Capacity building planning on digital transformation of the water sector

Presentation of capacity building way forward

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Capacity building is driven by the Mediterranean water challenge

- The Mediterranean region faces significant water challenges, exacerbated by climate change, population growth and aging infrastructure.
- Water scarcity affects over **180 million people**, with an additional 60 million experiencing water stress.
- Traditional water management approaches are no longer sufficient to address these complex issues.

-> Need to improve management

The promise of digital transformation

Digital technologies offer transformative potential for the water sector, enabling real-time monitoring, data-driven decision-making, and improved efficiency.

From smart meters to AI-powered analytics, these innovations can lead to more resilient and sustainable water systems.

However, a significant "**digital readiness**" gap exists across UfM member states,.

-> Targeted /dedicated capacity building needed

Key stakeholder groups: national agencies and regulators

Role: Ministries of water/irrigation, regulatory authorities, and basin agencies responsible for national water policy and investment.

Specific needs:

- Capacity in digitalization strategy and governance (e.g., integrating digital transformation into national water plans, establishing legal frameworks, securing funding).
- Exposure to best practices in drafting digital water policies, data standards, and procurement of smart systems.
- Inter-agency coordination skills, bridging water, energy, IT, and finance sectors.
- Country readiness varies significantly, from comprehensive digital water plans in some nations to others just beginning policy formulation.

Key stakeholder groups: water utilities and service providers

Role: Urban water supply and sanitation utilities, irrigation boards, and operators at national or municipal levels, at the forefront of digital tool implementation.

Specific needs:

- Technical skills to identify, implement, and manage digital technologies (e.g., smart meters, AI GIS analysis, machine learning analytics).
- Data analysis and management, turning sensor data into actionable insights, and utilizing public global remote opportunities.
- IT/OT integration, maintenance of digital equipment, and cybersecurity practices for critical infrastructure.
- Training on financial planning for digital infrastructure (e.g., PPPs) and ensuring management commitment.

Key stakeholder groups: academic and research institutions

Role: Universities, technical institutes, and water research centers, crucial for long-term capacity and advising governments on innovation.

Specific needs:

- Support to update curricula and research agendas with the latest digital water trends (e.g., machine learning, AI for water management, integrated water information systems).
- Training-of-trainers to enable professors to deliver new digital water modules.
- Exposure to industry case studies and partnership opportunities with utilities for applied research.
- Engaging academia ensures a multiplier effect, cascading knowledge to students and sparking further research and innovation.

Training matrix:

Stakeholder group	Key training topics	Preferred delivery modalities
National agencies and regulators	– Digital water policy and strategy development (integrating ICT, AI, and data analytics into water plans) – Governance frameworks and institutional reform for digital (data sharing policies, regulatory standards, ethical AI use) – Project planning and financing for digital investments (business cases, PPP models, financing for AI and digital infrastructure) – Change management and stakeholder engagement (leading a digital transition nationally) – Oversight of AI-based decision-support tools and national cloud-based water platforms	– Regional policy workshops and seminars for sharing country experiences – Executive leadership briefings and high-level panels to build awareness (possibly alongside UfM meetings) – Online webinars on specific policy topics (e.g. AI, accountability, data privacy laws, interoperability standards) through the CoP platform
Water utilities and operators (urban utilities, irrigation authorities)	– Technical training on digital tools: SCADA systems, IoT sensors, AI GIS and remote sensing, smart metering – Data analytics and management: database systems, real-time monitoring dashboards – Operations and maintenance in a digital age: asset management systems, predictive maintenance techniques – Customer service and communication: digital billing, using mobile apps and GIS for customer engagement, feedback loops. – Leak detection with AI-based analysis and use of public datasets to simulate hydrological models	– Online workshops and training-of-trainers modules. – On-site expert mission
Academia and research institutions	– Curriculