengths while supporting tailored national initiatives.

The directions for the regional action agenda provide a supportive and harmonizing framework for national efforts, focusing on areas where regional joint action yields greater impact. These actions are directly linked to the framework's main pillars: enhance governance through digitalization, build adaptive capacity for water resilience and promote capacity building activities.

The following paragraphs highlight proposed key regional action elements that may be utilized and considered in country-specific as well as regional action planning.

Directions for key regional actions (2025-2027):
1. **Explore integrating a regional financing dialogue on digitalization into existing UfM mechanisms**

This direction aims to strengthen strategic coordination and resource mobilization for digital transformation by utilizing existing UfM structures such as Water Finance Working Group (WATFIN WG) and Regional Policy Working Group (RPW). UfM can explore how to integrate financing discussions within these platforms, aligning efforts with the current mandates on water sector investment and digital transformation. This would enhance regional visibility of funding needs and support better alignment of donor and country priorities.

2. **Consider leveraging existing platforms to engage international donors and financiers**

UfM, RPW, Water Finance Working Group and the Water-Energy-Food-Ecosystems (WEFE) Working Group already serve as important convening spaces. These platforms could be used strategically to engage donors and international financing institutions in joint dialogues focused on shared digitalization water priorities. By facilitating more regular and structured interaction, UfM member states could benefit from improved alignment of international support, identification of co-financing opportunities, and early feedback on project pipelines.

3. **Explore the development of a medium and long-term regional training programme**

A regional training programme could help address capacity gaps by offering both introductory and advanced workshops on key digital water competencies. Potential focus areas include IoT-based monitoring, Geographical Information Systems (GIS) tools, data analytics, and cybersecurity. The training could be delivered in phases, starting with awareness-building and basic technical skills, followed by deeper content on digital integration, system design, and maintenance (as outlined in the 6-module framework - Figure 1).

4. **Consider options to establish and facilitate a UfM digital water Community of Practice**

A digital water Community of Practice could serve as a regional mechanism for continuous learning, knowledge exchange, and peer support. Hosted on an existing platform such as Water-Energy-Food-Ecosystems for the Mediterranean (WEFE4Med), the Community of Practice may include an online portal, expert-led forums, documented case studies, practical tools, and mentorship opportunities among practitioners. It could also provide a focal point for capturing regional experiences, promoting innovation and supporting scaling efforts by connecting technical actors and policy stakeholders across countries.

5. **Explore opportunities for regional "pair" learning exchanges**

Countries at different stages of digital transformation may benefit from structured information exchange formats. "Pair" learning exchanges could involve experts from one country working with counterparts in another to assess digital progress, co-design implementation steps, and share lessons from practice. These exchanges can be linked to the Community of Practice and supported through short-term technical missions, virtual dialogues or regional events. Capturing and sharing these experiences across the region could help build momentum and foster replication of successful approaches.

All regional initiatives, including pilot projects and peer learning exchanges, should prioritize gender and youth inclusion by ensuring balanced participation and fostering leadership among underrepresented groups. To support this, a dedicated initiative such as a "Women and Youth in Digital Water" platform could be developed to mirror successful models like the energy sector's "Women in Energy" network. This platform could provide structured mentorship, targeted training in digital water technologies, early-career fellowships and dedicated slots in regional events or technical working groups. It could also maintain a regional roster of qualified women and youth professionals to facilitate their engagement in project design, implementation and policy dialogue. The platform could be embedded in an existing regional structure, such as the Community of Practice.

The current state and proposed future pathways of water sector digitalization across the Mediterranean countries are presented through a detailed country-by-country matrix in Annex I. This table captures each country's baseline context, key digitalization projects, possible scaling strategies, stakeholder interactions, and integration into national policy frameworks. The table presents how different countries handle digitalization through their unique approaches while showcasing shared challenges and opportunities, reflecting both regional cohesion and national specificity.

5 Overview of national water digitalization contexts and ongoing initiatives

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
Albania	Fragmented water infrastructure with 50% water losses and European Union (EU) accession-driven reforms. Digital transformation efforts focus on select utilities with limited nationwide implementation.	Internet of Things (IoT) leak detection pilots in select utilities, including automatic remote reading of smart meters in 5 out of 58 former individual water utilities.	Expand IoT and smart meter coverage to all major utilities through Public-Private-Partnerships and EU pre-accession funding.	Partnerships with foreign donors for digitalization investments in major utilities. Technical assistance through EU integration programs.	National Water Strategy alignment with European Union's Water Framework Directive requirements.
Algeria	Centralized water governance with aging infrastructure and significant water challenges. Digital transformation initiatives are emerging through strategic partnerships.	DIO-ELECTRONIC IoT pilot for leak detection.	Gradual replication of the success in additional major cities through national budget and international climate financing mechanisms, with detailed city-specific rollouts.	Partnerships with technology providers for IoT deployment. Collaboration with climate finance institutions for scaling initiatives.	National AI Strategy integration with water sector priorities. Water law updates to accommodate digital governance frameworks.
Bosnia and Herzegovina	A fragmented governance structure with an agricultural focus through EU-funded initiatives. SMARTWATER project promotes smart technologies in agricultural water management.	The SMARTWATER project promotes cloud-based and remote sensing technologies in agricultural water management. IoT soil moisture sensors deployment across multiple farms.	Scale the project via partnerships with local universities and leveraging EU agricultural modernization funds.	University of Banja Luka coordination with international partners including The Spanish National Research Council and Instituto Superior de Agronomia from Portugal.	Integration into the national agricultural development strategy. EU candidate status is being leveraged for continued funding and technical assistance.
Croatia	Post-earthquake infrastructure modernization is necessary due to 42% water losses. Zagreb water network	Zagreb digital twin implementation by Hidroing for a 3,500 km water network serving 900,000	Implement similar digital twin models in Split, Rijeka and other key cities, coordinated by a municipal consortium and	Municipal utility consortium formation for shared experiences.	National Recovery and Resilience Plan integration with water digitalization priorities.

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
	represents one of the world's oldest systems requiring digital transformation.	people. Digital solutions reduced project completion time from 36 to 20 months.	funded through European Union Recovery and Resilience funds.		European Union funding mechanisms leveraged for systemic transformation.
Cyprus	Water scarcity challenges with heavy reliance on desalination and tourism pressure. Small island state dynamics require specialized digital solutions.	OCEANOS digital twin system for Limassol's drinking water network in collaboration with the local government.\n\nZENON early warning system for Larnaca's sewerage network.	Scale digital twin solutions across all major municipalities through collaborations with KIOS Research Center and international resilience projects such as Solid Preparedness Aad Resilience for Robust Operations during disaster Wilderness (SPARROWEU).	KIOS Research Center partnerships with municipal governments.\n\nInternational collaboration through SPARROWEU project for resilience enhancement.	National digitalization strategy integration with water sector priorities.\n\nMunicipal digital transformation roadmaps aligned with national frameworks.
Egypt	Nile-dependent water system with an agricultural focus and smart irrigation initiatives. Vision 2030 emphasizes AI integration in water management.	AI-driven automated irrigation systems for crop optimization.\n\nSmart irrigation pilots in Nile Delta governorates are focusing on specialized water and nutrient plans.	Expand smart irrigation via mobile app deployment, with Ministry of Water Resources and Irrigation oversight and farmer association engagement.	Farmers' unions' engagement for technology adoption.\n\nThe Ministry of Water resources and Irrigation coordinates nationwide scaling.	Vision 2030 integration with agricultural digitalization priorities.\n\nNational Water Resources Plan 2037 alignment with smart irrigation expansion.
France	Well-established water agency system with a comprehensive digital ecosystem. Leading position in water sector innovation and AI integration.	AI-driven leak detection systems with high accuracy rates.\n\nThe INNOV EAU fund supports innovation projects in water technology startups.	Promote nationwide deployment across six regional water agencies, supported by the INNOV EAU fund and public-private partnerships.	Water agency consortium agreements for technology standardization.\n\nPublic-private partnerships through innovation fund mechanisms.	Water Framework Directive updates incorporating AI standards.\n\nNational digital strategy alignment with water sector transformation goals.
Greece	Tourism pressure creates seasonal water demand with 26% annual losses.	DEYAK's digital twin achieves a 50% reduction in leak response time using OpenFlows technology.	Rollout similar digital twins nationally, supported by National Technical University of Athens (NTUA) research	National Technical University of Athens collaboration for research and development support.	National Recovery and Resilience Plan integration mandates digital twins for major utilities.

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
	Municipal Enterprise for Water Supply and Sewerage of Kozani (DEYAK) utility leading technological advancement through digital twin implementation.	Comprehensive 3D network mapping and Supervisory Control and Data Acquisition (SCADA) system integration.	partnerships and financed through the EU Recovery Fund.	Municipal utility partnerships for knowledge transfer and implementation.	European Union Water Framework Directive compliance through technological advancement.
Israel	Semi-arid climate with cybersecurity leadership in water infrastructure.

Near-universal smart meter coverage with sophisticated protection systems. | SigaGuard deploys its cybersecurity system across water utilities to protect against cyber-attacks.

Advanced electrical engineering and machine learning for anomaly detection. | Export cybersecurity model and expertise to Mediterranean partner countries through the Israel Water Authority and regional cooperation frameworks. | Israel Water Authority partnerships with technology providers. | Critical Infrastructure Protection Law updates incorporating water cybersecurity requirements.

Regional cooperation frameworks for technology transfer and expertise sharing. |
| Italy | The water sector is highly fragmented, with over 2,500 utilities and 42% water leakage rates.

High fragmentation among stakeholders, increasing hydro-climatic risks, and the need for continuous water balance and predictive planning across the Central Apennines Basin. | The Italgas-TaKaDu partnership is implementing IoT sensors across 270 km of network, serving 30,000 customers.

Development of a geo-referenced Digital Twin platform integrating remote sensing (RS), GIS/BIM, hydrological-hydraulic modeling, AI, and immersive visualization (VR/MR) for monitoring and forecasting. | Scale IoT deployment nationwide to all water utilities through dedicated Italian Regulatory Authority for Energy, Networks and Environment (ARERA) regulatory incentives and National Recovery and Resilience Plan (PNRR) funding.

Modular architecture allows replication across other Mediterranean districts; potential federation among basin authorities; standardization of data interfaces via WEFE4Med CoP. | ARERA regulatory framework supporting digital transformation through incentive mechanisms. Technology provider partnerships for nationwide scaling.

Involves Basin Authority, Civil Protection, Regions/Municipalities, irrigation consortia, utilities, universities, and research centers; multi-actor coordination and data sharing agreements. | The National Recovery and Resilience Plan (PNRR) prioritizes water sector digitalization. Regulatory reforms are encouraging utility consolidation and technology adoption.

Aligned with PNRR and national AI strategy; potential regulatory incentives from ARERA; supports open-data, cybersecurity (NIS2), and interoperability standards (INSPIRE, DCAT-AP IT). |

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
Jordan	The water sector is marked by scarcity, high non-revenue water losses (up to 50%), and uneven digital maturity. Transition toward digitalization is underway with urban utilities adopting SCADA systems and digital monitoring tools, while rural areas remain underdeveloped.	Deployment of SCADA systems and smart metering infrastructure, digital customer platforms, National Water Information System (NWIS), and data governance frameworks to improve efficiency and transparency.	Phased national digital rollout through public–private partnerships and donor-backed investment; targeting full integration of smart tools in all major utilities by 2040, aligned with the non-revenue water reduction targets.	Strong collaboration with international development banks; partnerships with local universities and the private sector for capacity building and innovation support.	Digital transformation prioritized in National Water Strategy 2023–2040. Supported by the National Digital Transformation Strategy, Data Classification Policy, and forthcoming sector-specific digital regulations.
Lebanon	Economic crisis is impacting the water sector with 40% non-revenue water. Institutional challenges affecting comprehensive digital transformation efforts.	Set up centralized data management and integrated hydrological information system (IHIS) at the Ministry. Develop protocols and procedures for the digital transfer of data from meteorological stations, hydrometric stations and groundwater monitoring stations to the Ministry's data center. Expand the network of stations, including meteorological, hydrometric, and groundwater monitoring stations, to cover resources across.	Expand digital billing and ERP systems through international aid and coordinated implementation by the Ministry of Energy.	Ministry of Energy coordination for sector-wide implementation.	National Water Sector Strategy 2024-2035, incorporating digital transformation priorities. International cooperation frameworks supporting capacity building and technology transfer.
Malta	Achieved 96% smart meter coverage, driven by tourism and seasonal demand. Small	250,000 smart water meters were deployed using SUEZ ON'connect technology,	Maintain smart meter coverage above 95% and license technology regionally, supported	SUEZ technological partnership for long-term operations and	National Energy-Water Nexus Policy development leveraging smart meter success.

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
	island state serving as a regional model for water digitalization.	achieving comprehensive coverage. Advanced demand management and billing accuracy improvements.	by SUEZ long-term partnerships and regional cooperation agreements.	maintenance. Regional cooperation agreements for knowledge sharing and technology transfer.	
Mauritania	Senegal River Basin focus with arid climate challenges. National Digital Transformation Agenda emphasizing water sector innovation.	Senegal-Mauritania Aquifer Sustainable Management project with GIS and database development. 5G drone deployment for water level monitoring and precision irrigation.	Scale the technology via collaboration with Senegal River Basin Organization and national digital transformation funding.	Senegal River Basin Organization and the Gambia River Basin Organization.	National Digital Transformation Agenda 2022-2025: Integration with Water-Energy Nexus Priorities. Regional cooperation frameworks supporting Sahel digital leadership development.
Monaco	Highly developed urban water infrastructure with universal access to safely managed water and sanitation. Strong integration with French systems and advanced digital oversight mechanisms for drought and consumption management.	Implementation of real-time monitoring, digital dashboards, and smart irrigation controls. Introduction of smart meters and automated systems for consumption and wastewater treatment control.	Expansion of digital tracking systems and smart meters; integration into the Extended Monaco smart governance platform; leveraging public funds and international technology partnerships for scaling innovation.	Partnerships with Veolia and other international operators; active collaboration with European and international institutions for technical exchanges.	Digital water management aligned with national Extended Monaco initiative; regulatory frameworks based on EU standards for data protection and operational transparency; integrated into strategic drought and environmental planning.
Montenegro	EU candidate status driving digital transformation.	SMART-water cross-border project for Lake Skadar monitoring. European Union-funded wastewater digitization in major municipalities.	Replicate smart monitoring across all major municipalities leveraging European Union accession funds and regional SMART-Water project coordination.	Regional partnerships through SMART-Water project coordination.	EU accession roadmap alignment with digital infrastructure requirements.
Morocco	Office National de l'Electricité et de l'Eau Potable (ONEE) leadership in digitalization with significant solar potential for water-energy	Artificial Intelligence demands forecasting implementation in major cities, including Casablanca.	Expand Artificial Intelligence and solar technology to additional cities.	ONEE-AfDB strategic partnership for technology integration.	National digitalization strategy emphasizing Africa-Mediterranean technology transfer leadership.

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
	integration. African Development Bank (AfDB) partnership supporting technological advancement.	Integrating solar-powered water management systems across multiple regions.			
North Macedonia	EU accession alignment with robust digital infrastructure and cybersecurity enhancement. NIS 2 Directive compliance driving water sector digitalization.	Cybersecurity in Water Services Management project enhancing critical infrastructure protection.	Nationally implement digital twins for critical water infrastructure by complying with the Network and Information Systems (NIS) 2 Directive.	Municipality of Kavadarci collaboration for pilot implementation.	NIS 2 Directive compliance requirements driving comprehensive cybersecurity frameworks.
Palestine	Geopolitical constraints are affecting the comprehensive implementation with 40% non-revenue water. Focus on gradual technology deployment and capacity building.	Smart metering pilots are being implemented in West Bank municipalities. GIS mapping systems for asset management and planning.	Incremental expansion to Gaza and additional municipalities based on political and technical feasibility, guided by the Palestinian Water Authority and international partners.	Palestinian Water Authority coordination with international development partners.	Water Sector Digitalization Roadmap development, incorporating incremental scaling approaches.
Portugal	Since the 1990s, Portugal has transformed its water sector from fragmented, under-resourced municipal systems into a modern network with over 95% urban coverage and high service standards.	Key digitalization projects include the deployment of smart meters, IoT sensors for leak detection and quality monitoring, and the development of digital twin systems like Porto's integrated urban water management platform.	Scaling strategies are driven by national plans such as the National Strategic Plan for the Water Supply, Wastewater, and Stormwater Management Sector 2030 and initiatives like "Água que Une," which focus on widespread adoption of digital tools and connection of regional systems.	Stakeholder interactions are broad, involving national and regional governments, The Portuguese Water and Waste Services Regulation Authority, the Águas de Portugal group, municipalities, private operators, and universities.	Digitalization is embedded in strategic plans for water and the environment and cross-referenced with national digital and climate strategies.

Country	Baseline context	Key digitalization projects	Scaling strategy and pathways	Stakeholder interactions	Integration into national policy
Slovenia	Digital Slovenia 2030 strategy with a strong environmental focus and flood resilience.	Smart building water management integration demonstrating nexus approaches.	Nationwide IoT sensor deployment through the Digital Slovenia 2030 strategy, coordinated by the Ministry of Environment.	Ministry of Environment coordination for integrated water information systems.	Digital Slovenia 2030 framework integration with water sector digitalization priorities and regional cooperation leadership.
Spain	Global leadership in water digitalization through the Strategic Project for the Recovery and Economic Transformation (PERTE) program.	GoAigua platform deployment in Valencia and multiple municipalities.	Financing via PERTE calls ensures balanced coverage across urban and rural municipalities.	The Iberian Water Alliance was formed for cross-border cooperation.	PERTE program institutionalization ensures long-term commitment and systemic transformation across autonomous communities.
Tunisia	24% energy costs in water operations are driving efficiency initiatives. The Société Nationale d'Exploitation et de Distribution des Eaux (SONEDE) leadership in smart network development with climate finance support.	Sousse-Monastir smart water network pilot with Green Climate Fund backing.	Nationwide smart meter rollout leveraging pilot success, driven by SONEDE's renewable energy integration commitment.	SONEDE is the main stakeholder.	National smart water strategy development based on Sousse-Monastir pilot success and scaling framework.
Türkiye	Rapid urbanization driving digitalization needs with national coordination. Digital Transformation Office leadership supporting cross-sectoral initiatives.	Istanbul Internet of Things networks for comprehensive leak detection.	Expand IoT networks to all metropolitan areas through National Smart Cities Strategy and municipal partnerships.	Municipal partnerships for technology deployment and knowledge sharing.	Legal framework development supporting unified water law and comprehensive digital governance standards.

Annex I – Country specific existing digital action plans

Detailed action plans are specifically developed for the individual Mediterranean countries, tailored to their unique needs, resources and challenges. The plans include:
- Baseline assessments of existing digital infrastructure;
- Specific goals and milestones for digital transformation in water management;
- Capacity-building initiatives aimed at strengthening digital skills and competencies among key stakeholders;

1. Albania

Baseline assessment

Albania's water sector faces significant challenges despite the country's abundant water resources, with only 22% of areas equipped for irrigation actually being irrigated in 2009 due to seriously deficient infrastructure, maintenance, and management. The water infrastructure is characterized by fragmented service providers, weak managerial and technical capacities, and high non-revenue water losses that often reach 40-50% in some regions.[10] Albania has been developing a water cadaster as part of its efforts to improve water resource management, with initial plans to complete it for key river basins by 2018. This initiative is a crucial step for the country to align with EU water management standards and strengthen its integrated water resource management strategy. For this process to be accelerated, additional financing is necessary.

Specific goals and milestones for digital transformation in water management

Albania's digital transformation strategy prioritizes comprehensive modernization through the National Water Supply and Sanitation Sector Modernization Program, targeting service improvements for up to 50% of the urban population by 2026. The program combines infrastructure investments totaling approximately €100 million with corporate development support and performance-based financing mechanisms.

Capacity-building initiatives

The government of Albania has established multiple international partnerships and technical assistance initiatives to implement comprehensive capacity-building programs. The National Water Supply and Sanitation Sector Modernization Program provides extensive training through performance-based grant systems, improved tariff setting methodologies, and national certification programs for water sector professionals. These initiatives include technical assistance financed by the Swiss State Secretariat of Economic Affairs, playing a key role in implementing recipient-executed programs successfully. Currently the national institutions from Albania are working for a reform the water sector.

2. Algeria

Baseline assessment

Algeria faces severe water scarcity, with only 18 billion cubic meters of its 36 billion cubic meters of annual water production effectively billed due to leaks and illegal connections. The water

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[10] World Bank. (2023, August 22). Better irrigation services and enhanced water management in Albania.
https://projects.worldbank.org/en/results/2023/08/22/better-irrigation-services-and-enhanced-water-management-in-albania

infrastructure of Algeria consists of outdated distribution systems, separate institutional structures, and minimal digital technology use in rural areas. The country has started implementing strategic projects to tackle these problems. The DIOELECTRONIC project in Bordj Bou Arreridj province demonstrates initial digital transformation by using IoT sensors to track water tank levels, identify leaks, and operate valves automatically. The pilot project achieved better water distribution efficiency and reduced manual intervention in the region[11]

The National Water Strategy 2021-2030 aims to meet Algerians' drinking water needs by relying on seawater desalination for up to 60% of the supply. Major desalination plants, such as Cap Blanc (Oran) and Mostaganem, produce 200,000-300,000 cubic meters daily, though energy costs and environmental impacts remain concerns.[12]

Specific goals and milestones for digital transformation in water management

Algeria's digital transformation goals prioritize AI, IoT and data analytics to optimize water management:
- Scale the DIO-ELECTRONIC IoT model nationwide.
- Construct six seawater reverse osmosis (SWRO) plants by 2030 as part of a €2.85 billion investment.[13]

Capacity-building initiatives

Algeria is investing in human capital to sustain digital transformation:
- Multiple training programs focused on digital water resource transformation are being organized by international donors in Algeria. The training program includes a curriculum on the water use tools and their dynamic dashboards while simultaneously conducting technology transfer to the FAO Water Productivity Open-access portal (WaPOR) Digitization Cell located in Algiers. Additionally, a hybrid training session has been held with IWMI and the WaPOR digitization unit in Algeria.[14]
- The Société des Eaux et de l'Assainissement d'Alger (SEAAL) -Algiers Water Company- established a digital system that provides real-time water distribution information and enables citizens to pay bills and report leaks, thus increasing public involvement.[15]

3.   Bosnia and Herzegovina

Baseline assessment

The water management sector of Bosnia and Herzegovina is at an initial stage of digital transformation, with a focus on the agricultural sector. The sector faces increasing challenges due to rising water consumption and the effects of climate change, which result in both severe droughts and floods. The SMARTWATER project, coordinated by the University of Banja Luka, received European Commission Horizon 2020 funding to drive digitalization efforts in Bosnia and Herzegovina. The project uses smart technologies, including cloud-based platforms and

[11] Djeriou, K., & Mouakeni, S. (2023). Digitization of Algeria's water resources sector: The experience of Bordj Bou Arreridj Province. Hassiba Ben Bouali University in Chlef.

[12] Chignac, F. (2024, August 15). Algeria facing water stress: innovative solutions for a sustainable future. Euronews. https://www.euronews.com/2024/08/15/algeria-facing-water-stress-innovative-solutions-for-a-sustainable-future

[13] Aquatech. (2024, December 12). Desalination securing Algeria's future water security. Aquatech. Retrieved from https://www.aquatechtrade.com/news/water-security/algeria-water-security-tied-to-11-new-desalination-plants

[14] Aquatech. (2024, December 12). Desalination securing Algeria's future water security. Aquatech. Retrieved from https://www.aquatechtrade.com/news/water-security/algeria-water-security-tied-to-11-new-desalination-plants

[15] Société des Eaux et de l'Assainissement d'Alger. (n.d.). SEAAL. Retrieved June 16, 2025, from https://seaal.dz/fr/

remote sensing, to enhance agricultural water management, which aims to maximize water, land, and fertilizer efficiency while building climate resilience. The water sector remains reliant on conventional infrastructure and manual monitoring systems in rural areas, despite the testing of digital solutions. The digital infrastructure in these areas remains underdeveloped, and the adoption of advanced technologies such as AI and big data analytics is in its infancy.[16]

Specific goals and milestones for digital transformation in water management

Bosnia & Herzegovina outlines its digital transformation vision for water management through its developing e-agriculture strategy and accompanying national development plans. The country works to speed up digital transformation across the public and private sectors through practical Information and Communication Technology (ICT) adoption at the farm and utility levels. The main objectives involve expanding the deployment of smart irrigation systems and implementing remote soil moisture sensors across wider areas while creating centralized cloud-based platforms for integrated water resource management. The SMARTWATER project focuses on strengthening research and innovation capabilities at the University of Banja Luka and the University of Sarajevo and developing contemporary irrigation systems and climate resilience approaches. The government collaborates with the Food and Agriculture Organization (FAO) and the World Bank to establish targets for enhancing digital infrastructure in rural areas and implementing water utility computerization and modern water tariff systems. The government has already recognized more than 20 digital agriculture best practices, which serve as models for expanding digital solutions throughout the country.[17]

Capacity-building initiatives

The digital transformation agenda of Bosnia & Herzegovina depends heavily on capacity building as its fundamental element. The SMARTWATER project launched twinning activities which unite Bosnian research institutions with Spanish, Portuguese and Italian leading international research institutions. The collaborative efforts aim to boost the scientific capabilities and innovation strength of Bosnian institutions. The e-agriculture strategy developed with FAO support contains particular measures to build digital knowledge and skills at both institutional and individual levels. The agricultural and water sectors receive training workshops, knowledge exchange programs, and awareness-raising campaigns to develop digital culture. The initiative focuses on developing extension services while promoting ICT solution adoption at farms to ensure digital transformation reaches both large and small-scale producers.[18]

4.   Croatia

Baseline assessment

The water management sector in Croatia is undergoing a major digital transformation due to both urgent requirements and strategic possibilities. The water supply network in Croatia

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[16] Western Balkans Info Hub. (2021, October 29; updated 2022, June 3). Promoting the application of smart technologies in agricultural water management in Bosnia and Herzegovina – SMARTWATER. Archived at WBC-RTI.INFO. Retrieved June 16, 2025, from https://wbc-rti.info/object/project/22312.html

[17] United Nations Bosnia and Herzegovina. (2021, November 25). Bosnia and Herzegovina prepares for digital transformation in agriculture with support from FAO [Press release]. Retrieved June 16, 2025, from https://bosniaherzegovina.un.org/en/160231-bosnia-and-herzegovina-prepares-digital-transformation-agriculture-support-fao

[18] United Nations Bosnia and Herzegovina. (2021, November 25). Bosnia and Herzegovina prepares for digital transformation in agriculture with support from FAO [Press release]. Retrieved June 16, 2025, from https://bosniaherzegovina.un.org/en/160231-bosnia-and-herzegovina-prepares-digital-transformation-agriculture-support-fao

suffers from two major problems: its advanced age results in 50% water loss, and the combination of insufficient technical and financial resources for network upgrades. The recent earthquakes that hit Zagreb revealed how vulnerable the water supply system is, which makes modernization and resilience essential. The water utilities of Zagreb, together with other Croatian utilities, started implementing modern digital solutions to address their needs. Digital twin for Zagreb's water supply system through Bentley's OpenFlows and Open Utilities platforms was one of the steps. The digital twin system processes real-time data and performs model calibration and scenario analysis, which has speeded up project completion and enhanced water loss management. The aquaculture sector in Croatia implements digital solutions through Marinet's AI-powered sensors that monitor water quality and fish health in real time.[19]

Specific goals and milestones for digital transformation in water management

Croatia's strategic goals for digital transformation are closely aligned with European Union directives and the broader priorities of the Union for the Mediterranean. The country is committed to reducing non-revenue water through the deployment of digital twins, AI and advanced metering infrastructure. The Zagreb digital twin project has already identified and prioritized 50 specific actions to reduce water loss, and the accelerated implementation timeline, cut by 16 months, demonstrates the potential impact of such technologies.[20] In the aquaculture sector, the Marinet project (2024–2026) is set to deliver a fully operational, AI-driven monitoring system for fish and shellfish farms, to enhance biosecurity, environmental sustainability and economic competitiveness.[21] Looking ahead, Croatia's water utilities are expected to continue investing in digital platforms, IoT and cybersecurity to ensure the resilience and reliability of critical infrastructure.

Capacity-building initiatives

The strategic goals of digital transformation in Croatia match EU directives and the Union for the Mediterranean's general priorities. The government of Croatia has focused on lowering non-revenue water through digital twin technology, Artificial Intelligence systems, and advanced metering infrastructure. The Zagreb digital twin project has selected 50 specific measures to reduce water loss. The Marinet project (2024–2026) will establish a complete AI-based monitoring system for fish and shellfish farms to boost biosecurity, environmental sustainability, and economic competitiveness.[22]

[19] Support4Partnership. (2024, July 30). Croatia and Italy are developing digital solutions in aquaculture [News article]. Retrieved June 16, 2025, from https://support4partnership.org/en/news/croatia-and-italy-are-developing-digital-solutions-in-aquaculture

[20] EverythingAboutWater. (2022, September 3). Hidroing develops smart water solutions for 144-year-old water supply network in Zagreb, Croatia [Case study]. Retrieved June 16, 2025, from https://www.eawater.com/casestudy/hidroing-develops-smart-water-solutions-for-144-year-old-water-supply-network-inzagreb-croatia/

[21] Support4Partnership. (2024, July 30). Croatia and Italy are developing digital solutions in aquaculture [News article]. Retrieved June 16, 2025, from https://support4partnership.org/en/news/croatia-and-italy-are-developing-digital-solutions-in-aquaculture

[22] European Commission. (2024, September). Development of national loss reduction plan and capacity building among water suppliers [Publication]. Retrieved June 16, 2025, from https://reform-support.ec.europa.eu/publications-0/development-national-loss-reduction-plan-and-capacity-building-among-water-suppliers_en

5. Cyprus

Baseline assessment

The public sector of Cyprus is implementing a complete digital transformation, focusing on water management. The government has established the 2025 Vision, which contains more than 80 reforms and a strong digitalization initiative to transform governance and services and establish Cyprus as a leading smart infrastructure hub in the region.[23] Water scarcity remains a long-standing issue due to extended droughts and the effects of climate change. The country depends on desalination to produce most of its drinking water through energy-consuming seawater desalination facilities.[24] The water management sector undergoes digital transformation through multiple initiatives, including the Municipality of Paphos's project, which deployed 27,000 smart water meters to track real-time consumption, detect leaks, and improve billing accuracy as part of its strategy to minimize non-revenue water and enhance resource efficiency.[25]

The KIOS Research and Innovation Center of Excellence at the University of Cyprus works with Imperial College London to develop smart systems and digital twins for water and energy networks. The Oceanos Digital Twin uses data from thousands of kilometers of pipes and sensors and consumer reports to create a digital twin of the Limassol water network, which enables advanced simulation and predictive maintenance and operational decision support.[26]

Specific goals and milestones for digital transformation in water management

The Oceanos Digital Twin will expand its real-time management capabilities to monitor more than 1,300 km of Limassol's water network, while commercial applications will expand to other cities.[27] The government has approved a €66.4 million plan to increase desalination capacity through mobile and permanent plants to boost the annual water supply by 15 million cubic meters by 2030.[28] These efforts are complemented by public awareness campaigns and infrastructure upgrades to reduce domestic water waste and improve irrigation efficiency.

Capacity-building initiatives

Capacity building is integral to Cyprus's digital water agenda. The KIOS Center of Excellence leads the way through the Horizon 2020 Teaming programme to unite Cypriot experts with international specialists who work on smart infrastructure, control systems, and cybersecurity.[29] The partnership with Imperial College London enables expertise transfer and develops engineers and researchers who specialize in digital twins, Artificial Intelligence and critical

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[23] The Future Media. (2025, February). Cyprus' 2025 vision: Over 80 reforms and a digital transformation drive. Retrieved June 16, 2025, from https://thefuturemedia.eu/cyprus-2025-vision-over-80-reforms-and-a-digital-transformation-drive

[24] mart Water Magazine. (2024, December 2). Cyprus government approves plan to expand desalination capacity to combat water scarcity [News article]. Retrieved June 16, 2025, from https://smartwatermagazine.com/news/smart-water-magazine/cyprus-government-approves-plan-expand-desalination-capacity-combat-water

[25] Smart-Energy.com. (2022, August 13). Paphos to install 27,000 smart water meters. Retrieved June 16, 2025, from https://www.smart-energy.com/industry-sectors/smart-meters/paphos-to-install-27000-smart-water-meters/

[26] Mundell, I. (2025, February 21). Smart systems keep water and power flowing in Cyprus. Imperial College London. Retrieved June 16, 2025, from https://www.imperial.ac.uk/news/261273/smart-systems-keep-water-power-flowing/

[27] Mundell, I. (2025, February 21). Smart systems keep water and power flowing in Cyprus. Imperial College London. Retrieved June 16, 2025, from https://www.imperial.ac.uk/news/261273/smart-systems-keep-water-power-flowing/

[28] Smart Water Magazine. (2024, December 2). Cyprus government approves plan to expand desalination capacity to combat water scarcity [News article]. Retrieved June 16, 2025, from https://smartwatermagazine.com/news/smart-water-magazine/cyprus-government-approves-plan-expand-desalination-capacity-combat-water

[29] Mundell, I. (2025, February 21). Smart systems keep water and power flowing in Cyprus [News article]. Imperial College London. Retrieved June 16, 2025, from https://www.imperial.ac.uk/news/261273/smart-systems-keep-water-power-flowing/

infrastructure management. The University of Cyprus provides Master's programs in intelligent essential systems of infrastructure to maintain a continuous supply of qualified professionals for the sector.[30]

6. Egypt

Baseline assessment

Egypt's water management sector is at a critical juncture due to severe water scarcity, climate change and rapid population growth. The Nile River provides more than 98% of Egypt's renewable water resources; thus, integrated, efficient management practices remain essential for economic and social advancement.[31] Digitalization stands as a vital component of Vision 2030 and Sustainable Agriculture Development Strategy 2030 since the government intends to transform water and food security systems through modern technological advancements.[32] The installation of smart water meters in Monte Galala, along with other urban areas, has enabled better data collection and processing for billing optimization and operational efficiency.[33] The Ministry of Communications and Information Technology, together with the Ministry of Agriculture and Land Reclamation, established protocols to integrate Information and Communication Technology, along with Artificial Intelligence (AI) and machine learning, into irrigation systems and farm management for water conservation and yield enhancement.[34]

Specific goals and milestones for digital transformation in water management

The Egyptian government has established multiple complex objectives for its digital water management transformation plan. The government plans to implement artificial intelligence solutions for water-efficient irrigation through predictive analytics that will optimize water allocation and forecast seasonal requirements. The government aims to achieve the digitalization of agricultural land management through the use of big data and machine learning applications, to enhance farming efficiency and food security by 2030.[35]

The Ministry of Water Resources and Irrigation in Egypt has adopted an inclusive governance approach by supporting and activating Water User Associations (WUAs). These associations serve as practical models for stakeholder engagement in water management.

WUAs are entities that represent farmers and water users along canals and irrigation networks. Their role includes promoting community participation in water management, coordinating water distribution, selecting crops, and contributing to the maintenance of water infrastructure. Efforts are underway to connect these associations to digital platforms for information exchange, monitoring water distribution, and submitting complaints or suggestions

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[30] University of Cyprus & KIOS Research and Innovation Center of Excellence. (n.d.). MSc program in intelligent critical infrastructure systems [Program page]. Retrieved June 16, 2025, from https://www.kios.ucy.ac.cy/new-msc-program-in-intelligent-critical-infrastructure-systems/

[31] GIZ. (2025, March). Increasing the efficiency of water use in the Nile Delta: Nile Delta Water Management Programme II in Egypt [Project information]. Retrieved June 16, 2025, from https://www.giz.de/en/worldwide/131856.html

[32] Oxford Business Group. (2022). Tools of the trade: Digitalisation is key to bolstering Egypt's food and water security [Report chapter]. In The Report: Egypt 2022. Retrieved June 16, 2025, from https://oxfordbusinessgroup.com/reports/egypt/2022-report/economy/tools-of-the-trade-digitalisation-is-key-to-efforts-to-bolster-food-and-water-security

[33] Iskraemeco. (2025). Smart electricity and water meters in Il Monte Galala, Egypt [Project summary]. Retrieved June 16, 2025, from https://iskraemeco.com/project/smart-electricity-and-water-meters-in-il-monte-galala-egypt/

[34] Daily News Egypt. (2020, August 10). Egypt uses AI to improve water-efficient irrigation [News article]. Retrieved June 16, 2025, from https://www.dailynewsegypt.com/2020/08/10/egypt-uses-ai-to-improve-water-efficient-irrigation/

[35] Oxford Business Group. (2022, July 12). Tools of the trade: Digitalisation is key to efforts to bolster food and water security [Article]. Retrieved June 16, 2025, from https://oxfordbusinessgroup.com/tools-of-the-trade-digitalisation-is-key-to-efforts-to-bolster-food-and-water-security/

electronically, and there is an application has been developed, and its pilot use has already begun.

The expansion of smart metering technology in urban areas will enhance water services billing accuracy while decreasing utility losses and delivering instant consumption details to both water providers and customers. The Nile Delta Water Management Programme works to digitize services for smallholder farmers while developing digital water demand planning maps and establishing modern irrigation demonstration pilots.[36]

Capacity-building initiatives

Through the Ministry of Agriculture and Land Reclamation, the government operates extensive training programs to help agricultural workers learn new digital systems and AI applications.[37] The agreement between the Ministry of Communications and Information Technology and the Ministry of Agriculture includes training sessions to boost agricultural workers' skills in data management, remote-control operations, and artificial intelligence scheduling for irrigation and farm management systems.[38]

The Ministry of Water Resources and Irrigation in Egypt actively supports digital transformation through specialized training programs. These initiatives aim to enhance technical capacity in water management and irrigation systems using modern technologies.

The Ministry of Water Resources and Irrigation in Egypt has already begun implementing drone technology as part of its training programs at the Regional Training Center for Water Resources and Irrigation. This initiative aims to enhance the efficiency of water resource management through the use of modern technology by cropping pattern analysis and monitoring water flow in real time.

7.   France

Baseline assessment

The water management sector in France uses advanced digital tools to lead European digital transformation efforts using Artificial Intelligence (AI), machine learning and Internet of Things (IoT). The water sector in France implements numerous digital solutions through French utility companies and technology providers, which enable real-time water quality monitoring and infrastructure predictive maintenance. The underwater weather stations developed by French technology startups utilize IoT sensors and machine learning algorithms to detect 14 physico-chemical parameters in real time while forecasting water quality changes. The monitoring system currently operates in aquaculture facilities.[39] France emphasizes that the digital transformation of the water sector should not only focus on technological innovation but also

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[36] GIZ. (2025, March). Increasing the efficiency of water use in the Nile Delta: Nile Delta Water Management Programme II in Egypt [Project information]. Retrieved June 16, 2025, from https://www.giz.de/en/worldwide/131856.html

[37] Oxford Business Group. (2022). Tools of the trade: Digitalisation is key to efforts to bolster food and water security [Report chapter]. In The Report: Egypt 2022. Retrieved June 16, 2025, from https://oxfordbusinessgroup.com/reports/egypt/2022-report/economy/tools-of-the-trade-digitalisation-is-key-to-efforts-to-bolster-food-and-water-security

[38] Daily News Egypt. (2020, August 10). Egypt uses AI to improve water-efficient irrigation [News article]. Retrieved June 16, 2025, from https://www.dailynewsegypt.com/2020/08/10/egypt-uses-ai-to-improve-water-efficient-irrigation/

 (n.d.). French tech start-up looking for distributors for its water monitoring and predictive system based on AI in the aquaculture sector [Partnering opportunity]. Retrieved June 16, 2025, from https://een.ec.europa.eu/partnering-opportunities/french-tech-start-looking-distributors-its-water-monitoring-and-predictive

on strengthening the quality and transparency of water management. Digital tools should enable more efficient allocation of resources and ensure strict monitoring of water quality, pollutants, and emerging contaminants. The strategy should also promote a culture of water-use efficiency, encouraging behavioral change and improved demand management across all sectors - agriculture, industry, and urban services - through enhanced efficiency standards and transparent data.

Specific goals and milestones for digital transformation in water management

France's strategic digital transformation goals match its national sustainability targets while following European Union's directives. The French government plans to enhance the implementation of AI and operational intelligence systems for better water resource management and sustainable delivery of reliable services. AI technologies combined with machine learning algorithms help water services organizations predict water quality problems such as bacterial contamination and harmful algal blooms while optimizing wastewater treatment plants through smart city initiatives. Through the Digital Water City (DWC) project, France functions as a lighthouse city to show European cities how digital solutions can be transferred between cities through open innovation and co-creation approaches.[40]

Capacity-building initiatives

The French government dedicates substantial funding to establishing capacity development programs for water experts alongside the users who need these services. The complete training programs of utilities and technology providers focus on teaching AI and IoT, along with advanced analytics skills for operational and strategic decision-making. Through the DWC project Communities of Practice, the program enables European partners to co-create digital solutions while promoting knowledge exchange and stakeholder engagement.[41]

8.   Greece

Baseline assessment

Greece is making significant strides in digitalizing its water management sector, driven by the urgent need to address water scarcity, climate change and the seasonal pressures of tourism. The water utilities of Greece utilize modern technology advancements, including Artificial Intelligence (AI), machine learning, Internet of Things (IoT), and digital twins, to enhance their infrastructure, operational efficiency, and sustainability standards. Thessaloniki's water utility (EYATH S.A.) uses AI systems with radar sensors to analyze historical data for preventing sewer blockages, which reduces both overflows and improves water quality.[42]

Specific goals and milestones for digital transformation in water management

The Greek digital water agenda aligns with both European Union (EU)'s directives and the Union for the Mediterranean's priorities. The Greek government aims to enhance AI and machine

[40] Enterprise Europe Network. (n.d.). French tech start-up looking for distributors for its water monitoring and predictive system based on AI in the aquaculture sector [Partnering opportunity]. Retrieved June 16, 2025, from https://een.ec.europa.eu/partnering-opportunities/french-tech-start-looking-distributors-its-water-monitoring-and-predictive
[41] European Commission. (2019–2022). DIGITAL-WATER.city (DWC) – Leading urban water management to its digital future [Project fact sheet]. CORDIS. Retrieved June 16, 2025, from https://cordis.europa.eu/project/id/820954
[42] Siemens Industry. (2024, November). AI helps predict water blockages: Effective water management meets modern innovation in Thessaloniki [LinkedIn post]. LinkedIn. Retrieved June 16, 2025, from https://www.linkedin.com/posts/siemens-industry-_ai-iot-artificialintelligence-activity-7263838337478643712-euWL/

learning applications to improve water resource management, reduce non-revenue water rates, and enhance flood and drought protection. Water sector digitalization efforts focus on strengthening the ability to improve resilience to water scarcity. Real-time monitoring of water sources and distribution networks becomes possible through advanced sensor networks. Predictive modeling alongside data analytics enables organizations to make effective decisions that optimize water allocation and demand management.[43]

Capacity-building initiatives

Capacity building stands as a fundamental element of Greece's digital transformation approach. Utilities, together with municipalities, allocate resources that enable water institutions to deploy and operate smart meters and IoT devices and manage data analytics platforms. Major utilities, academic institutions, and industry representatives have met at Urban Water Management and Hydroinformatics Group workshops to exchange successful practices, promote innovation, and develop practical expertise in AI, machine learning, and predictive analytics. The National Technical University of Athens functions as a leading research institution that connects theory to practice through educational programs focused on Machine Learning-based leakage assessment, asset management systems, and hydraulic pressure control.[44] The WaterWise Hub establishes a quadruple-helix framework that enables academia and industry, together with government and citizens, to develop digital water solutions and circular practices through collaborative co-creation.[45] The water sector benefits from public awareness programs and knowledge-sharing activities, which support digital transformation for inclusive and sustainable growth at every level.

9.   Israel

Baseline assessment

Israel is widely recognized as a global leader in the digital transformation of water management, driven by necessity in a semi-arid climate and a history of innovation. The country implements artificial intelligence, machine learning, alongside Internet of Things (IoT) and data analytics throughout its complete water management cycle. Israel maintains a state-of-the-art water network with desalination facilities and wastewater treatment facilities alongside precision agriculture systems that operate through digital technology. Israel has completed 70% of its nationwide smart water metering program, with two million smart meters installed, aiming to reach 100% coverage in 2026.[46]

[43] Union for the Mediterranean Secretariat. (2024, May). Digital transformation for water and sustainable development in the Mediterranean [Report]. Retrieved June 16, 2025, from https://ufmsecretariat.org/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf

[44] Urban Water Management and Hydroinformatics Group (UWMH), National Technical University of Athens. (2025, April 10). Driving innovation in water management: Adopting new technologies in the water sector [News article]. Retrieved June 16, 2025, from https://uwmh.eu/news/153-driving-innovation-in-water-management-adopting-new-technologies-in-the-water-sector.html

[45] Urban Water Management and Hydroinformatics Group (UWMH). (n.d.). WATERWISE HUB: An excellence hub on water in the circular economy [Project page]. Retrieved June 16, 2025, from https://uwmh.eu/projects/137-waterwise-hub.html

[46] Smart Water Magazine. (2025, January 21). Israel leads the way in water conservation with smart meter revolution [News article]. Retrieved June 16, 2025, from https://smartwatermagazine.com/news/smart-water-magazine/israel-leads-way-water-conservation-smart-meter-revolution

Specific goals and milestones for digital transformation in water management

Israel's strategic objectives center on complete digitalization and optimization of water resources to ensure resilience against climate change and growing demand. By the end of 2026, the goal is to achieve universal smart meter coverage, allowing for real-time monitoring, leak detection and consumption management at the household level.[47] Israel plans to expand desalination capacity and water recycling systems through a new connection between the Sea of Galilee (Lake Kinneret) and the national water network that will feed desalinated water into the lake to maintain freshwater supply levels during droughts.[48] Through precision irrigation, IoT, and AI technology, Israeli farmers track soil moisture and weather conditions together with crop health data in real time, which helps them optimize irrigation plans for maximum yield with reduced waste.[49]

Capacity-building initiatives

Public and private sector entities, together with government, industry, and academic institutions of Israel, support digital water transformation through various capacity-building initiatives. The Israel Innovation Authority selected Nebius to create an innovative infrastructure through a thorough planning process. The infrastructure received over New Israel Shekel (NIS) 500 million in funding, with NIS 160 million in government backing, to attract four high-quality proposals from the industry sector. The supercomputer system enables significant expansion of AI training capabilities and reduces processing expenses for the Israeli technological ecosystem. Through this initiative, the government created a novel public-private partnership framework that dedicated funds to support early-stage high-risk research and development of companies that use the infrastructure.

Robust capacity-building efforts by the public and private sectors across government, industry and academia support Israel's digital water transformation. The Israel Innovation Authority selected Nebius to establish a groundbreaking infrastructure, concluding an extensive planning process. This project, valued at over NIS 500 million with NIS 160 million in government support, attracted four high-quality proposals, demonstrating strong industry interest. The supercomputer aims to significantly expand access to AI training capabilities and reduce processing costs for the Israeli ecosystem. This initiative also introduced a unique public-private collaboration model, directing government funding towards early-stage, high-risk Research & Development activities for companies utilizing the infrastructure.[50]

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[47] Smart Water Magazine. (2025, January 21). Israel leads the way in water conservation with smart meter revolution [News article]. Retrieved June 16, 2025, from https://smartwatermagazine.com/news/smart-water-magazine/israel-leads-way-water-conservation-smart-meter-revolution

[48] Smart Water Magazine. (2022, December). Israel will store desalinated water in the Sea of Galilee [News article]. Retrieved June 16, 2025, from https://smartwatermagazine.com/news/smart-water-magazine/israel-will-store-desalinated-water-sea-galilee

[49] Intent Media Labs Private Limited. (2024, July 19). Harnessing AI and IoT: Revolutionizing water management for a sustainable future [LinkedIn article]. LinkedIn. Retrieved June 16, 2025, from https://www.linkedin.com/pulse/harnessing-ai-iot-revolutionizing-water-management-sustainable-tsvoc/

[50] Israel Innovation Authority. (2025, May 14). Nebius selected to establish Israel's national supercomputer [Press release]. Innovation Israel. Retrieved June 16, 2025, from https://innovationisrael.org.il/en/press_release/nebius-to-establish-supercomputer/

10. Italy

Baseline assessment

Italy's water management sector is marked by significant structural and operational challenges that have made digital transformation both urgent and complex. The country's water distribution network is notably aged, with 22% of pipes over 50 years old and 36% between 31 and 50 years old, leading to high water losses, estimated at 42% nationally and up to 50% in some southern regions, compared to 8% in Germany and 20% in France. The sector is also highly fragmented, with over 2,500 companies - 83 % managed by local authorities - resulting in inefficiencies and limited investment capacity. The adoption of digital solutions has been slow; for instance, in 2019, only 3.5% of water meters were smart, and only 1.4% of the water company's investments were focused on digitalization. However, digital investments planned for 2020–2023 have increased to 4.8% of total investments, indicating growing recognition of the need for innovation.[51] Acqua 4.0 is a recent digital platform implementation that integrates business intelligence with Geographical Information Systems, Artificial Intelligence, and Internet of Things capabilities to enhance data collection, analytics, and operational decision-making, ultimately optimizing the entire water service chain.[52] Among the most advanced initiatives, the Digital Twin project developed by AUBAC (Central Apennines River Basin Authority) provides a real-time, geo-referenced digital replica of the river basin, integrating remote sensing, GIS/BIM, hydrological and hydraulic modeling, artificial intelligence, and immersive visualization. This platform supports continuous environmental monitoring, predictive analytics for water demand and supply, risk scenario simulation (floods, droughts, wildfires, landslides), and integrated risk management for water resources and territorial protection. The Digital Twin AUBAC is designed for interoperability and scalability, enabling multi-stakeholder coordination and serving as a model for other Mediterranean basins.

Specific goals and milestones for digital transformation in water management

The digital transformation strategy of Italy is closely tied to EU directive requirements and European funding opportunities. The National Recovery and Resilience Plan dedicated €900 million to build 25,000 km of new water networks that will decrease water losses in southern Italy through digital control system implementations. The transformation process aims to convert twenty-five potable water networks into intelligent networks that track flow rates, pressure and water quality in real-time.[53] The Digital Twin AUBAC project further advances these goals by enabling real-time monitoring, scenario analysis, and decision support at the river basin scale, with a modular architecture that can be replicated in other districts.

Capacity-building initiatives

Italy's digital transformation program has a strong focus on building capacity for both technical staff and institutional actors. Italian Regulatory Authority for Energy, Networks and Environment launched awareness programs and training sessions about smart metering and data analytics, as well as digital asset management.[54] Utilities are investing in upskilling their

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[51] BIP Group. (2022, October 26). Digital Water: How the integrated water system evolves [News article]. Retrieved June 16, 2025, from https://www.bip-group.com/news/digital-water-how-the-integrated-water-system-evolves

[52] Smartwater s.r.l. (2022, January 26). Acqua 4.0 – il Water Management System da inserire nel PNRR. Retrieved from https://smartwatersrl.com/en/water-management-system

[53] BIP Group. (2022, October 26). Digital Water: How the integrated water system evolves [News article]. Retrieved June 16, 2025, from https://www.bip-group.com/news/digital-water-how-the-integrated-water-system-evolves

[54] BIP Group. (2022, October 26). Digital Water: How the integrated water system evolves [News article]. Retrieved June 16, 2025, from https://www.bip-group.com/news/digital-water-how-the-integrated-water-system-evolves

workforce to manage new digital platforms, IoT devices and advanced analytics tools. Collaborative Research & Development projects, such as Acqua 4.0, IT-WATER, and the Digital Twin AUBAC, involve partnerships between utilities, technology companies, basin authorities, and research institutions, fostering knowledge exchange and the co-development of best practices.[55]

11. Jordan

Baseline assessment

Chronic scarcity and growing demand in Jordan's water sector present serious challenges, making digital transformation crucial for operational effectiveness and resource sustainability. Jordan's water management infrastructure is currently undergoing a phased shift toward digitalization. Digital monitoring systems have been implemented by urban utilities, e.g., Yarmouk and Miyahuna, allowing for remote management and real-time data collection. However, there are still disparities in the general level of digital maturity. Many systems, particularly in rural and decentralized areas, still rely on manual processes. Projects to modernize the sector have been started by the government, mostly through the Ministry of Water and Irrigation, with assistance from foreign donors. These projects include investments from international development partners and the implementation of Supervisory Control and Data Acquisition (SCADA) systems, which are meant to increase resilience and efficiency.[56]

Specific goals and milestones for digital transformation in water management

Jordan has established clear objectives and benchmarks for the digital transformation of water management. One of the top priorities is reducing non-revenue water losses, which are currently among the highest in the region, to less than 25% by 2040. Predictive data analytics, advanced metering infrastructure and deployment of smart sensors are necessary to accomplish this in order to detect leaks quickly and run the network effectively.[57] Another milestone is expanding the use of digital customer platforms and smart meters to offer real-time usage data, improved client self-service, and automated alerts on anomalies, thereby empowering end-users and streamlining complaints and waste management. Integrated digital management platforms are being developed to enhance central oversight, inform long-term planning, and foster transparent, evidence-based decision-making in investment and allocation.[58]

Capacity-building initiatives

The National Water Strategy explicitly calls for supporting capacity development to improve the workforce's technological competencies. In practice, this involves training programs for water utility staff on emerging digital tools and data systems. For example, plans have been made to train technical personnel in using Supervisory Control and Data Acquisition (SCADA) interfaces, data analytics, and cybersecurity protocols. Partnerships with local universities and

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[55] Smartwatersrl. (n.d.). Acqua 4.0 – Water management system da inserire nel PNRR [Webpage]. Retrieved June 16, 2025, from https://smartwatersrl.com/water-management-system/

[56] Jordan News Agency. (2024, December 8). USAID, Ministry of Water launch $24 million digital water transformation project. Petra. https://www.petra.gov.jo/Include/InnerPage.jsp?ID=66193&lang=en&name=en_news

[57] Ministry of Water and Irrigation. (2023). National Water Strategy 2023–2040. Government of Jordan. https://www.mwi.gov.jo/EBV4.0/Root_Storage/AR/EB_List_Page/national_water_strategy_2023-2040.pdf

[58] World Bank. (2023, May 26). Jordan – Water sector reform program: Program information document (PID) (Report No. PIDC355556). https://documents1.worldbank.org/curated/en/099052623124518529/pdf/BOSIB0d4798d310db097bc06922e98e0ee3.pdf

international experts are being leveraged to cultivate a new generation of water professionals adept in digital innovation.[59] Donor-supported initiatives also play a role in building capacity: United States Agency for International Development (USAID) and other partners not only fund infrastructure but also provide technical assistance and on-the-job training.[60]

12. Lebanon

Baseline assessment

Lebanon's water sector is at a critical point due to climate change, aging infrastructure, and ongoing economic and political challenges. Lebanon has one of the highest rates of rainfall in the Middle East and North Africa region, but it faces chronic water shortages due to its seasonal rainfall pattern, insufficient storage capacity, and poor infrastructure. The Ministry of Energy and Water has finalized the National Water Sector Strategy (NWSS) 2024–2035, highlighting the importance of digitalization, efficiency, and resilience.[61] Utilities such as the South Lebanon Water Establishment (SLWE) have undergone digital maturity assessments and begun implementing enterprise resource planning systems, digital customer engagement tools and advanced operational platforms. SLWE, serving over 200,000 residents, has introduced digital tools in accounting, finance and operational management, including computerized maintenance management systems (CMMS) and digital water quality monitoring.[62]

Specific goals and milestones for digital transformation in water management

Lebanon's goals for digital transformation are closely linked to making the water supply more reliable, of better quality, and more efficient. The NWSS 2024-2035 promotes the use of innovative tools and invests in the digitization of the water sector. The NWSS objectives include a) development of digital solutions and advanced technologies for data-driven decision-making; b) digital transformation of the Water Establishments; c) implementation of digital solutions and advanced technologies for data driven decision making; d) develop / improve automation, digitization, and performance monitoring; e) digitize MoEW's procedures to generate, collect, manage and disseminate data on the national level. The NWSS 2024–2035 plan and projects like Second Greater Beirut Water Supply Project (SGBWSP) aim to complete key water infrastructure projects, integrate digital processes more widely, and enhance the use of digital platforms for billing, collection, and customer management.[63] The SLWE's five-year digital roadmap includes updating supervisory control and data acquisition systems, adding Emergency Response Plan modules to cover all areas of business, and using Internet of Things, sensors to monitor water production, distribution, and quality in real time.[64]

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[59] Jordan Pulse. (2024, March 4). *Digital transformation project launched to reduce water loss in Jordan*. https://www.jordanpulse.com/article/7774

[60] Jordan News. (2023, April 5). *Water Ministry, USAID sign $22m deal for SCADA system development*. https://www.jordannews.jo/Section-109/News/Water-Ministry-USAID-sign-22m-deal-for-SCADA-system-development-27929

[61] Ministry of Energy and Water, Lebanon. (2024, June). Lebanon's national water strategy 2024–2035: Executive summary [PDF]. Programme Solidarité Eau. Retrieved June 16, 2025, from https://www.pseau.org/outils/ouvrages/mee_lebanon_s_national_water_strategy_2024_2035_2024_executive_summary_.pdf

[62] Seureca. (2023, September). The digital transformation report for the South Lebanon Water Establishment [Project report]. Water Reform Lebanon. Retrieved June 16, 2025, from https://water-reform.com/wp-content/uploads/2023/09/13.The-digital-transformation-report-for-the-South-Lebanon-Water-Establishment-1.pdf

[63] World Bank. (2025, January 15). New World Bank program to improve water supply and quality and advance water sector reforms [Press release]. Retrieved June 16, 2025, from https://www.worldbank.org/en/news/press-release/2025/01/15/new-world-bank-program-to-improve-water-supply-and-quality-and-advance-water-sector-reforms

[64] Seureca. (2023, September). The digital transformation report for the South Lebanon Water Establishment [Project report]. Water Reform Lebanon. Retrieved June 16, 2025, from https://water-reform.com/wp-content/uploads/2023/09/13.The-digital-transformation-report-for-the-South-Lebanon-Water-Establishment-1.pdf

Capacity-building initiatives

Building capacity is a big part of Lebanon's digital water plan. The SLWE and other utilities are investing in employee and local government technician training on the use and maintenance of digital systems, including Supervisory Control and Data Acquisition (SCADA) and Internet of Things platforms. International partners often help with these efforts. For example, the European Union-funded Technical Assistance Programme aims to improve institutional capacity and sectoral dialogue. In the agricultural sector, projects in the Shouf Biosphere Reserve provide farmers with hands-on training in using automated irrigation systems and collecting digital data. These projects are also supported by communication campaigns and workshops that teach good practices to farmers all over the country.[65]

13. Malta

Baseline assessment

The small size of Malta, combined with its limited natural freshwater sources and population increase of more than four times during peak tourist seasons, creates unique and serious water management challenges. The water supply in Malta depends primarily on groundwater aquifers, together with desalinated seawater. The Water Services Corporation (WSC) began installing smart water meters across the archipelago starting from 2009. The installation of more than 310,000 meters reached a completion rate of over 96% throughout the area. The SUEZ-operated ON'connect remote reading solution enables smart meters to provide real-time consumption data, detects leaks swiftly, and produces about 3,500 alerts each month for abnormal usage.[66]

Specific goals and milestones for digital transformation in water management

The short-term and medium-term objectives of Malta aim to reinforce its position as a smart water management leader through digital technology adoption. SUEZ maintains its smart metering contract with the WSC until 2029. The existing network will continue to operate while receiving improvements through the addition of the ON'connect platform and Wize (Low Power Wide Area Network (LPWAN) technology to its system.[67] The country operates active tests to improve AI models for water demand prediction alongside groundwater management and saltwater intrusion mitigation. The system will function as an automated water distribution manager that allocates resources between desalinated water, groundwater, and recycled water. The system balances affordable costs with environmental sustainability, ensuring a reliable water supply during droughts and tourist seasons.[68]

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[65] Istituto Oikos. (n.d.). Saving water, growing crops: Remote-controlled irrigation system to address water scarcity in the Shouf Biospherve Reserve, Lebanon [Project page]. Retrieved June 16, 2025, from https://www.istituto-oikos.org/projects/saving-water-growing-crops-lebanon

[66] Smart Energy International. (2025, January 16). Malta's Water Services Corporation extends smart-metering contract to 2029 [News article]. Retrieved June 16, 2025, from https://www.smart energy.com/industry sectors/smart water/maltas water services corporation extends smart metering contract to 2029/

[67] SUEZ SA. (2025, January 16). SUEZ and Water Services Corporation extend their contract on smart metering in the Maltese Archipelago for 5 years [Press release]. Retrieved June 16, 2025, from https://www.suez.com/en/news/press-releases/suez-water-services-corporation-extend-contract-smart-metering-maltese-archipelago-5-years

[68] Times of Malta. (2025, January). Artificial intelligence to help predict and manage Malta's water supplies [News article]. Retrieved June 16, 2025, from https://timesofmalta.com/article/artificial-intelligence-help-predict-manage-malta-water-supplies.1103271

Capacity-building initiatives

The water sector of Malta has benefited from substantial investments that enabled its digital transformation. The Malta College of Arts, Science, and Technology (MCAST) executes the WATERLINE project under Horizon Europe funding. The project aims to establish a European Digital Water Higher Education Institution Alliance. The initiative brings together local stakeholders with academics and industry experts to develop educational programs and curricula for water management through data analytics, Internet of Things, Artificial Intelligence and automation technologies. The Community of Practice meetings hosted at MCAST serve as opportunities for collaboration between stakeholders who share knowledge. The program ensures Malta's workforce obtains the necessary skills to adapt to the evolving digital water sector.[69]

14. Mauritania

Baseline assessment

Mauritania is undergoing a significant digital transformation, with water management at the forefront due to the country's arid climate, rapid urbanization and uneven distribution of water resources. The country has experienced persistent water accessibility issues mainly in rural regions due to a lack of proper infrastructure and limited utilization of groundwater resources. The National Digital Transformation Agenda (2022–2025) signaled a strong commitment to digitalization with its focus on governance, legal frameworks and digital skills development and is backed by €400 million in funding from public-private partnerships, international donors and national budget.[70]

Specific goals and milestones for digital transformation in water management

The National Artificial Intelligence Strategy (2025–2029) of Mauritania establishes specific targets to apply Artificial Intelligence (AI) and advanced digital technologies in water management with particular emphasis on the Senegal River Basin. The strategy establishes a smart water management system for the Senegal River, which combines Internet of Things (IoT) sensors with meteorological data and forecasting models and 5G drones to provide real-time monitoring of hydrological parameters, including flow rates and water levels.[71]

Capacity-building initiatives

The digital transformation agenda of Mauritania dedicates significant resources to building capacities among both public sector workers and local community members. The national strategy implements educational curriculum reforms to support digital economy requirements while offering digital skill certifications for civil servants.[72] The National Integrated Rural Water

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[69] Malta College of Arts, Science & Technology. (2024, September 23). WATERLINE Project community of practice meeting held at MCAST [News article]. Retrieved June 16, 2025, from https://mcast.edu.mt/2024/09/23/waterline-project-community-of-practice-meeting-held-at-mcast/

[70] Ministry of Digital Transformation, Innovation, and Modernization of the Administration. (2022, April). Mauritania's national digital transformation agenda (2022–2025) [Strategic framework]. Digital Watch Observatory. Retrieved June 16, 2025, from https://dig.watch/resource/mauritanias-national-digital-transformation-agenda-2022-2025

[71] Ministry of Digital Transformation, Innovation and Modernization of the Administration (MTNIMA), Mauritania. (2024, July 26). National artificial intelligence strategy: Strategic framework for artificial intelligence and digital transformation in Mauritania [PDF]. Retrieved June 16, 2025, from https://mtnima.gov.mr/wp-content/uploads/2024/07/strategie-EN-Final-26-07-2024-.pdf

[72] Ministry of Digital Transformation, Innovation, and Modernization of the Administration. (2022, April). Mauritania's national digital transformation agenda (2022–2025) [Strategic framework]. Digital Watch Observatory. Retrieved June 16, 2025, from https://dig.watch/resource/mauritanias-national-digital-transformation-agenda-2022-2025

Sector Project (PNISER), which receives support from the African Development Bank, provides extensive training to local stakeholders about agricultural techniques, digital processes, and management structures.[73] The development of local expertise in AI, IoT, and data analytics through international technical assistance supports the long-term sustainability of digital water management solutions.

15. Monaco

Baseline assessment

Monaco provides its entire population with safe drinking water and sanitation, reflecting the country's compact size and robust infrastructure. Its water systems are highly developed and work closely with those of neighboring France.[74] However, in recent years, the principality has faced mounting challenges from recurring droughts and broader environmental pressures. In response, the government has placed greater emphasis on boosting resilience and improving the efficiency of water management. Recent drought strategies highlight this shift by emphasizing real-time monitoring, alert-based regulation, and coordinated oversight of water use across households, industries, and recreational areas. These efforts rely heavily on digital tools to track consumption and manage resources effectively. [75]

Specific goals and milestones for digital transformation in water management

Monaco's goals for digital transformation are tightly linked with its sustainability and efficiency objectives. The government aims to guarantee efficient use of water resources by deploying integrated management plans that allow for rapid adaptation to changing conditions, such as droughts or population fluctuations. This includes implementing alert levels to trigger progressive restrictions and relying on real-time data to tailor policy responses.[76] Measures such as optimizing irrigation schedules, mandating recycling systems for cleaning operations and the prohibition of water-intensive activities during certain periods reflect a focus on digital enforcement and adaptive management. These steps are designed to ensure Monaco's continued water security while meeting high environmental standards and serving as a model for digital resource governance.

Capacity-building initiatives

In Monaco, efforts to build capacity for digital water management focus on both professional development and engaging key stakeholders, naturally within the context of a smaller-scale system. The national water utility, SMEaux, places strong emphasis on training its staff in emerging technologies and cybersecurity practices relevant to the water sector. Employees regularly receive hands-on instruction in areas such as data management, automated system

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[73] African Development Bank Group. (n.d.). Mauritania – National Integrated Rural Water Sector Project (PNISER): Summary of the Environmental and Social Management Plan [PDF]. Retrieved June 16, 2025, from https://www.afdb.org/fileadmin/uploads/afdb/Documents/Environmental-and-Social-Assessments/MAURITANIE%20PNISER-PGES%20RESUME%20Final_EN.pdf

[74] UN-Water. (n.d.). *Monaco: SDG 6 data*. Sustainable Development Goal 6 Data Portal. https://www.sdg6data.org/en/country-or-area/Monaco

[75] Government of Monaco. (2022, August 17). *Prince's Government implements water resource management plan and activates alert level*. https://en.gouv.mc/Princely-Governement/News/Prince-s-Government-implements-water-resource-management-plan-and-activates-alert-level

[76] Monaco Voice. (2023, July 10). *Managing drought in Monaco: Urgent measures implemented as water supply faces challenges*. https://monacovoice.com/en/article/managing-drought-in-monaco-urgent-measures-implemented-as-water-supply-faces-challenges

operations and the upkeep of complex monitoring and treatment infrastructure. To be up to speed with the new technologies, Monaco often works with global partners like Veolia, who contribute technical knowledge and support ongoing training initiatives.[77] Additionally, the broader Extended Monaco program promotes digital literacy throughout public services, allowing water sector personnel to benefit from general e-government training and national digital transformation efforts.[78]

16. Montenegro

Baseline assessment

Water management stands as a fundamental sector for digital transformation in Montenegro. The Digital Transformation Strategy of 2022–2026 provides a plan to digitalize public services and infrastructure while prioritizing the water sector.[79] The Artificial Intelligence Readiness Assessment Report (AIRA), published in May 2025 by the United Nations Development Programme (UNDP) and the European Union (EU), assessed the necessity of increased digital skill development alongside improved interoperability and regulatory systems to leverage Artificial Intelligence (AI) and advanced technologies for public services, including water management.[80]

Specific goals and milestones for digital transformation in water management

The digital transformation objectives for water management in Montenegro link directly to its European Union accession process and climate resilience targets. The EU granted Montenegro €23.5 million through the Western Balkans Investment Framework to create lasting, sustainable water supply and wastewater systems in Kolašin, Rožaje and Mojkovac. Due to this initiative, 30,000 residents from the northern region will benefit from enhanced water quality and reduced water losses.[81] The government of Montenegro developed its first AI Strategy, which will promote artificial intelligence and data analytics use in various sectors. Through this initiative, smart sensors, real-time data platforms, and predictive analytics will be integrated to enhance water distribution and water quality monitoring.[82]

Capacity-building initiatives

Capacity building is a cornerstone of Montenegro's digital transformation efforts. The AIRA Report indicates that digital literacy expansion, along with professional development and

[77] Government of Monaco. (2022, January 25). *Cutting-edge technology introduced to treat wastewater in the Principality and protect the Mediterranean*. https://en.gouv.mc/Policy-Practice/The-Environment/Actualites/Cutting-edge-technology-introduced-to-treat-wastewater-in-the-Principality-and-protect-the-Mediterranean

[78] Government of Monaco. (n.d.). *Extended Monaco*. https://extendedmonaco.com/en/

[79] Ministry of Public Administration, Digital Society and Media. (2021, December). Montenegro digital transformation strategy 2022–2026 with action plan 2022–2023 [PDF]. Retrieved June 16, 2025, from https://wapi.gov.me/download/59dcab9b-b0e8-48b7-830b-6e4eab690521?version=1.0

[80] United Nations Development Programme. (2025, May 13). Montenegro presents its first AI Readiness Assessment Report for the Public Administration [Press release]. UNDP. https://www.undp.org/montenegro/press-releases/montenegro-presents-its-first-ai-readiness-assessment-report-public-administration

[81] Western Balkans Investment Framework. (2025, March 18). Montenegro receives a €23 million grant to enhance sustainable water use and climate resilience [News release]. WBIF. https://www.wbif.eu/news-details/montenegro-receives-23-million-grant-enhance-sustainable-water-use-and-climate-resilience

[82] United Nations Development Programme. (2025, May 13). Montenegro presents its first AI Readiness Assessment Report for the Public Administration [Press release]. UNDP. https://www.undp.org/montenegro/press-releases/montenegro-presents-its-first-ai-readiness-assessment-report-public-administration

institutional capabilities to manage advanced digital solutions, must be prioritized.[83] EU-funded technical assistance programs assist local authorities, together with water utilities, in adopting new digital tools and managing data and EU regulatory compliance. A Consolidated Data Center (CDC) in Nikšić is under development for the energy sector while also serving as a technological hub for data-driven decision making and inter-institutional cooperation.[84]

17.   Morocco

Baseline assessment

Morocco's water sector is undergoing a significant digital transformation, spurred by mounting water scarcity, rapid urbanization and the impacts of climate change. Digital technology adoption in the country has made substantial progress over the last ten years, particularly in agricultural areas, as well as in water utilities and public infrastructure systems.[85] The National Office for Electricity and Drinking Water leads the implementation of digitalization projects, which can involve deploying advanced metering infrastructure together with real-time monitoring systems.[86] Water treatment and sewerage connection rates remain low in rural areas where only 10% of homes receive service, and wastewater treatment reaches fewer than 5% of the total population.[87]

Specific goals and milestones for digital transformation in water management

Using AI, machine learning and IoT technologies, Morocco aims to achieve its strategic digital transformation goals for enhancing the efficiency and resilience of its water management sector. The government works with international organizations to develop AI-driven decision support systems, real-time monitoring and predictive analytics for optimizing water resource management.[88] The African Development Bank's €104.7 million loan in 2024 is a major milestone, specifically aimed at boosting digitalization within The National Office of Electricity and Drinking Wate (ONEE), expanding drinking water production and enhancing the performance of supply systems in multiple regions.[89]

Capacity-building initiatives

The digital water strategy of Morocco focuses on enhancing irrigation modernization while improving water management and securing water resources through capacity-building initiatives. This strategy includes programs to improve irrigation services, implementation of

[83] United Nations Development Programme. (2025, May 13). Montenegro presents its first AI Readiness Assessment Report for the Public Administration [Press release]. UNDP. https://www.undp.org/montenegro/press-releases/montenegro-presents-its-first-ai-readiness-assessment-report-public-administration

[84] Spasić, V. (2025, March 24). Montenegro's EPCG, DSO, TSO to establish Consolidated Data Center [News article]. Balkan Green Energy News. https://balkangreenenergynews.com/montenegros-epcg-dso-tso-to-establish-consolidated-data-center/

[85] Fakhraddine, M., Zerrad, N., Berhili, H., & Morchid, M. (2025, April). Digital transformation in Moroccan agriculture: Applications, used technologies, impacts on marketing, limitations, and orientations for future research. Smart Agricultural Technology, 11, 100978. https://doi.org/10.1016/j.atech.2025.100978

[86] North Africa Post. (2024, December 10). AfDB contributes €104.7 million to boost water sector in Morocco, speed up ONEE digitalization [News article]. https://northafricapost.com/82574-afdb-contributes-e104-7-million-to-boost-water-sector-in-morocco-speed-up-onee-digitalization.html

[87] Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). (2024). Sustainable water management in Morocco. https://www.giz.de/en/worldwide/127115.html

[88] Intelligence Artificielle Maroc. (2024). AI for sustainable water management in Morocco. https://www.intelligenceartificiellemaroc.com/en/blog/ai-for-sustainable-water-management-in-morocco/

[89] North Africa Post. (2024, December 10). AfDB contributes €104.7 million to boost water sector in Morocco, speed up ONEE digitalization [News article]. https://northafricapost.com/82574-afdb-contributes-e104-7-million-to-boost-water-sector-in-morocco-speed-up-onee-digitalization.html

new on-farm irrigation technology and climate change adaptation strategies. The government is collaborating with tech companies and research institutions to promote Artificial Intelligence and environmental management to the population.[90]

18.   North Macedonia

Baseline assessment

North Macedonia is at a pivotal stage in its digital transformation journey for water management, underpinned by a robust digital public infrastructure and ongoing alignment with European Union standards. The country has made notable progress in developing digital identification, data interoperability platforms, electronic services portals and digital registries, providing a strong foundation for digitalization across sectors, including water and agriculture.[91] The water sector continues to face ongoing difficulties due to water scarcity risks in Skopje, decentralized governance structures, inadequate transboundary coordination, insufficient data collection, and system interoperability.[92]

Specific goals and milestones for digital transformation in water management

The digital transformation goals of North Macedonia for water management align with both EU integration targets and national development priorities. The government, together with international organizations including the European Union (EU), European Investment Bank (EIB) and Food and Agriculture Organization (FAO), aims to modernize water infrastructure, improve data-driven decision-making and foster sustainable resource management. The construction of Skopje's major wastewater treatment plant received support from a €70 million EU grant and a €68 million EIB loan to achieve 90% water purification and provide sanitation services to half a million people.[93]

Capacity-building initiatives

National and international stakeholders are implementing education, training and awareness-building programs targeting technical personnel, policymakers and the general public.[94] The FAO conducts workshops and consultations to teach digital literacy skills to farmers and local officials who will use digital tools in agriculture and water management.[95] The implementation of cybersecurity training aims to protect essential water infrastructure from current security

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[90] Stockholm International Water Institute (SIWI). (2024). Water Integrity Capacity Building Programme in MENA. https://siwi.org/undp-siwi-water-governance-facility/programmes/water-integrity-programme/water-integrity-capacity-building-programme-in-mena#:~:text=The%20programme%20combines%20a%20series,49%20per%20cent%20were%20women.

[91] Food and Agriculture Organization of the United Nations (FAO). (2024). North Macedonia steps up efforts to digitalize agriculture. https://www.fao.org/europe/news/detail/north-macedonia-steps-up-efforts-to-digitalize-agriculture/en

[92] Mirta, M. (2024, June). Digital transformation in North Macedonia's agriculture [Report]. United Nations Economic Commission for Europe (UNECE). https://unece.org/sites/default/files/2024-06/15_North%20Macedonia_Mirta_27.5.pdf

[93] European Investment Bank. (2024). North Macedonia water development: Improving infrastructure and access. https://www.eib.org/en/stories/north-macedonia-water-development

[94] Mirta, M. (2024, June). Digital transformation in North Macedonia's agriculture [Report]. United Nations Economic Commission for Europe (UNECE). https://unece.org/sites/default/files/2024-06/15_North%20Macedonia_Mirta_27.5.pdf

[95] Food and Agriculture Organization of the United Nations (FAO). (2024). North Macedonia steps up efforts to digitalize agriculture: National consultation workshop held in Skopje. https://www.fao.org/in-action/enhancing-land-consolidation/news/news-detail/north-macedonia-steps-up-efforts-to-digitalize-agriculture--national-consultation-workshop-held-in-skopje/en

threats.[96] The implemented initiatives aim to achieve digital transformation through inclusive and sustainable practices that meet national objectives and EU accession standards.

19. Palestine

Baseline assessment

The Palestinian water sector operates under severe conditions due to water scarcity, inadequate infrastructure, political restrictions and technological limitations. The Palestinian Water Authority (PWA) is responsible for managing water resources in the West Bank and Gaza Strip, where the sector is characterized by aging networks, high non-revenue water (often exceeding 40%).[97] The sector faces multiple barriers, but digital transformation has gained increasing acceptance as a solution to enhance operational efficiency and transparency and build resilience. The water management sector has started implementing digital tools for monitoring water resources and managing billing operations and customer relations.[98]

Specific goals and milestones for digital transformation in water management

The PWA has established its digital transformation vision through the National Water Sector Strategy and the Water Sector Digitalization Roadmap, which received support from international agencies including the World Bank, GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and the European Union. The PWA aims to achieve three main objectives through digital transformation by expanding digital monitoring systems to minimize water losses, using GIS and remote sensing for resource mapping and planning and creating integrated digital platforms for data collection and decision support.[99]

Capacity-building initiatives

The digital water agenda of Palestine places capacity building as its main priority. Through partnerships with international donors, the PWA has established training programs to teach utility staff, engineers and IT professionals about digital asset management, data analytics, smart metering and Supervisory Control and Data Acquisition (SCADA) system operation. Educational institutions have started teaching water informatics, Geographical Information Systems and digital resource management as part of their curriculum.

20. Portugal

Baseline assessment

Portugal has made notable progress in digitalizing its water sector, leveraging a strong foundation of digital infrastructure and a clear vision for future development. The initial assessment shows that major utilities like Águas do Porto are already adopting advanced digital tools, such as Geographical Information Systems (GIS), Supervisory Control and Data Acquisition (SCADA) and digital twin technologies. For instance, the H2Porto platform consolidates data from 22 different sources, offering real-time monitoring and enabling predictive analytics that have significantly enhanced asset management. Additionally, the use

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[96] United Nations Development Programme. (2024). Cybersecurity in water services management in North Macedonia [Project description]. https://www.undp.org/north-macedonia/projects/cybersecurity-water-services-management

[97] United Nations Information System on the Question of Palestine (UNISPAL). (n.d.). Report on [Title unavailable] [PDF]. https://unispal.un.org/pdfs/47657-GZ.pdf

[98] Water and Sanitation Regulatory Council (WSRC) Palestine report PDF. Water and Sanitation Regulatory Council (WSRC). (n.d.). [PDF]. https://www.wsrc.ps/public/uploads/Publication/1703588627781695.pdf

[99] World Bank. (2025). [PDF]. https://documents1.worldbank.org/curated/en/099506102242310229/pdf/IDU06d497800013b6043370b27605da07e93f893.pdf

of Internet of Things (IoT) sensors has transformed traditional meters into smart meters, providing reliable and current data streams.[100] Portugal's role as an international connectivity hub, with a strong submarine cable infrastructure, further enables seamless data exchange and real-time communication. Key results from these efforts include a 25% boost in operational efficiency, a 30% decrease in water supply failures and a 99% accuracy rate for data in Porto.[101]

Specific goals and milestones for digital transformation in water management

Portugal's National Strategy for Smart Territories (ENTI), launched in late 2023, aims to leverage digital technologies to promote sustainability, efficient governance, and better decision-making. Supported by Recovery and Resilience Facility (RRF) investments and part of the broader Digital and Smart Nation agenda, ENTI concentrates on transforming data into actionable insights through high-speed connectivity and interoperable digital services. Key tools include the future Smart Territories Portal, National Data Management System, Public Policies Dashboard, and the Local Government Observatory, all designed to improve data sharing and service delivery. Urban Management Platforms will enable integrated data handling, digitized procedures, and support for smart energy grids, mobility, and environmental monitoring. Notably, five digital twins will be developed to address national priorities such as climate resilience, water management, mobility, and civil protection.[102]

Capacity-building initiatives

Portugal's Action Plan for Digital Transition, approved in April 2020, highlights capacity building as a key pillar, along with digital inclusion and professional reskilling. This pillar focuses on three sub-elements: digital education, professional training and reskilling, and basic digital literacy for adults.[103] In practice, professionals, including those in the water sector, are supported through initiatives like the UPskill program, vocational reskilling, and partnerships between universities and companies to align education with labor market needs. These measures aim to equip public servants, business professionals, and citizens with the digital skills essential for Portugal's transition to a smarter, more inclusive economy.[104]

21.   Slovenia

Baseline assessment

Slovenia is accelerating its digital transformation of water management through its existing national digital strategies and modern digital framework. The government's "Digital Slovenia 2030" strategy establishes digitalization as an essential foundation for public administration as

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[100] Ruhwedel, S. (2021, September 28). *Águas do Porto combines data from 22 types of sources into a digital twin*. *Gwf Wasser|Abwasser*. https://gwf-wasser.de/products-solutions/water-management-guas-do-porto-combines-data-from-22-types-of-sources-into-a-digital-twin/

[101] Waltero. (2025, March 25). Digital Twin Water Utility and Unified Analytics. https://waltero.com/resources/digital-twin-water-utility/

[102] European Commission. (2025, June). *Digital Decade 2025 country report: Portugal*. Directorate-General for Communications Networks, Content and Technology. https://wwwcdn.dges.gov.pt/sites/default/files/digital_decade_2025_country_report_portugal.pdf

[103] European Commission. (2020, April 21). *Action Plan for the Digital Transition*. Council of Ministers Resolution No. 31/2020. Digital Skills and Jobs Platform. https://www.portugal.gov.pt/download-ficheiros/ficheiro.aspx?v=%3D%3DBQAAAB%2BLCAAAAAAABAAzNDExMQIA5ua1dQUAAAA%3D

[104] Cedefop & ReferNet. (2025). *Action plan for the digital transition: Portugal*. In *Timeline of VET policies in Europe (2024 update)* [Online tool]. Cedefop. https://www.cedefop.europa.eu/en/tools/timeline-vet-policies-europe/search/39096

well as for economic development and critical infrastructure, including water sector operations.[105] The Slovenian water utilities are using artificial intelligence, machine learning, IoT and digital twins that are helping to optimize flood management, reduce water and enhance irrigation efficiency.

Specific goals and milestones for digital transformation in water management

Slovenia's digital transformation objectives for water management are strongly linked to the European Union (EU) directive requirements. Following the 2023 floods, the government has launched a "super advanced digital ecosystem" initiative to link satellite observation with supercomputing and Artificial Intelligence (AI) systems for precise water flow and risk monitoring.[106] The EU Cohesion Policy Programme 2021–2027 serves as a guide for modernizing and digitizing urban wastewater collection and treatment infrastructure across agglomerations exceeding 2,000 population equivalents.[107]

Capacity-building initiatives

The water sector of Slovenia benefits from a robust academic and research system, which includes Ljubljana and Maribor universities that deliver advanced programs in computer science and engineering alongside environmental management. The government supports public-private partnerships and knowledge exchange platforms to accelerate the adoption of digital solutions and drive innovation. Slovenia utilizes EU programs and the Digital Agenda for the Western Balkans to connect its capacity development efforts, thereby accessing best practices and technical assistance for water management digital transformation.

22. Spain

Baseline assessment

Spain is internationally recognized as a leader in the digital transformation of the water sector, underpinned by a robust ecosystem of utilities, technology providers and public-private partnerships. The country's water utilities, such as Global Omnium, have pioneered the integration of IoT, big data and artificial intelligence across the entire water cycle for over a decade. Platforms like GoAigua, developed from Global Omnium's digital transformation, unify data from Supervisory Control and Data Acquisition (SCADA), Geographical Information Systems (GIS) and Internet of Things (IoT) sensors, providing a holistic, real-time view of water infrastructure and processes.[108] This approach enables advanced analytics, leak detection, fraud prevention and predictive maintenance, resulting in substantial water savings, such as more than 4 million cubic meters annually in Valencia alone.[109] Spain's national strategy, notably through the Strategic Project for the Recovery and Economic Transformation (PERTE) plan, is mobilizing over €3 billion in public and private investment, supported by Next Generation

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[105] Turp-Balazs, C. (2025, April 23). Silicon shores: The Adriatic's digital infrastructure revolution. Emerging Europe. https://emerging-europe.com/analysis/silicon-shores-the-adriatics-digital-infrastructure-revolution/

[106] Slovenia Times. (2025, April 8). Slovenia calls for global partnership for water. https://sloveniatimes.com/40865/slovenia-calls-for-global-partnership-for-water

[107] Evropska sredstva. (2024, March). Povzetek programa skupaj [PDF]. https://evropskasredstva.si/app/uploads/2024/03/Povzetek-programa_skupaj_ENG.pdf

[108] Xylem. (2025). Global Omnium transforms from conventional to smart meter network. https://www.xylem.com/en-rw/support/case-studies-white-papers/global-omnium-transforms-from-conventional-to-smart-meter-network/

[109] Idrica. (2025). Experts discuss digital transformation in the water sector. https://www.idrica.com/blog/experts-digital-transformation-water/

European Union (EU) funds, to accelerate the adoption of digital solutions and further strengthen the country's position as a global reference in smart water management.[110]

Specific goals and milestones for digital transformation in water management

Spain's digital transformation agenda is comprehensive and ambitious. The PERTE plan outlines the deployment of extensive IoT sensor networks for real-time monitoring of water quality, consumption and system performance. Smart metering is a cornerstone, providing granular usage data to both utilities and consumers, empowering data-driven decisions to reduce wastage and enhance efficiency.[111] Spain is also leveraging Artificial Intelligence (AI) and cloud computing for advanced applications: for example, Amazon Web Services (AWS)-backed projects in Aragon are implementing AI-powered early warning systems for flood risk (protecting 700,000 residents in Zaragoza), optimizing agricultural irrigation through AI-driven recommendations and modernizing infrastructure with predictive analytics.[112] In Andalusia, AI tools like LSTMHybrid (Long Short-Term Memory) , developed by the University of Córdoba, predict weekly irrigation needs with high accuracy, allowing farmers to optimize water and energy use in response to drought and tariff periods.[113]

Capacity-building initiatives

Spain's capacity-building efforts are multi-faceted, involving both public and private sectors. The PERTE plan emphasizes collaboration between government, utilities, technology firms and research institutions to foster innovation and accelerate digital adoption. Companies like Idrica and GoAigua provide not only technology platforms but also consultancy, engineering and operational support to guide utilities through the digital transformation process.[114] Community engagement is also central: smart meters and digital platforms empower consumers to monitor and manage their water use, fostering a culture of sustainability. National and regional training programs, as well as partnerships with universities and industry, are building a workforce skilled in AI, data analytics and digital water management, ensuring the sector's long-term resilience and adaptability.

23. Tunisia

Baseline assessment

Tunisia stands among the world's most water-stressed countries, with only 450 cubic meters of water available per person each year. The nation has utilized 4.4 km³ of its total water potential. The agricultural sector in Tunisia uses 80% of the country's total water resources, while export-oriented citrus and vegetable cultivation policies continue to reduce national water reserves.

[110] Tolba Aboelnga, H. (2024). Digital transformation for water and sustainable development in the Mediterranean [Report]. Union for the Mediterranean. https://ufmsecretariat.org/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf

[111] Tolba Aboelnga, H. (2024). Digital transformation for water and sustainable development in the Mediterranean [Report]. Union for the Mediterranean. https://ufmsecretariat.org/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf

[112] Amazon Web Services. (2025, March 3). AWS AI powers new water projects in Spain. https://www.aboutamazon.eu/news/sustainability/aws-ai-powers-new-water-projects-in-spain

[113] Olive Oil Times. (2023, August 23). Researchers in Andalusia develop AI tool to improve irrigation efficiency. https://www.oliveoiltimes.com/business/researchers-in-andalusia-develop-ai-tool-to-improve-irrigation-efficiency/121683

[114] Xylem. (2024). Global Omnium transforms from conventional to smart meter network. https://www.xylem.com/en-rw/support/case-studies-white-papers/global-omnium-transforms-from-conventional-to-smart-meter-network/

Specific goals and milestones for digital transformation in water management

The "Eau 2050" vision serves as Tunisia's digital transformation strategy by delivering an extensive water sector development plan through integrated resource management systems. The General Directorate of Governance collaborates with the government to develop digital platforms for public water resource management, enhancing transparency and streamlining administrative services. The new initiatives aim to simplify groundwater exploration authorization procedures while eliminating middlemen and establishing specific timeframes for each procedural step.

Capacity-building initiatives

Tunisia is implementing comprehensive capacity-building programs through the InTERiM (IoT and Edge for water Management) project, combining Swiss expertise in edge computing with Tunisian Internet if Things (IoT) smart agriculture applications for irrigation water management. The initiative brings together the Institute of Technology, Higher School of Communication of Tunis (SupCom), Institut National Agronomique de Tunisie (INAT) and telecom provider Ooredoo under a 250k Tunisian dinar budget to deploy intelligent Internet of Things applications on hybrid/cloud platforms. The project aims to create market expansion opportunities targeting Tunisia and broader African markets through technology transfer and capacity development.

24. Türkiye

Baseline assessment

Türkiye is rapidly advancing in the digitalization of its water management sector, driven by both national priorities and the need to address growing challenges such as water scarcity, aging infrastructure and urbanization. The State Hydraulic Works (DSİ) functions as the main water resources development authority, which controls planning and construction and operation of dams, irrigation networks, and drinking water systems. In parallel, the General Directorate of Water Management (SYGM) under the Ministry of Agriculture and Forestry plays a key role in policy-making, water resources planning, basin-level management, and the development of national water policies in line with EU directives and the 2030 Agenda for Sustainable Development. While increasing decentralization has brought more private sector and local association involvement in operations.[115] Major cities, including Istanbul, Ankara, and Konya, lead the adoption of digital urban governance through Internet of Things (IoT)-based water management, Artificial Intelligence (AI) driven analytics, and citizen engagement platforms to boost efficiency and transparency.[116]

Specific goals and milestones for digital transformation in water management

The digital transformation goals for water management in Türkiye align with national digitalization and sustainability targets. The country focuses on implementing smart meters and IoT sensors to obtain real-time water usage data, which will help decrease non-revenue water and boost operational performance.[117] AI and machine learning are being harnessed for

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[115] Kibaroğlu, A. (2022). Türkiye's water security policy: Energy, agriculture, and transboundary issues. Insight Turkey, 24(2). https://www.insightturkey.com/articles/turkiyes-water-security-policy-energy-agriculture-and-transboundary-issues

[116] Doğan, G. (2025, March 3). Digital urban governance in an era of AI. BROAD-ER. https://broad-er.eu/2025/03/03/digital-urban-governance-in-an-era-of-ai/

[117] Waltero. (2025). Utility asset management in Turkey 2025: Digitization & IoT. Waltero. https://waltero.com/resources/utility-asset-management-in-turkey/

predictive maintenance, early leak detection and energy optimization, with real-world results already observed in urban utilities and industrial settings.

Capacity-building initiatives

Utilities, together with municipalities, dedicate funds to train their staff members for operating and maintaining smart meters, IoT devices, and advanced analytics platforms. Public-private partnerships, in collaboration with technology providers, facilitate the transfer of knowledge and the implementation of best practices in AI, cybersecurity, and digital asset management.[118]

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[118] Waltero. (2025). Utility asset management in Turkey 2025: Digitization & IoT. Waltero. https://waltero.com/resources/utility-asset-management-in-turkey/

Annex II - Country specific policy and regulatory frameworks

Enabling policy and regulatory environments for digital transformation is an important aspect to promote implementation of the strategic framework. This chapter covers reviewing the status of each country on:

- Developing or updating national policies that encourage the adoption of digital tools in the water sector;
- Creating frameworks for data governance, including standards for data collection, sharing and privacy.

Activities undertaken by the Mediterranean countries regarding enabling policy environments for digitalization (with focus on the water sector) are presented below.

1. Albania

Situational analysis of policy and regulatory situation

Since 2018, Albania has made swift progress in digital transformation and emerged as the top e-government and digital public service provider in the region. The water management in the country is regulated through the Water Resources Management Agency (WRMA). The e-Albania platform enables access to 95% of public services which shows a high level of policy dedication to digitalization. The legal and institutional framework for water management is well established, with the Water Regulatory Authority (WRA), the Ministry of Infrastructure and Energy (MIE) and the National Agency of Water Supply, Sewerage and Waste Infrastructure (AKUM) playing central roles in sector regulation, investment and policy development.[119]

Activities undertaken regarding enabling policy environments

Digital transformation is supported by various initiatives launched by the Albanian government, which have an increasing focus on new technologies and artificial intelligence. In 2023, Albania started to integrate Artificial Intelligence (AI) in public services through the Virtual Assistant 1.0 and Diella projects and the development of AI modules for European Union (EU) standard legal harmonization.[120] The government also implemented an ethical framework for AI usage. In 2024, plans were underway to implement full automation of the procurement system through AI, aiming to create a transparent, efficient, and paperless system that reduces human error and increases competition.[121]

In the water sector, digital transformation is encouraged through regulatory decisions that link tariff approvals and performance targets to the adoption of digital management tools, such as Supervisory Control and Data Acquisition (SCADA) and remote meter reading. The Albanian Water Regulatory Authority and AKUM have established cooperation agreements for integrated performance information systems, supporting real-time data collection and reporting for water utilities.[122] National strategic plans, including the National Plan for the

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[119] Water Regulatory Authority of Albania. (n.d.). The Water Regulatory Authority of Albania. WAREG. Retrieved June 16, 2025, from https://www.wareg.org/articles/the-water-regulatory-authority-of-albania/

[120] National Agency for Information Society. (2025). Digital revolution in Albania. EPC-Tirana Summit. Retrieved June 16, 2025, from https://epctiranasummit.al/digital-revolution

[121] Kadyrzhanova, A. (2024, September 25). Albania plans AI-driven public procurement. bne IntelliNews. Retrieved June 16, 2025, from https://www.intellinews.com/albania-plans-ai-driven-public-procurement-345031/

[122] Shani, N. (2024, February 7). Artikulli i digitalizimit. Energy Regulatory Authority of Albania. Retrieved June 16, 2025, from https://erru.al/wp-content/uploads/2024/02/Eng_Artikulli-i-Digitalizimit_7.2.2024-revised-Shani.pdf

Sustainable Development of Digital Infrastructure (2020–2025), support the digitalization actions by promoting universal broadband access and high-speed connectivity for public institutions as well as comprehensive 5G coverage.[123]

Actions

To further advance digital transformation in water management, the Albania should focus on several key actions:

- Accelerate the development of sector-specific regulatory frameworks for AI and machine learning in water management, building on its national AI strategy and recent ethical guidelines. This includes establishing clear standards for data governance, privacy and interoperability to facilitate secure data sharing across agencies and utilities and aligning with EU digital regulations as part of the ongoing integration process.
- Capacity-building initiatives must be expanded, targeting water sector professionals with training in AI, data analytics and digital operations. This will help address disparities in digital adoption among utilities and ensure that all regions benefit from modernized, efficient water services.
- The government should promote public-private partnerships and leverage international cooperation, including ongoing support from the World Bank and other donors, to finance digital upgrades and foster innovation in water management. Special attention should be given to scaling up proven digital tools such as Supervisory Control and Data Acquisition (SCADA), smart metering and AI-driven anomaly detection—to all utilities, not just those with donor support.
- Finally, harmonizing national regulations with regional and international standards, particularly in data governance and AI ethics, will be essential for cross-border cooperation and integration with broader Mediterranean digital ecosystems.

2.   Algeria

Situational analysis of policy and regulatory situation

Algeria has made important progress in creating supportive digital transformation policies and regulations that focus on artificial intelligence and advanced technologies. The National Digital Strategy, alongside the recently introduced National Artificial Intelligence (AI) strategy, functions as the foundation for the government to speed up digital transformation in every sector, including water management.[124] The regulatory framework includes detailed laws that protect data privacy as well as ensure cybersecurity and regulate electronic communications. The Law Relating to the Protection of Individuals in the Processing of Personal Data, implemented in August 2023, mandates strict data governance and security standards. Sectoral cybersecurity frameworks require the appointment of dedicated security officers and the implementation of robust technical safeguards for information systems.[125]

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[123] Government of Albania. (2019). Albania's national plan for the sustainable development of digital infrastructure (2020–2025). https://dig.watch/resource/albanias-national-plan-for-the-sustainable-development-of-digital-infrastructure-2020-2025
[124] Debbah, M. (2024, October 12). Algeria unveils AI strategy to boost digital transformation. Ecofin Agency. https://www.ecofinagency.com/public-management/1012-46241-algeria-unveils-ai-strategy-to-boost-digital-transformation
[125] Digital Policy Alert. (2025, April 16). DPA digital digest: Algeria [2025 edition]. https://digitalpolicyalert.org/digest/dpa-digital-digest-algeria

Activities undertaken regarding enabling policy environments

Under its 'Digital Algeria 2030' initiative, the government of Algeria launched more than 500 digital projects, which dedicated substantial funds to transform public institutions and build digital governance structures. The government has developed an Interactive National Portal for Digital Services together with an interoperability platform, which consolidates administrative procedures to improve access for distant communities. The initiatives maintain support through updated regulatory frameworks in telecommunications and content moderation, as well as competition policy, which ensures both fairness and security in the digital marketplace.

The national AI strategy of Algeria focuses on Artificial Intelligence research together with innovation, while building a favorable environment for start-ups to develop. The strategy includes establishing a national AI fund, enhancing system data, and expanding Algerian National Agency for Personal Data Protection (ANPDP) regulatory frameworks to manage AI-specific regulatory requirements.[126]

Actions

Algeria should continue to strengthen its policy and regulatory frameworks to leverage AI and digital technologies in water management fully. The following actions are recommended:

- Develop a dedicated legal framework for AI in water management that addresses sector-specific risks, ethical considerations and data privacy, building on the existing AI strategy and data protection laws.
- Expand capacity-building programs targeting water sector professionals, focusing on AI, machine learning and data analytics skills to bridge the digital skills gap identified in international assessments.
- Promote public-private partnerships and international cooperation to attract investment, share best practices and accelerate the deployment of advanced digital solutions, such as Internet of Things (IoT)-enabled water monitoring and predictive analytics platforms.
- Harmonize national regulations with regional and international standards, particularly in data governance and AI ethics, to facilitate seamless integration with Mediterranean and African digital ecosystems.

3.   Bosnia and Herzegovina

Situational analysis of policy and regulatory situation

Bosnia and Herzegovina (BiH) is advancing its digital transformation agenda, though progress is uneven and faces unique challenges due to the country's complex administrative structure. The digitalization of public services is underway, with initiatives such as the eCitizen platform, which enables direct communication between residents and local authorities, and other digital tools that improve transparency and access to services. However, the adoption of advanced digital solutions in the water sector remains limited and fragmented.[127]

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[126] Digital Policy Alert. (2025, April 16). DPA digital digest: Algeria [2025 edition]. https://digitalpolicyalert.org/digest/dpa-digital-digest-algeria

[127] United Nations Development Programme. (2023, December 20). *A matter of choice: Reimagining development in Bosnia and Herzegovina in the age of AI*. UNDP Bosnia and Herzegovina. https://www.undp.org/bosnia-herzegovina/blog/matter-choice-reimagining-development-bosnia-and-herzegovina-age-ai

The legal and institutional framework for water management in BiH is characterized by high fragmentation, with responsibilities distributed across the state, entity (Federation of BiH and Republika Srpska), cantonal, and municipal levels. The primary legislation governing water management is the Entity Laws on Water and Communal Affairs, complemented by cantonal laws in the Federation. Recent efforts have focused on harmonizing these laws with the European Union (EU)'s Water Framework Directive and other relevant EU directives, aiming to ensure integrated water resource management at the river basin level.[128]

Activities undertaken regarding enabling policy environments

BiH has launched several initiatives to foster an enabling environment for digital transformation, including in the water sector. Digital transformation projects, often supported by international partners such as United Nations Development Programme (UNDP), focus on building digital capacity, improving operational and financial planning, and introducing performance indicators for utilities. The Municipal Environmental Governance (MEG) 2 project, for example, supports municipalities and utilities in establishing systematic management practices and developing water services laws that standardize practices and mandates across the country.[129]

The use of artificial intelligence in public administration is still in its early stages, with pilot projects such as the Municipal Intelligent Assistant (MIA) chatbot implemented in select municipalities to assist citizens with utility-related inquiries.[130] The only direct reference to Artificial Intelligence (AI) in legislation is found in the Federation's 2021–2027 Development Strategy, and a working group has been established to draft a dedicated law on Artificial Intelligence (AI).[131]

Actions

To advance digital transformation in water management, Bosnia and Herzegovina should prioritize the following actions:
- Accelerate the development of sector-specific digital and AI frameworks: Finalize and implement regulatory frameworks for AI and digital technologies in water management, ensuring alignment with national strategies and European Union digital regulations.
- Expand capacity building initiatives:
  Invest in training for water sector professionals in digital operations, data analytics, and AI applications. This will help address disparities in digital adoption between utilities and regions, ensuring equitable access to modernized services.
- Harmonize regulations with EU and international standards: Continue aligning water management and digital transformation policies with EU directives and best practices,

[128] The World Bank. (2021, February 8). *Project Information Document (PID): BiH Water and Sanitation Services Modernization Project (P168943)* (Report No. PIDA29924).

[129] United Nations Development Programme. (2022, March 21). *Water is not a luxury: How we are building better water services in Bosnia and Herzegovina*. UNDP Bosnia and Herzegovina. https://www.undp.org/bosnia-herzegovina/blog/water-not-luxury-how-we-are-building-better-water-services-bosnia-and-herzegovina

[130] Bosnia and Herzegovina, Ministry of Human Rights and Refugees. (2025, May 5). *Human Rights Council Resolution 57/5, questionnaire – delivered* (No. 01-05-1752-5/24) [Correspondence]. Bosnia and Herzegovina, Ministry of Foreign Affairs.

[131] United Nations Development Programme. (2024). *Factsheet: Artificial intelligence in local government — Driving innovation, bridging gaps and shaping the digital transition in the Western Balkans and Moldova*. UNDP.

particularly in data governance and AI ethics. This will facilitate cross-border cooperation and integration into broader European digital ecosystems.

4. Croatia

Situational analysis of policy and regulatory situation

Croatia is actively shaping its policy and regulatory environment to support digital transformation, particularly through the integration of artificial intelligence and advanced digital technologies. Croatia's European Union (EU) membership necessitates adherence to European Union policy and regulatory directives to align its Artificial Intelligence (AI) and digital strategy with the EU's objectives.[132]

The water management sector in Croatia has a comprehensive legal framework, which includes the Water Act and related regulations that have established standards for water quality, resource management and protection against harmful effects. Under the Ministry of Economy and Sustainable Development, Croatian Waters (Hrvatske Vode) is the central authority that implements policies and coordinates water management activities at national, regional and local levels.[133]

Activities undertaken regarding enabling policy environments

Croatia has initiated several projects and policy measures to foster an enabling environment for digital transformation in water management. Notably, the SMART-Water project, launched in 2024, exemplifies the integration of AI and sensor technologies for real-time monitoring and inspection of inland water quality. This initiative leverages geospatial data, satellite imagery and predictive AI models to continuously assess the physical and chemical characteristics of water in pilot areas, including Croatia's Vrana Lake. Key national institutions, such as the Ruđer Bošković Institute and the University of Zadar, are actively involved in developing Geographical Information Systems (GIS) databases, remote sensing methodologies and water quality prediction models.[134]

At the policy level, Croatia's forthcoming AI development plan emphasizes the digitalization of the economy, the cultivation of AI management skills and the establishment of robust data governance frameworks. The government has formed a working group comprising representatives from public institutions, academia and the private sector to ensure that the regulatory framework supports innovation while safeguarding ethical standards and societal well-being.[135]

Actions

To advance digital transformation in water management, Croatia should prioritize the following actions:

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[132] Kadyrzhanova, A. (2025, May 27). Croatia to launch AI development plan as minister warns of major job market shifts. bne IntelliNews. https://www.intellinews.com/croatia-to-launch-ai-development-plan-as-minister-warns-of-major-job-market-shifts-383204/

[133] Kadyrzhanova, A. (2025, May 27). Croatia to launch AI development plan as minister warns of major job market shifts. bne IntelliNews. https://www.intellinews.com/croatia-to-launch-ai-development-plan-as-minister-warns-of-major-job-market-shifts-383204/

[134] Interreg Central Europe. (2024). National-level policy recommendations: Croatia [PDF]. https://programme2014-20.interreg-central.eu/Content.Node/D.T.3.4.3--National-level-policy-recommendations-CROATIA.pdf

[135] Just AI. (2025). AI regulations and policies in Croatia. https://justai.in/ai-regulations-and-policies-in-croatia/

- Finalize and implement its National AI Development Plan, ensuring that it includes sector-specific guidelines for the responsible use of AI in water management. This should encompass standards for data collection, sharing and privacy, in line with EU regulations, to facilitate secure and interoperable digital systems across the sector.
- Capacity-building initiatives must be expanded to equip water sector professionals with the necessary skills in AI, machine learning and data analytics. Collaboration between government, academia and the private sector should be strengthened to foster research, innovation and the practical deployment of AI solutions in water utilities.
- The government should continue to support and scale up pilot projects like SMART-Water, which demonstrate the value of AI-driven monitoring and predictive analytics for water quality and resource management. Lessons learned from these projects should inform national policy and regulatory updates, ensuring that successful digital tools are adopted more broadly.

5. Cyprus

Situational analysis of policy and regulatory situation

Cyprus faces acute water scarcity, intensified by climate change and frequent droughts, which has driven the country to prioritize innovation and digital transformation in water management. The national regulatory framework for water management in Cyprus operates through both domestic laws and the European Union's (EU) Water Framework Directive, which requires sustainable water practices, pollution control, and adaptation to extreme weather events. The European Commission recently criticized Cyprus for its failure to match EU requirements in water legislation since the country did not conduct regular water permit reviews as required by the Directive. The current regulatory deficit shows that policy mechanisms must be more flexible and adaptive to maintain continuous compliance and efficient resource management.[136]

The water sector of this country operates through disconnected data platforms that require better implementation of digital management systems. Multiple organizations, including the Water Development Department and local water boards, have responsibilities in water management, but their separate systems create operational inefficiencies and data silos.

Activities undertaken regarding enabling policy environments

Cyprus implements modern water management through digital and Artificial Intelligence (AI)-based technologies to enhance its sector operations. The KIOS Center, alongside local authorities and international partners, established smart water systems that combine sensor networks with advanced geographical information systems and artificial intelligence analytics capabilities. The Oceanos Geographical Information System (GIS) platform receives real-time pressure and quality sensor data through thousands of kilometers of water pipe mapping in Limassol.[137]

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[136] European Commission. (2024, November 14). European Commission calls on Belgium and Cyprus to comply with the Water Framework Directive. Smart Water Magazine. https://smartwatermagazine.com/news/european-commission/european-commission-calls-belgium-and-cyprus-comply-water-framework
[137] Mundell, I. (2025, February 21). Smart systems keep water and power flowing in Cyprus. Imperial College London. https://www.imperial.ac.uk/news/261273/smart-systems-keep-water-power-flowing/

SmartWater2020, which received INTERREG V-A Greece-Cyprus programme funding, installed sensors, meters and valves to modernize water supply system operations. These monitoring systems use intelligent software to detect water leaks and quality problems as well as potential cyber threats. The project aims to reduce water waste and improve resource distribution through automated systems that use artificial intelligence. The Water Boards of Limassol and Larnaca, along with the Water Development Department, act as essential partners that translate industrial requirements into technological advancements.[138]

Actions

To further advance digital transformation in water management, Cyprus should focus on several strategic actions:

- Update its national regulatory framework to ensure full compliance with the EU Water Framework Directive, particularly by instituting mandatory periodic reviews of water permits. This will help maintain high standards for water quality and resource sustainability, while also aligning with broader European digital governance requirements.
- The government should accelerate the integration of AI and machine learning into water management policies, building on successful pilot projects. This includes establishing national standards for data collection, sharing, and privacy, as well as ensuring interoperability between different agencies' digital systems. Expanding capacity-building initiatives is essential, equipping water sector professionals with skills in digital operations, data analytics and AI-driven decision support.
- Further investment in smart infrastructure such as sensor networks, GIS platforms, and predictive analytics should be prioritized, with a focus on scaling up proven solutions from pilot projects to national deployment. Public-private partnerships and international collaborations, especially with EU research institutions, can provide both technical expertise and sustainable financing.

6.   Egypt

Situational analysis of policy and regulatory situation

Egypt's policy and regulatory environment for digital transformation in water management is shaped by both urgent national needs and ambitious development strategies. Severe water scarcity affects Egypt due to the country's population growth combined with climate change impacts and transboundary water challenges. The National Water Resources Plan 2037 (NWRP 2037) serves as Egypt's comprehensive plan for sustainable and equitable water management by placing digitalization and technological innovation at its core to optimize allocation, enhance resilience, and secure water resources for future generations.

The Holding Company for Water and Wastewater (HCWW), together with its 25 regional subsidiaries, maintains water management oversight through a framework that focuses on efficiency alongside service quality and environmental protection.[139]

[138] University of Cyprus. (n.d.). SmartWater2020: Innovative technologies to minimize the loss of water in Cyprus and Crete. KIOS Research and Innovation Center of Excellence. https://www.kios.ucy.ac.cy/projects_kios/smartwater2020-innovative-technologies-to-minimize-the-loss-of-water-in-cyprus-and-crete/
[139] Iskraemeco. (2024, January 24). Egypt water management. https://iskraemeco.com/blog/egypt-water-management/

Activities undertaken regarding enabling policy environments

The Egyptian government launched multiple strategic initiatives to build an enabling policy environment for digital transformation in water management through Artificial Intelligence (AI) and new technology development. The government has invested funds to improve water infrastructure through expanding digital monitoring systems alongside promoting smart water management solutions. Advanced digital sensors, together with Internet of Things (IoT) devices, function as real-time water quality and soil moisture monitoring tools. These technologies enable efficient irrigation, reduce water losses and provide actionable data for both farmers and water utilities, supporting sustainable resource allocation.[140]

Actions

To further enable digital transformation in water management, Egypt should continue to strengthen its policy and regulatory frameworks with a focus on AI and emerging technologies. The following actions are recommended:
- Finalize and implement sector-specific regulations for AI and machine learning in water management, ensuring robust standards for data governance, privacy and interoperability. This will facilitate secure data sharing between agencies and support the integration of digital tools across the sector.
- Expanding capacity-building programs is essential, targeting water sector professionals, utility operators and farmers with tailored training in digital operations, data analytics and AI-driven decision support. This will help bridge the skills gap and ensure effective use of new technologies.
- The government should scale up investment in smart infrastructure, such as sensor networks, digital meters and AI-powered analytics platforms, prioritizing both urban and rural areas. Public-private partnerships and international collaborations can provide technical expertise and sustainable financing for these initiatives.
- Harmonize its regulatory frameworks with regional and international standards, especially in data governance, cybersecurity and AI ethics, to facilitate cross-border cooperation and integration with Mediterranean and African digital ecosystems.

7. France

Situational analysis of policy and regulatory situation

The national water management policy of France is driven by a robust regulatory framework, which is consistent with the European Union's Water Framework Directive (EU-WFD). The framework is focused on the sustainable use of water, ecosystem conservation and stakeholder involvement at all levels of governance, ranging from national councils to local water agencies. The French system has evolved to institutionalize dialogue among the state, local communities and users, fostering a partnership approach to water governance that supports both resource optimization and environmental protection.[141]

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[140] Daily News Egypt. (2020, August 10). Egypt uses AI to improve water-efficient irrigation.
https://www.dailynewsegypt.com/2020/08/10/egypt-uses-ai-to-improve-water-efficient-irrigation/
[141] Nion, G. (2009). Water framework directive and water policies in France: Evolution and tools for a rational use of water resources. In M. El Moujabber, L. Mandi, G. Trisorio-Liuzzi, I. Martín, A. Rabi, & R. Rodríguez (Eds.), Technological perspectives for rational use of water resources in the Mediterranean region (pp. 221–230). CIHEAM.
https://om.ciheam.org/om/pdf/a88/00801197.pdf

In recent years, policy initiatives have increased in order to address the challenges of climate change, drought and resource scarcity. The 2023 Water Plan (Plan Eau) introduced 53 specific measures to improve water use efficiency, protect water quality and restore water bodies, to reduce water consumption by at least 10% by 2030.[142]

Activities undertaken regarding enabling policy environments

France has taken decisive steps to foster an enabling environment for digital transformation in water management, with a strong focus on Artificial Intelligence (AI) and advanced technologies. The INNOV EAU initiative, which is a part of France Water 2030, is aimed at the development of digital technology and data-driven solutions for the management of water resources.[143] The government has streamlined the procedures of the regulatory framework to speed up the implementation of the digital water management projects that include the water monitoring or water leak detection areas, where AI and Internet of Things (IoT) technologies are increasingly central.[144]

Major utilities and technology providers such as SUEZ have applied AI to convert millions of data points into actionable information that has improved leak detection and pollution tracking, predictive maintenance and customer engagement.[145]

Actions

To further advance digital transformation in water management, France should continue to refine its policy and regulatory frameworks with a particular emphasis on AI and emerging technologies. The following actions are recommended:

- Accelerate the adoption of AI-specific regulatory standards for the water sector, ensuring robust data governance, privacy and interoperability across agencies and utilities. This will facilitate secure data sharing and the integration of AI-driven solutions for leak detection, demand forecasting and predictive maintenance, enhancing both efficiency and resilience
- Capacity-building initiatives must be expanded, targeting water professionals and local authorities with training in digital operations, data analytics and AI-driven decision support. This will help bridge the digital skills gap and ensure widespread, effective use of new technologies
- The government should continue to incentivize public-private partnerships and scale up successful pilot projects, such as those under the INNOV EAU and Plan Eau initiatives, to national deployment. Investments in smart infrastructure sensor networks, digital twins and AI-powered analytics should be prioritized to optimize resource allocation and reduce waste.
- Maintain close alignment with European Union directives and foster cross-border cooperation with Mediterranean partners, harmonizing regulatory frameworks to facilitate the seamless integration of digital systems and joint responses to shared water challenges.

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[142] Pollutec Learn & Connect. (2025, May 30). Reuse of treated wastewater in France in 2025. https://learnandconnect.pollutec.com/en/reuse-of-treated-wastewater-in-france-in-2025/

[143] Capteurs d'Avenir. (2023, August 29). The surge in smart water solutions. Learn & Connect. Retrieved from https://learnandconnect.pollutec.com/en/the-surge-in-smart-water-solutions/

[144] Capteurs d'Avenir. (2025, May 10). Reuse of treated wastewater in France in 2025. Learn & Connect. Retrieved from https://learnandconnect.pollutec.com/en/reuse-of-treated-wastewater-in-france-in-2025/

[145] Suez. (2024). AI water and waste. https://www.suez.com/en/news/ai-water-waste

8. Greece

Situational analysis of policy and regulatory situation

Greece has made significant strides in establishing a robust policy and regulatory framework to support digital transformation, with a particular emphasis on artificial intelligence and emerging technologies. The country's digital governance is anchored in the National Digital Transformation Strategy (the "Digital Bible") 2020–2025, which sets digital inclusion standards alongside open data principles, interoperability and cybersecurity resilience.

Greece's Artificial Intelligence (AI) landscape is further shaped by the national AI strategy, "A Blueprint for Greece's AI Transformation," released in late 2024. This comprehensive blueprint, developed by a high-level advisory committee, sets out a vision for responsible, inclusive and innovation-driven AI deployment across all sectors, including water management.[146]

Activities undertaken regarding enabling policy environments

Greece has initiated multiple programs to create favorable conditions for digital transformation in water management. AI and Internet of Things (IoT) solutions currently serve Greek water management efforts to address both water scarcity problems, non-revenue water issues and infrastructure inefficiencies. The Municipality of Parga collaborated with Sigfox Hellas to deploy 7,000 IoT-enabled smart water meters that use low-power networks to collect real-time data for energy-efficient leak detection. The water utility EYATH in Thessaloniki uses Siemens' SIWA Blockage Predictor to analyze sensor and rainfall data for predicting blockages through AI technology, which helps prevent sewer overflows and pollution.[147]

The European project GEORGIA receives funding from the European Union (EU) to integrate AI-powered digital tools that optimize water management and agricultural irrigation systems while promoting sustainable crop production and climate change adaptation. The government backs initiatives to build a National AI Research Institute while establishing regulatory sandboxes for testing AI applications and a centralized National AI Data Hub that supports research and innovation.[148]

Actions

To further advance digital transformation in water management, Greece should continue to strengthen its policy and regulatory frameworks with a focus on AI and emerging technologies. Specifically:

- Accelerate the implementation of its national AI strategy, ensuring that sector-specific guidelines for water management are developed in line with European Union regulations and ethical standards. This includes establishing robust frameworks for data governance, privacy and interoperability, enabling secure and efficient data sharing between utilities, government agencies and research institutions.
- Capacity-building initiatives must be expanded, targeting water sector professionals with training in AI, machine learning and digital operations. The establishment of the

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[146] Digital Watch. (2024). A blueprint for Greece's AI transformation. https://dig.watch/resource/a-blueprint-for-greeces-ai-transformation

[147] Siemens. (n.d.). Thessaloniki blockage predictor. https://references.siemens.com/en/reference/thessaloniki-blockage-predictor?id=34229

[148] Lambadarios Law. (2025, February). What we know so far about Greece's AI national strategy. https://www.lambadarioslaw.gr/2025/02/what-we-know-so-far-about-greeces-ai-national-strategy/

National AI Research Institute and AI Centers of Excellence, in partnership with academia and industry, will be crucial for fostering innovation and developing a skilled workforce.

- The government should continue to support and scale up successful pilot projects, such as smart metering and AI-powered sewer monitoring, to other municipalities and regions. Public-private partnerships and European Union funding should be leveraged to finance large-scale digital upgrades and ensure that advanced technologies are accessible to both urban and rural communities.

- Maintain close alignment with European Union directives and foster cross-border cooperation with Mediterranean partners, harmonizing regulatory frameworks to facilitate data sharing and joint solutions to shared water challenges.

9. Israel

Situational analysis of policy and regulatory situation

Israel's approach to water management is globally recognized for its integration of advanced technologies, robust regulatory frameworks and institutional reforms. The Water Law (1959) serves as Israel's fundamental legal basis by establishing water resources as public state property to enable centralized management and distribution.[149] The Governmental Authority for Water and Sewage (Israel Water Authority -IWA) acts as the national regulator through its establishment in 2007 to direct planning processes and control water allocation, set tariffs and track performance for all water utilization purposes, including drinking supply, sanitation, irrigation and resource management.[150] At the same time, Mekorot operates as the national water company responsible for water production and transmission.

Israel's regulatory environment is designed to promote innovation and financial stability. The sector operates on a full cost recovery basis, with tariffs set to ensure financial independence and encourage efficiency. The legal framework is further strengthened by specific laws requiring water measurement, oversight of drilling activities, and flood prevention, creating a comprehensive system that supports both operational excellence and environmental protection.

Activities undertaken regarding enabling policy environments

Israel has quickly advanced the digital transformation of its water sector, focusing heavily on Artificial Intelligence (AI), Internet of Things (IoT), and smart technologies. The Water Authority aims for 100% smart water meter adoption by the end of 2026, with a current rate of 70%, one of the highest worldwide. These smart meters, supported by a national Long Range Wide Area Network (LoRaWAN) Internet of Things (IoT) network, deliver real-time consumption data, identify leaks, and send alerts, reducing water loss to just 7% and saving millions of cubic meters each year.

AI technology plays a crucial role in managing water resources. TaKaDu, IOsight, and Kando use Artificial Intelligence (AI) systems to detect leaks, perform predictive maintenance, and monitor pollution in both domestic and international markets.

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[149] World Bank. (2023). Water management in Israel: Key innovations and lessons learned for water-scarce countries [PDF]. https://documents1.worldbank.org/curated/en/657531504204943236/pdf/Water-management-in-Israel-key-innovations-and-lessons-learned-for-water-scarce-countries.pdf

[150] Fanack Water. (n.d.). Water management in Israel. https://water.fanack.com/israel/water-management-in-israel/

With remote AI monitoring systems operated by Ayyeka and Diagsense, real-time infrastructure inspections and water quality assessments become possible. Climate-Eyes employs satellite imagery and AI to evaluate reservoir quality and assess dike stability.

Actions

To further strengthen its leadership in digital water management, Israel should:

- Continue updating its regulatory frameworks to address emerging challenges related to AI, machine learning and data governance, ensuring robust standards for privacy, interoperability and cybersecurity in line with global best practices.
- Expand capacity-building programs for water professionals, utility operators and regulators, emphasizing digital skills, AI literacy and data analytics to maximize the benefits of advanced technologies.
- Scale up the integration of AI and IoT solutions across all segments of the water sector, including rural and underserved areas, to achieve the Water Authority's goal of 100% smart meter coverage and further reduce non-revenue water.
- Foster greater international cooperation and knowledge exchange, leveraging Israeli expertise to support regional and global efforts in sustainable management and digital transformation.
- Ensure ongoing harmonization of national regulations with evolving international standards, particularly in the fields of AI ethics, data privacy and digital infrastructure, to facilitate cross-border collaboration and technology transfer.

10. Italy

Situational analysis of policy and regulatory situation

The Regulatory Authority for Energy, Networks and Environment (ARERA) plays a central role in setting strategic directions, with a particular focus on digital transformation, infrastructure quality and consumer awareness. The regulatory framework established by Resolution 609/2021/R/idr promotes modern water measurement practices through the installation of smart metering technology and the adoption of digital tools.[151]

The Italian national Artificial Intelligence (AI) strategy for 2024-2026 establishes artificial intelligence as the fundamental element to drive digital transformation across public administration. The updated national AI strategy focuses on building clear, ethical, reusable AI solutions through solid nationwide data collection and model development, which follows European standards for digital and data governance.[152] Among the most advanced initiatives, the Digital Twin project developed by AUBAC (Central Apennines River Basin Authority) stands out as a best practice for the integration of digital technologies and AI in water management. The AUBAC Digital Twin provides a real-time, geo-referenced digital replica of the river basin, integrating remote sensing, GIS/BIM, hydrological and hydraulic modeling, artificial intelligence, and immersive visualization. This platform supports continuous environmental monitoring, predictive analytics for water demand and supply, risk scenario simulation (floods, droughts, wildfires, landslides), and integrated risk management for water resources and territorial protection. The Digital Twin AUBAC is designed for interoperability and scalability,

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[151] BIP Group. (2024). Digital water: How the integrated water system evolves. https://www.bip-group.com/news/digital-water-how-the-integrated-water-system-evolves
[152] Agenzia per l'Italia Digitale (AGID). (2024). Italian strategy for artificial intelligence 2024–2026 [PDF]. https://www.agid.gov.it/sites/agid/files/2024-07/Italian_strategy_for_artificial_intelligence_2024-2026.pdf

enabling multi-stakeholder coordination and serving as a model for other Mediterranean basins.

Activities undertaken regarding enabling policy environments

Italy has launched multiple initiatives to establish a favorable environment for the digital transformation of water management, which centers on AI and advanced analytics. The National Recovery and Resilience Plan Mission 2 allocates €900 million for new water networks with digital control systems, while Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) provides €482 million for digitalization and leakage reduction initiatives.[153]

Italian utilities are increasingly adopting AI-driven solutions, particularly geospatial AI analytics, to address the country's chronic leakage problem. Utilities like Acquedotto del Fiora and HERA Group use AI and satellite data to predict pipeline failures, optimize maintenance and prioritize investments, allowing even smaller operators to achieve efficiency comparable to larger utilities.[154] The Digital Twin AUBAC project further exemplifies the integration of advanced digital tools and AI for real-time monitoring, scenario analysis, and decision support at the river basin scale.

Actions

To accelerate digital transformation in water management, Italy should:

- Continue to refine its regulatory frameworks to support the widespread adoption of AI and digital technologies in the water sector. This includes updating standards for data governance, interoperability and cybersecurity and ensuring alignment with European Union directives and best practices. The national AI strategy's focus on transparent, ethical and trustworthy AI solutions should be fully integrated into water sector regulations, particularly for applications involving predictive analytics, leak detection and real-time infrastructure management.
- Expanded capacity building programs to equip water sector professionals with advanced digital and AI skills, supporting the effective deployment and management of smart systems. Public-private partnerships and increased investment in research and innovation are essential to scale up successful pilot projects and bring proven digital solutions to a national scale.
- Prioritize the integration of digital and AI-enabled water management systems across its fragmented utility landscape, leveraging national funding and regulatory incentives to drive consolidation and modernization. Continued investment in smart meters, digital twins and predictive maintenance platforms will be critical for reducing water losses, optimizing energy use and enhancing overall system resilience.
- Harmonize national regulations with European Union and Mediterranean standards will facilitate cross-border cooperation, data sharing and joint responses to shared water challenges, ensuring Italy's water sector is both future-ready and globally competitive.

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[153] BIP Group. (2024). Digital water: How the integrated water system evolves. https://www.bip-group.com/news/digital-water-how-the-integrated-water-system-evolves
[154] ISOIL. (2025). The Italian job: Using geospatial AI to improve water asset performance. https://www.isoil.it/en/category-news-en/the-italian-job-using-geospatial-ai-to-improve-water-asset-performance/

11. Jordan

Situational analysis of policy and regulatory situation

Jordan has started establishing a policy foundation to encourage digital innovation in the water sector. At the national level, digital transformation is driven by the Ministry of Digital Economy and Entrepreneurship (MODEE), which provides overarching strategies and guidelines. The water sector is aligning with this agenda: the latest National Water Strategy (2023–2040) emphasizes digital solutions and smart management as key to achieving water security.[155] While Jordan does not yet have a dedicated "digital water law," it has pertinent policies that facilitate digitalization. Notably, the government issued a Data Management and Classification Policy in 2019 to guide how public entities handle and share data. This policy framework, alongside a forthcoming national personal data protection law, lays the groundwork for trustworthy data governance.[156]

Activities undertaken regarding enabling policy environments

Jordan has undertaken several activities to enable an environment conducive to digital transformation in water management:

- National digital transformation strategy: This strategy includes explicit measures for digitalizing water management services, promoting interoperability, standardized data formats, and encouraging integration of digital tools throughout water infrastructure and administration.
- Data governance and standards: The Ministry of Water and Irrigation has developed frameworks for data governance, establishing standardized processes for data collection, sharing, security, and privacy. Recent reforms call for sector-wide coding systems to harmonize all data collection and reporting activities, and the creation of a National Water Information System designed to interlink with national and regional digital systems.
- Policy for Non-Revenue Water (NRW) reduction: Jordan has implemented a phased policy for reducing NRW, utilizing digital monitoring to support leak detection and accountability, and incorporating these measures into official performance and regulatory standards.

Actions

To accelerate digital transformation in water management, Jordan should:

- Develop and implement a dedicated digital water policy: Develop and adopt a sector-specific digital transformation policy with clear timelines, stakeholder roles, and legal mandates to support the full integration of advanced digital tools in water management.
- Scale capacity building programs: Expand training and retention initiatives for utility personnel, prioritizing skills in digital infrastructure maintenance, data management, cybersecurity and use of data analytics for decision-making.
- Promote inclusive, citizen-centric digitalization services: Ensure that future digital water services are designed for accessibility and user empowerment, leveraging digital

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[155] Ministry of Water and Irrigation. (2023). *National water strategy 2023–2040*. Government of Jordan.
https://www.mwi.gov.jo/EBV4.0/Root_Storage/AR/EB_List_Page/national_water_strategy_2023-2040.pdf
[156] Ministry of Digital Economy and Entrepreneurship. (2019). *Data management and classification policy*. Government of Jordan.
https://www.modee.gov.jo/EBV4.0/Root_Storage/EN/EB_List_Page/Data_management_and_classification_policy.pdf

> inclusion policies to bridge any gaps in access or skills between urban and rural populations.
> - Enhance funding mechanisms: Mobilize green finance and innovative funding tools to accelerate the procurement and deployment of state-of-the-art digital infrastructure in the water sector.

By pursuing these actions, Jordan can further enable a robust, adaptive regulatory environment and unlock the transformative benefits of digitalization for national water sustainability, efficiency, and equity.

12. Lebanon

Situational analysis of policy and regulatory situation

Lebanon's water sector governance is shaped by a centralized framework under the Ministry of Energy and Water (MEW), which coordinates with four Regional Water Establishments (RWEs) and the Litani River Authority. The governance structure was designed to enhance operational independence, financial sustainability and technical expertise to enable private sector participation and public-private partnerships.

The National Water Sector Strategy (NWSS) 2024–2035 provides a detailed plan for sector reform, emphasizing increased storage capacity, the development of a fully operational data management and monitoring system, improved water quality compliance, and increased hydropower production. The strategy also aims for ambitious service provision targets, such as achieving 90% reliable access to public water services by 2035, expanding wastewater treatment, and enhancing irrigation efficiency. Financial sustainability is a core focus, with efforts to recover operating costs through tariff adjustments, higher collection rates, and reducing production costs. Additionally, the NWSS emphasizes digitalization and the adoption of advanced technologies to improve operational efficiency and resilience.

Activities undertaken regarding enabling policy environments

Lebanon has recently taken significant steps to modernize its water sector, supported by international partners such as the World Bank. The Second Greater Beirut Water Supply Project, approved in January 2025, allocates $257.8 million to complete critical infrastructure, improve water quality and advance sector reforms. The project aims to increase water supply to 1.8 million citizens, reducing their reliance on costly private water sources. The project promotes operational process digitalization along with billing system enhancements and digital management solutions that help decrease water losses.[157]

On the technology front, Lebanon is in the early stages of integrating Artificial Intelligence (AI) and digital solutions into water management. The Lebanese Agricultural Research Institute (LARI) has pioneered the use of AI-powered early weather warning systems, smart irrigation applications and tailored recommendations for farmers based on weather and soil sensor data. The National Center for Remote Sensing (NCRS) has developed smart irrigation technologies utilizing satellite and atmospheric data to optimize water use in agriculture. These initiatives

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[157] World Bank. (2025, January 15). New World Bank program to improve water supply and quality and advance water sector reforms [Press release]. https://www.worldbank.org/en/news/press-release/2025/01/15/new-world-bank-program-to-improve-water-supply-and-quality-and-advance-water-sector-reforms

demonstrate the potential of AI and digital tools to improve resource allocation, enhance resilience to climate change and support data-driven decision-making.[158]

Actions

To accelerate digital transformation in water management, Lebanon should:

- Further develop and implement a sector-specific regulatory framework for digitalization and AI in water management, ensuring robust standards for data governance, privacy and interoperability. This will facilitate the secure integration of digital tools across agencies and utilities, supporting the NWSS goal of a fully operational data management and monitoring system.
- Expand training programs and fostering partnerships with research institutions like LARI and NCRS will help bridge the digital skills gap and support the effective deployment of new technologies.
- Prioritize investment in smart infrastructure such as sensors, smart meters and AI-powered analytics platforms across both urban and rural areas. Scaling up successful pilot projects and leveraging international financing, as exemplified by the Second Greater Beirut Water Supply Project (SGBWSP), will be critical for achieving sectoral reform targets and improving service reliability.
- Harmonize its regulatory frameworks with regional and international standards, particularly in data governance and AI ethics, to facilitate cross-border cooperation and knowledge exchange with Mediterranean partners.

13.   Malta

Situational analysis of policy and regulatory situation

Malta's water sector operates within a rigorous regulatory framework shaped by European Union (EU) directives, particularly the Water Framework Directive (WFD) and national plans such as the River Basin Management Plan and the Water Catchment Management Plan.[159] The Water Services Corporation (WSC) functions as the central authority that oversees the entire drinking water and wastewater cycle throughout the country while handling both urban and agricultural water systems. The sector faces acute challenges due to limited natural freshwater resources, high population density and seasonal surges from tourism, necessitating advanced management and technological innovation.[160]

The National Artificial Intelligence Strategy of Malta serves as a guide for the recent AI adoption and digital transformation initiatives in the country. The government aims to establish Malta as a primary center for AI development in the region through funding and regulatory support for innovative activities.[161] The water sector reflects this strategic direction through its focus on digitalization and smart technologies to handle resource scarcity and enhance operational efficiency and environmental sustainability.

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[158] MENA AI Food Security Case of Lebanon. (n.d.). https://menaobservatory.ai/storage/eNWguhAS1xtYprrxYXx1kwj41Vt5lO-metaQTJLNEQgLSBNRU5BIEFJIC0gRm9vZCBTZWN1cml0eSAtIENhc2Ugb2YgTGViYW5vbiAtIFYyLnBkZg==-.pdf

[159] Environment and Resources Authority Malta. (2025). Interim report 2025 [PDF]. https://era.org.mt/wp-content/uploads/2021/03/Interim-Report-2025-Final-Version.pdf

[160] Water Services Corporation Malta. (n.d.). The water management framework in Malta. https://www.wsc.com.mt/the-water-management-framework-in-malta/

[161] Global Government Forum. (2025). Malta fosters ambition to be best possible environment for AI with six new government projects. https://www.globalgovernmentforum.com/malta-fosters-ambition-to-be-best-possible-environment-for-ai-with-six-new-government-projects/

Activities undertaken regarding enabling policy environments

The government of Malta has introduced multiple digital initiatives for water management that prioritize smart metering systems with real-time monitoring and Artificial Intelligence (AI) analytics capabilities. The Water Services Corporation installed over 310,000 smart water meters beginning in 2009, which reached 96% coverage of the entire archipelago. WSC, together with Suez, manages these smart water meters.[162]

Actions

To further advance digital transformation in water management, Malta should:
- Continue to refine its regulatory frameworks to fully support the integration of AI and advanced digital technologies in water management. This includes updating standards for data governance, privacy and interoperability, ensuring secure and efficient data sharing between agencies, utilities and stakeholders. Regulatory alignment with evolving EU directives and best practices is essential for maintaining compliance and facilitating cross-border cooperation.
- Expand capacity-building programs, particularly in digital literacy, AI and data analytics for water sector professionals. Initiatives like WATERLINE should be scaled to ensure a workforce capable of managing and innovating within increasingly complex digital systems.
- Continue the investments in smart infrastructure, including further deployment of Internet of Things devices, real-time monitoring platforms and AI-powered analytics for predictive maintenance, leak detection and resource optimization. Scaling up successful pilot projects and leveraging public-private partnerships will be key to achieving national resilience and sustainability goals

14. Mauritania

Situational analysis of policy and regulatory situation

Mauritania is undergoing a profound digital transformation, guided by a robust policy and regulatory framework that prioritizes the integration of artificial intelligence, data governance and digital infrastructure across key sectors, including water management. The country's National Digital Transformation Agenda (2022–2025) and the National Artificial Intelligence Strategy (2024–2029) together provide a comprehensive roadmap for leveraging new technologies to address development challenges and enhance public services.[163] The Ministry of Digital Transition, Innovation and Modernization of the Administration leads these efforts, supported by newly established institutions for digital governance, cybersecurity and data protection.

Activities undertaken regarding enabling policy environments

Mauritania launched specific initiatives to promote digital transformation in water management through the adoption of Artificial Intelligence (AI) and Internet of Things (IoT) technologies, as well as advanced data analytical tools. The National Artificial Intelligence Strategy details specific plans for installing a smart water management system along the Senegal River. The system combines weather data with forecasting techniques and IoT devices

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[162] Smart Energy. (2025). Malta's Water Services Corporation extends smart metering contract to 2029. https://www.smart-energy.com/industry-sectors/smart-water/maltas-water-services-corporation-extends-smart-metering-contract-to-2029/
[163] Ministry of Digital Transformation Mauritania. (2024, April). Mauritania AI strategy draft [PDF]. https://mtnima.gov.mr/sites/default/files/Mauritani%20AI%20Strategy%20Draft%20April-2024.pdf

to maximize water management for farming, animal husbandry and drinking supply while also acting as a flood and drought warning system.[164]

Actions

To further advance digital transformation in water management, Mauritania should:

- Continue to strengthen its regulatory frameworks for AI and digital technologies in the water sector, ensuring robust standards for data governance, privacy and interoperability. The implementation of the National Strategy for Open and Interoperable Data should be accelerated, with clear operational guidelines and capacity-building for agencies to ensure data quality and compliance.
- Expand capacity building initiatives for water professionals, utility operators, and farmers that are focused on digital literacy, AI and data analytics. For the development of specialized training and certification programs, as outlined in the AI strategy, will be essential for building a skilled workforce capable of managing smart water systems and leveraging advanced analytics.
- Continue to invest in smart infrastructure, including IoT sensors, AI-powered analytics platforms and digital monitoring systems for both urban and rural water management. Scaling up pilot projects such as the smart water management system for the Senegal River-and integrating advanced technologies like drones and edge computing will enhance operational efficiency and climate resilience.
- Foster international collaboration and harmonize its regulatory frameworks with regional and global standards, particularly in AI ethics, data protection and digital infrastructure. This will facilitate knowledge exchange, cross-border cooperation and access to international funding and expertise.

15. Monaco

Situational analysis of policy and regulatory situation

Monaco's policy environment strongly favors digital transformation, in line with the Principality's vision of a "Smart Principality." There is a high-level political commitment to digital innovation through the Extended Monaco program launched in 2019, which seeks to embed digital technology into all aspects of governance and the economy.[165] This program, though not water-specific, creates a supportive backdrop for smart water initiatives by promoting infrastructure upgrades (e.g. nationwide 5G and fiber networks) and digital skills. In terms of regulation, Monaco generally aligns with European standards and has robust frameworks for data governance. Notably, the government has put in place strict personal data protection regulations (largely equivalent to the European Union (EU)'s General Data Protection Regulation) to ensure privacy and security in digital services.

Activities undertaken regarding enabling policy environments

Monaco has implemented a series of targeted policy and operational measures to foster digital transformation in water management:

- Smart regulations and strategic planning: The government regularly updates its National Framework for Water Resources. This incorporates real-time digital

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[164] Ministry of Digital Transformation Mauritania. (2024, April). Mauritania AI strategy draft [PDF]. https://mtnima.gov.mr/sites/default/files/Mauritani%20AI%20Strategy%20Draft%20April-2024.pdf
[165] Government of Monaco. (n.d.). *The Extended Monaco digital programme*. https://en.gouv.mc/Policy-Practice/A-Modern-State/The-Extended-Monaco-digital-programme

monitoring, dynamic consumption restrictions, and automated controls, with multi-level alert systems during periods of water stress.

- Automation and transparency tools: Comprehensive deployment of automated systems and digital dashboards supports monitoring, reporting, and enforcement. Smart meters offer dynamic water tracking and public transparency, while digital infrastructure underpins a coordinated drought response.
- Data governance and security: An updated legal framework ensures that digital initiatives (water sector included) operate under in-depth data protection and cybersecurity protocols, strengthening safe data sharing and cross-border collaboration, in compliance with EU standards.

Actions

To accelerate digital transformation in water management, Monaco should:

- Further upgrade digital mandates: Enhance sector-specific regulations, benchmarking digital requirements against EU policies, especially for predictive analytics, system integration, and operational intelligence.
- Invest in predictive digital infrastructure: Expand pilots and applications in Artificial Intelligence (AI), digital twins, and advanced analytics to strengthen water sector adaptivity for climate change.
- Enhance data interoperability and cybersecurity: Continue developing frameworks for secure, interoperable data sharing within Monaco and with French and EU partners, bolstering water sector cyber-resilience.

16. Montenegro

Situational analysis of policy and regulatory situation

Montenegro has developed an advanced digital policy and regulatory structure that works to achieve European Union (EU) standards by utilizing artificial intelligence and machine learning. The Digital Transformation Strategy 2022–2026 functions as a complete blueprint to modernize governance while enabling citizen and business empowerment and sustainable development through digital innovations. The digital strategy supports the creation of integrated e-government services alongside information system interoperability while ensuring robust cybersecurity standards, open data management practices, and digital inclusion principles, which align with EU digital policies and European Data Strategy. [166]

The Artificial Intelligence Readiness Assessment Report (AIRA), which Montenegro released in May 2025, provides a comprehensive review of the institutions' readiness to use Artificial Intelligence (AI) ethically and strategically. The report shows how Montenegro has a well-developed digital structure and institutions are becoming more AI-aware, yet points out weaknesses in digital competencies and institutional data sharing and the absence of AI regulatory frameworks for public institutions. The assessment results will guide the development of Montenegro's first national AI strategy, which has environmental protection and water management as its primary focus. [167]

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[166] Digital Watch. (2022). Montenegro digital transformation strategy 2022–2026. https://dig.watch/resource/montenegro-digital-transformation-strategy-2022-2026

[167] United Nations Development Programme (UNDP). (2025, May 13). Montenegro presents its first AI readiness assessment report for public administration [Press release]. https://www.undp.org/montenegro/press-releases/montenegro-presents-its-first-ai-readiness-assessment-report-public-administration

Activities undertaken regarding enabling policy environments

A notable example is Montenegro's participation in the SMART-Water Project, a cross-border initiative with Croatia and Bosnia and Herzegovina. Through this project, AI technology combines satellite imagery to create automated real-time freshwater ecosystem monitoring for Lake Skadar. The platform integrates various data sources via web-based Geographical Information Systems (GIS) technology, enabling rapid water quality assessments that prompt timely ecological emergency responses. The system achieves dual purposes of public education about water stewardship and community participation while establishing new standards for environmental tracking across borders. [168]

Actions

To further advance digital transformation in water management, Montenegro should:
- Prioritize the development and adoption of a national AI strategy that includes sector-specific guidelines for water management, ensuring robust standards for data governance, privacy and interoperability. This will facilitate the secure integration of AI and digital tools across agencies and support the ethical, transparent use of these technologies in line with EU and international best practices.
- Expand capacity-building initiatives, targeting water sector professionals and public administrators with training in digital literacy, AI and data analytics. Partnerships with international organizations and academic institutions can help bridge skills gaps and foster a culture of innovation.
- Continue to invest in smart infrastructure, such as IoT sensors, real-time monitoring platforms and AI-powered analytics for predictive maintenance, water quality management and resource optimization. Scaling up successful pilot projects like SMART-Water and integrating their methodologies into national practice will be key to achieving sustainable outcomes.
- Further harmonize its regulatory frameworks with EU standards and foster regional cooperation, particularly in data sharing and joint management of transboundary water resources. This approach will strengthen Montenegro's resilience to climate change and environmental pressures while positioning the country as a leader in digital and AI-enabled water management in the Western Balkans.

17. Morocco

Situational analysis of policy and regulatory situation

Since the nation faces severe water scarcity and climate change risks, the government of Morocco developed an advanced, forward-thinking policy structure for digital transformation. Water policy in the government focuses on sustainable development alongside efficient resource management and climate adaptation.[169]

Digital transformation stands as a fundamental objective that runs through all national strategies of Morocco. Digital 2030 serves as the strategy launched in 2024 to boost both digital economic development and public administration transformation through artificial

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[168] Institute Ruđer Bošković. (2025). SMART Water Project: Putting AI to work for the environment.
https://www.irb.hr/eng/News/SMART-Water-Project-Putting-AI-to-Work-for-the-Environment
[169] Smart Water Magazine. (2025). Morocco adopts effective policy to ensure water security.
https://smartwatermagazine.com/news/smart-water-magazine/morocco-adopts-effective-policy-ensure-water-security

intelligence as its main progress driver.[170] The national policy now focuses on providing universal high-speed internet access while digitizing administrative tasks and implementing AI solutions throughout key strategic areas, including water management. The Economic, Social and Environmental Council has declared AI as a national priority to achieve maximum efficiency.

Activities undertaken regarding enabling policy environments

On the innovation front, Morocco is a regional leader in Artificial Intelligence (AI) for water sustainability, as demonstrated by its hosting of the AI 4 Water Sustainability Challenge, which fosters AI-based solutions for smart water management, early flood detection and resource planning. This initiative, anchored at Mohammed VI Polytechnic University and supported by United Nations Educational, Scientific and Cultural Organization (UNESCO), promotes the use of AI for real-time data integration, predictive analytics and decision support in water management.[171] The policy structures are undergoing modifications to enable digital progress. The government continues to work on universal broadband access while digitizing administrative services and developing regulatory frameworks that promote innovation through data privacy protection and cybersecurity measures.[172]

Actions

To further accelerate digital transformation in water management, Morocco should:
- Finalize and implement sector-specific regulatory frameworks for AI and digital technologies in water management, establishing clear standards for data governance, privacy and interoperability. This will ensure secure, efficient data sharing and integration of AI-driven solutions across agencies and utilities.
- Expand capacity-building programs targeting water professionals, utility managers and public administrators, focusing on digital literacy, AI and data analytics. The involvement of new AI institutes and partnerships with universities will be crucial for developing a skilled workforce.
- Sustain investment in smart infrastructure, including Internet of Things (IoT) sensors, digital twins and AI-powered analytics platforms, to further reduce water losses, optimize resource allocation and enhance climate resilience.
- Foster public-private partnerships and leverage international collaborations to finance digital upgrades, share best practices and scale up successful pilot projects.
- Harmonize national regulations with evolving international standards, particularly in AI ethics, data protection and digital infrastructure, to facilitate cross-border cooperation and regional knowledge exchange.

18. North Macedonia
Situational analysis of policy and regulatory situation

North Macedonia has made notable progress in developing a policy and regulatory framework for digital transformation, with water management increasingly recognized as a critical sector for innovation and modernization. The country's main legal foundation for water management

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[170] University World News. (2025, April 27).
https://www.universityworldnews.com/post.php?story=20250427220959668
[171] International Research Center on Artificial Intelligence (IRCAI). (2025). IRCAI partners with AI in Africa. https://ircai.org/inircai-partners-with-ai-in-africa/
[172] Actuia. (2025). Morocco towards the implementation of a national policy dedicated to AI to accelerate digital transformation. https://www.actuia.com/en/news/morocco-towards-the-implementation-of-a-national-policy-dedicated-to-ai-to-accelerate-digital-transformation/

is the national Law on Waters, which is well-aligned with the European Union (EU)'s Water Framework Directive. North Macedonia has implemented effective policies and regulations for digital transformation, which now considers water management as an essential sector for modernization and innovation. However, significant gaps remain in the implementation of integrated water resources management (IWRM) principles, with a low score on the United Nations Water Sustainable Development Goals (SDG) 6.5.1 assessment and persistent challenges such as fragmented institutional arrangements, limited technical capacity and inadequate data systems.[173]

Digitalization is a national priority, driven by the National Long-Term Information and Communication Technology (ICT) Strategy (2020–2025) and a broader digital transformation agenda that targets secure, sustainable and interoperable digital public services.[174] Recent cyberattacks on government institutions and global trends in water sector cyber threats have underscored the urgency of protecting critical infrastructure as digitalization advances.[175]

Activities undertaken regarding enabling policy environments

The "Cybersecurity in Water Services Management" project (2025–2026) aims to enhance the resilience of critical water infrastructure by implementing cybersecurity measures, building local capacity and setting benchmarks for digital security across public utilities. At the national level, the Ministry of Digital Transformation and the Agency for Electronic Communications, through the National Computer Security Incident Response Team (MKD-CIRT), set cybersecurity standards and coordinate responses to digital threats. [176]

The levels of transparency and public participation in water management have also improved. The Ministry of Environment and Spatial Planning has committed to the mandatory publication of water management documents, fostering public involvement and ensuring compliance with EU and Open Government Partnership standards. In agriculture, digitalization efforts are gaining momentum, with Food and Agriculture Organization (FAO)-supported assessments identifying key gaps in digital skills, data availability, and system interoperability. Policy recommendations are being formulated to guide the sector's digital transformation and support its integration with EU processes.

Actions

To further advance digital transformation in water management, North Macedonia should:
- Finalize and implement sector-specific frameworks for Artificial Intelligence (AI) and digital technologies, ensuring robust standards for data governance, privacy and interoperability. This will support the secure integration of digital tools and AI-driven analytics across water agencies and utilities, in line with EU directives.
- Expand capacity-building initiatives for water professionals, utility managers and farmers, with a focus on digital skills, cybersecurity awareness and the practical use of

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[173] UNECE. (2024, June). Mirta, M. [Report]. https://unece.org/sites/default/files/2024-06/15_North%20Macedonia_Mirta_27.5.pdf
[174] Interoperable Europe. (2024). Supporting document: North Macedonia [PDF]. https://interoperable-europe.ec.europa.eu/sites/default/files/inline-files/NIFO_2024%20Supporting%20Document_North%20Macedonia_vFINAL.pdf
[175] United Nations Development Programme (UNDP). (n.d.). Cybersecurity water services management in North Macedonia [Project description]. https://www.undp.org/north-macedonia/projects/cybersecurity-water-services-management
[176] United Nations Development Programme (UNDP). (n.d.). Cybersecurity water services management in North Macedonia [Project description]. https://www.undp.org/north-macedonia/projects/cybersecurity-water-services-management

AI and smart technologies. Partnerships with international organizations and local academia will be crucial to bridging the digital skills gap.

- Invest in upgrading digital infrastructure, including smart meters, Internet of Things (IoT) sensors and real-time data platforms, to improve monitoring, leak detection and resource optimization. Scaling up pilot projects and leveraging donor support will accelerate the adoption of advanced technologies.
- Continue to harmonize regulatory frameworks with EU and regional standards, particularly in cybersecurity, data protection and AI ethics, to facilitate cross-border cooperation and joint responses to shared water challenges.
- Foster public engagement and transparency through open data platforms and mandatory publication of key water management documents, increasing accountability and enabling informed participation in decision-making.

19. Palestine

Situational analysis of policy and regulatory situation

Palestine's water sector is governed by a framework that has evolved to address both chronic water scarcity and the need for modernization. The 2014 Water Law established the Water Sector Regulatory Council (WSRC) as an independent entity tasked with monitoring and regulating water and sanitation service providers (SPs), approving tariffs, licensing and protecting consumers.[177] However, the implementation of this framework faces challenges due to incomplete legal structures, unclear division of responsibilities between central agencies (notably the Palestinian Water Authority, PWA and the Ministry of Local Government, MoLG) and limited financial resources.[178]

Activities undertaken regarding enabling policy environments

The government of Palestine has developed essential measures to support digital transformation through IoT and new technology frameworks. The WSRC, together with other stakeholders, has worked to promote cross-sector cooperation along with capacity building and public-private partnerships, which drive innovation in water management.[179] The United Nations Development Programme (UNDP) / Programme of Assistance To The Palestinian People (PAPP) Accelerator Lab joined forces with FlowLess (local start-up) to implement an IoT and AI-based smart system for non-revenue water (NRW) detection across the West Bank through a pilot program. This system enables accurate, real-time data collection and rigorous analysis of leaks and losses, which allows remote monitoring during emergencies while providing an expandable framework for Palestinian water systems.[180]

Actions

To accelerate digital transformation in water management, Palestine should:

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[177] World Bank. (n.d.). Securing water for development in West Bank and Gaza: Sector note [PDF]. https://documents1.worldbank.org/curated/en/736571530044615402/Securing-water-for-development-in-West-Bank-and-Gaza-sector-note.pdf

[178] Union for the Mediterranean Secretariat (UfM). (2024, January). Digital transformation for water and sustainable development in the Mediterranean [PDF]. https://ufmsecretariat.org/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf

[179] Maastricht School of Management. (2025). Water management TMT in Palestine. https://www.msm.nl/news-events-and-blogs/news/water-management-tmt-in-palestine

[180] United Nations Development Programme (UNDP). (n.d.). Detecting non-revenue water using internet of things and artificial intelligence. https://www.undp.org/papp/blog/detecting-non-revenue-water-using-internet-things-and-artificial-intelligence

- Finalize and clarify the legal and regulatory framework for digitalization and AI in the water sector, ensuring that the WSRC has full authority and clear mandates for data governance, privacy and interoperability. This will facilitate secure integration of digital tools across agencies and utilities, supporting transparent, efficient and accountable water management.
- Expand capacity building initiatives, targeting water professionals, utility operators and local government staff with training in digital literacy, AI and data analytics. Partnerships with local innovators, research centers and international organizations will be essential for bridging digital skills gaps and scaling up successful pilot projects.
- Prioritize investments in smart infrastructures such as IoT sensors, smart meters and AI-powered analytics platforms, with a focus on reducing water losses, improving resource allocation and enhancing resilience to climate change. Leveraging donor support and public-private partnerships will be key to financing these upgrades and ensuring their sustainability.
- Harmonize its regulatory frameworks with regional and international standards, particularly in AI ethics, data protection and digital infrastructure, to facilitate cross-border cooperation and knowledge exchange with neighboring countries.

20. Portugal

Situational analysis of policy and regulatory situation

Portugal has created a detailed policy and regulatory framework to support digital transformation in the water sector. The country's national digital decade roadmap (2024 update) and the "Portugal Digital Strategy" both prioritize water for digital innovation. These strategies are aligned with European Union (EU) directives and are strengthened by regular updates and stakeholder consultations.[181] The regulatory authority for water and sanitation services, Portuguese Regulatory Authority for Water and Waste Services (ERSAR), plays a key role in overseeing implementation, standardization, and compliance in both public and private water utilities. Additionally, Portugal has revised its Water Law and adopted integrated public policies that focus on digitalization, operational efficiency, and environmental goals.[182]

Activities undertaken regarding enabling policy environments

Recent actions by the Portuguese government have focused on comprehensive reforms in the water sector, with an emphasis on digitalization. The government's 2024–2028 policy guidelines, under initiatives like "Water that Unites," prioritize updating digital infrastructure, promoting the use of smart meters, enhancing real-time monitoring, and revising regulatory frameworks to encourage the adoption of digital tools by utilities and users.[183] ERSAR has also introduced regulatory information systems for digital data submission, validation, and analysis by utilities, supporting greater transparency, benchmarking, and annual public reporting. Regulatory exchanges (such as those led by the Eastern and Southern Africa Water and Sanitation Regulators Association and Lisbon International Centre for Water) have fostered

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[181] European Commission. (2025, June 16). *Digital Decade 2025 country report: Portugal* (Staff Working Document). Directorate-General for Communications Networks, Content and Technology. Retrieved from https://wwwcdn.dges.gov.pt/sites/default/files/digital_decade_2025_country_report_portugal.pdf

[182] LIS-Water. (2022, March 11). Portugal's integrated water sector policy had positive impact on society, economy & environment. Smart Water Magazine. Retrieved from https://smartwatermagazine.com/lis-water

[183] Lusa. (2024, July 4). *Water supply in Portugal: government plans nationwide reforms*. Portugal Resident. Retrieved from https://www.portugalresident.com/water-supply-in-portugal-government-plans-nationwide-reforms

knowledge-sharing and capacity-building to ensure that Portuguese regulations stay aligned with the best international practices.[184]

Actions
Specific actions to enable a policy and regulatory environment that supports digital transformation in Portugal's water sector include:
- Implementing national digitalization programs, such as smart meter deployment and digital public administration for water services.
- Advancing initiatives for data governance and adopting standards for digital data collection, sharing, and privacy for utilities.
- Supporting the development of strategic investment programs (2025–2029) led by the Águas de Portugal Group, which include modernization and digital upgrades across supply and sanitation services.
- Intensifying collaboration with international partners and regulatory networks to ensure alignment with global best practices on digitalization and water governance.
- Promoting data-driven decision-making and targeted capacity-building for utility staff, supporting a future-ready regulatory environment

21. Slovenia
Situational analysis of policy and regulatory situation
Slovenia stands as a digital transformation leader through its well-established policy framework, which now focuses on artificial intelligence and advanced digital technology adoption. The Digital Public Services Strategy (2022–2030) outlines a citizen- and business-centric digital transformation approach that targets complete online accessibility of key public services by 2030 and digital identity adoption from at least 80% of users. The Better Regulation Action Plan supports this strategy through efforts to modernize Information Techology (IT) systems and develop new e-services while enhancing cybersecurity measures.

The Ministry of Digital Transformation maintains authorization to oversee state information systems while developing interoperable solutions for public bodies in the public sector, including water management. The National Interoperability Framework and the Modular Open Platform for Electronic Documents (MOPED) system for eDocuments enhance digital integration and provide secure, efficient data exchange between government entities. Digital public administration in Slovenia has advanced substantially, but water management digitalization remains in development as the sector works to fill gaps in eService delivery, IT infrastructure, and data quality.[185]

Activities undertaken regarding enabling policy environments
The National Programme to Promote the Development and Use of Artificial Intelligence (NpAI) serves as Slovenia's comprehensive framework to advance Artificial Intelligence (AI) implementation in water management among other sectors. Through the NpAI, Slovenia aims to become a top AI leader by advancing research, innovation and ethical implementation of new technologies while prioritizing public trust, human rights and international partnerships.

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[184] ESAWAS. (2024). ESAWAS leads regulatory exchange visit to Portugal for members. *ESAWAS*. Retrieved from https://www.esawas.org/esawas-leads-regulatory-exchange-visit-to-portugal-for-members
[185] Interoperable Europe. (2023). Digital Public Administration Factsheets: Slovenia [PDF]. https://interoperable-europe.ec.europa.eu/sites/default/files/inline-files/DPA_Factsheets_2023_Slovenia_vFINAL_rev.pdf

Slovenia implements advanced digitalization solutions by combining artificial intelligence with satellite monitoring and supercomputing to create a "super advanced digital ecosystem" which predicts water movements, controls resource utilization and responds to flood events caused by climate change. The government has explicitly linked water diplomacy with technological innovation, advocating for a global partnership that utilizes AI and digital tools for sustainable and secure water access. [186] The implemented technologies will allow for accurate ecosystem and water tracking while providing dynamic resource forecasting together with leak detection capabilities.

Actions
To further accelerate digital transformation in water management, Slovenia should:
- Finalize and implement sector-specific regulatory frameworks for AI and digital technologies in water management, building on the principles of transparency, human oversight and data protection established in existing laws. This includes updating standards for data governance, privacy and interoperability to facilitate secure and efficient integration of AI-driven solutions across agencies and utilities.
- Expand capacity building initiatves targeting water professionals, public administrators and Information Technology (IT) specialists with training in AI, data analytics and digital operations. Integrating AI into educational curricula and promoting lifelong learning, as outlined in the NpAI, will help ensure a skilled workforce capable of managing advanced digital systems.
- Continue to invest in smart infrastructure such as Internet of Things (IoT) sensors, digital twins and real-time analytics platforms for predictive maintenance, leak detection and resource optimization in water utilities. Scaling up successful pilot projects and leveraging international partnerships, especially in the context of water diplomacy and climate resilience, will be key to achieving sustainable outcomes.
- Harmonize its regulatory frameworks with European Union's standards and foster cross-border cooperation, particularly in data sharing, AI ethics and digital infrastructure. By maintaining its commitment to transparency, ethical AI and international collaboration, Slovenia can consolidate its position as a leader in digital and AI-enabled water management, ensuring sustainable, efficient and resilient solutions for its citizens and the wider region.

22. Spain
Situational analysis of policy and regulatory situation
Spain stands as a global and Mediterranean pioneer in digital water management through its strong national plans, adoption of artificial intelligence, machine learning and IoT technologies. The country bases its regulatory framework on European Union's (EU) directives. The Strategic Project for Recovery and Economic Transformation (PERTE) will dedicate €3 billion between 2022 and 2026 to digitizing water cycle management throughout urban, agricultural and industrial domains.[187]

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[186] Slovenia Times. (2025, April 8). Slovenia calls for global partnership for water. https://sloveniatimes.com/40865/slovenia-calls-for-global-partnership-for-water

[187] ICEX-Invest in Spain. (2022). Perte Agua. https://www.investinspain.org/content/icex-invest/en/noticias-main/2022/perte-agua.html

Royal Decree 665/2023 has implemented regulatory updates that simplify hydro-management operations by removing administrative obstacles to enable the deployment of digital solutions through minor infrastructure works and digital fiber installation. These reforms are part of Spain's broader Recovery, Transformation and Resilience Plan, which prioritizes digitalization and the use of new information and communication technologies in water management.[188] The Digital Spain 2025 strategy enhances this path by establishing targets for universal high-speed internet access, top-tier digital competencies and Artificial Intelligence (AI) and cybersecurity leadership.[189]

Activities undertaken regarding enabling policy environments

Spain's PERTE plan is a model of holistic digital transformation in water management, integrating several advanced technologies and policy measures:

- Spain deployed digital twin technology to create virtual water infrastructure duplicates, which allow real-time system monitoring combined with predictive analytics and data-based decision support. The implementation of this technology provides better system visibility, together with improved operational efficiency and climate impact resistance.[190]
- Spain implements AI-based systems that provide early flood alerts together with predictive maintenance and agricultural resource optimization capabilities. For example, artificial intelligence, together with cloud technology, protects 700,000 citizens of Aragon from floods while optimizing both agricultural production and water usage.[191]
- The implementation of regulatory reforms eliminated bureaucratic obstacles to deploying digital infrastructure and processing minor works, which accelerated technology adoption.[192]

The AI Strategy 2024 of Spain supports these initiatives with €1.5 billion dedicated to AI development alongside supercomputing and sustainable digital infrastructure funding.[193]

Actions

To consolidate and expand its leadership in digital water management, Spain should:

- Continue refining sector-specific regulatory frameworks for AI, Internet of Things (IoT) and digital technologies in water management, ensuring robust standards for data governance, privacy, interoperability and cybersecurity. Alignment with evolving EU directives is essential for seamless integration and cross-border cooperation.
- Expand capacity-building initiatives, targeting water professionals, utility managers and public administrators with training in digital literacy, AI and data analytics. This will ensure effective use of advanced technologies and foster a culture of innovation.

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[188] Osborne Clarke. (2025). Water regulation updates: Look to streamline hydro management in Spain. https://www.osborneclarke.com/insights/water-regulation-updates-look-streamline-hydro-management-spain
[189] Digital Watch. (2025). Digital Spain 2025. https://dig.watch/resource/digital-spain-2025
[190] Union for the Mediterranean Secretariat (UfM). (2024, January). Digital transformation for water and sustainable development in the Mediterranean [PDF]. https://ufmsecretariat.org/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf
[191] Amazon Web Services (AWS). (2025, March 3). AWS AI powers new water projects in Spain. https://www.aboutamazon.eu/news/sustainability/aws-ai-powers-new-water-projects-in-spain
[192] Osborne Clarke. (2025). Water regulation updates: Look to streamline hydro management in Spain. https://www.osborneclarke.com/insights/water-regulation-updates-look-streamline-hydro-management-spain
[193] La Moncloa. (2024, May 14). Council of Ministers press conference. https://www.lamoncloa.gob.es/lang/en/gobierno/councilministers/paginas/2024/20240514-council-press-conference.aspx

- Sustain and scale investment in smart infrastructure, including digital twins, IoT networks and AI-powered analytics platforms, to further reduce water losses, optimize resource allocation and enhance resilience to climate change.
- Foster public-private partnerships and community engagement, leveraging Spain's strong ecosystem of utilities, technology firms and Small and Medium-sized Enterprises (SMEs) to drive innovation and ensure inclusive, sustainable outcomes.
- Promote transparency and public participation by enhancing information accessibility for end users, empowering communities and businesses to contribute to sustainable water use actively.

23. Tunisia

Situational analysis of policy and regulatory situation

The severe water scarcity in Tunisia intensified due to population expansion and climate change effects, demanding efficient water governance at the national level. The regulatory framework for water in Tunisia aims to support sustainable development and climate adaptation through policies that focus on modern infrastructure development and technological integration. The national government and utility companies, along with research institutions, work together in Tunisia to deploy digital solutions that address water management challenges.[194]

Despite these advances, Tunisia still faces significant barriers to digital transformation. Key challenges include inadequate infrastructure for digital technologies and limited financial resources for large-scale digitalization projects.[195]

Activities undertaken regarding enabling policy environments

The government of Tunisia established multiple programs to create favorable conditions for digital transformation in water management through Artificial Intelligence (AI), Internet of Things (IoT), and data analytics. The Société Nationale d'Exploitation et de Distribution des Eaux (SONEDE) implements smart water network pilot programs across the Sousse and Monastir regions. Real-time water flow, pressure, and quality data collection becomes possible through smart meters and IoT sensors, which help detect leaks and better plan maintenance activities.[196]

Actions

To accelerate digital transformation in water management, Tunisia should:
- Finalize and implement a national regulatory framework for AI and digital technologies in the water sector, establishing clear standards for data governance, privacy and interoperability. This will facilitate secure, efficient integration of digital tools and AI-driven analytics across agencies and utilities, supporting smarter, more resilient water management.

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[194] Green Climate Fund. (n.d.). Development strategic framework: Upgradation of smart water network system. https://www.greenclimate.fund/document/development-strategic-framework-upgradation-smart-water-network-system-through

[195] Union for the Mediterranean Secretariat (UfM). (2024, January). Digital transformation for water and sustainable development in the Mediterranean [PDF]. https://ufmsecretariat.org/wp-content/uploads/2024/05/Digital-Transformation-for-Water-Sustainable-Development-in-the-Med_Jan2024.pdf

[196] Green Climate Fund. (n.d.). Development strategic framework: Upgradation of smart water network system. https://www.greenclimate.fund/document/development-strategic-framework-upgradation-smart-water-network-system-through

- Expand capacity building initiatives targeting water professionals, utility operators and farmers with training in digital literacy, AI and data analytics. Partnerships with local innovators, research institutions and international organizations will be critical for bridging the digital skills gap and ensuring effective deployment of new technologies.
- Continue the investments in smart infrastructure, such as IoT sensors, smart meters and AI-powered analytics platforms across both urban and rural areas. Scaling up successful pilot projects and leveraging international financing will be key to achieving sectoral reform targets and improving service reliability.
- Harmonize its regulatory frameworks with regional and international standards, particularly in AI ethics, data protection and digital infrastructure, to facilitate cross-border cooperation and knowledge exchange with Mediterranean partners.

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24. Türkiye

Situational analysis of policy and regulatory situation

The Turkish government identified digital transformation as an essential solution to handle its escalating water management difficulties, which stem from water shortage, climate change effects, and rising urban and agricultural water requirements. The Digital Transformation Office (DTO) operates as the central body under the Presidency, which executes the digital government strategy.[197] The State Hydraulic Works (DSİ) regulates Turkey's water sector by controlling resource management, infrastructure and licensing operations through legal instruments such as the Water Use Right Agreement and the Renewable Energy Law.[198]

In addition to DSİ's regulatory functions, the General Directorate of Water Management (SYGM) develops integrated water policies, prepares basin management plans, and ensures regulatory alignment with EU water directives and sustainable development goals. The Water Efficiency Strategy Document and Action Plan in the Framework of Adaptation to the Changing Climate (2023-2033) sets national targets for reducing water losses and promoting efficient water use through smart technologies and digital monitoring, including mandatory standards that encourage municipalities to implement SCADA systems, smart meters, and real-time leak detection tools, supporting both operational efficiency and sustainability targets.

Türkiye's digital government strategy emphasizes the transition from e-government to a fully digital government, with a strong focus on interoperability, cybersecurity and the integration of Artificial Intelligence (AI) and Internet of Things (IoT) technologies. The DTO maintains authority to direct public sector digital transformation efforts, which enables water management projects to maintain alignment with digitalization initiatives. The transition needs additional support from a stronger legal and regulatory framework, together with improved institutional coordination and expanded digital skill development for the workforce.

Activities undertaken regarding enabling policy environments

Türkiye has made significant strides in deploying digital and AI-driven technologies in water management. Through smart meters and advanced monitoring systems, operators get exact

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[197] OECD. (2023, May). Digital government review of Türkiye [PDF]. https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/05/digital-government-review-of-turkiye_69ffd9d4/3958d102-en.pdf

[198] Kibaroğlu, A. (2022). Türkiye's water security policy: Energy, agriculture, and transboundary issues. Insight Turkey, 24(2). https://www.insightturkey.com/articles/turkiyes-water-security-policy-energy-agriculture-and-transboundary-issues

water consumption measurements and instant leak detection, which leads to better operational efficiency and lower water loss rates. The combination of Supervisory Control and Data Acquisition (SCADA) systems with IoT sensors delivers real-time pressure, flow and quality data to distribution networks as AI-powered predictive models detect early signs of leaks and equipment failure.[199]

Actions

To accelerate digital transformation in water management, Türkiye should:

- Continue refining its legal and regulatory frameworks to fully support the integration of AI, IoT and advanced digital technologies in the water sector. This includes updating standards for data governance, privacy, interoperability and cybersecurity and ensuring alignment with international best practices.
- Expand capacity building initiatives targeting water professionals, utility operators and public administrators with training in digital literacy, AI and data analytics. The DTO and sector regulators should collaborate with universities and industry to develop specialized curricula and certification programs.
- Continue the investments in smart infrastructure such as smart meters, IoT sensors and AI-powered analytics platforms across both urban and rural areas. Scaling up successful pilot projects and leveraging international financing, such as World Bank support, will be critical for improving service reliability and climate resilience.
- Foster public-private partnerships and international collaboration, particularly for financing, knowledge exchange and the development of innovative digital solutions. Harmonizing national regulations with evolving EU and global standards, especially in AI ethics, data protection and digital infrastructure, will facilitate cross-border cooperation and regional integration.
- Promote the adoption of digital technologies in water management by investing in smart infrastructure such as smart metering, SCADA Systems, and IoT Sensors by facilitating Public-Private Partnerships (PPPs) & Innovation Ecosystem, as appropriate.

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[199] Waltero. (2025). Utility asset management in Turkey 2025: Digitization & IoT. https://waltero.com/resources/utility-asset-management-in-turkey/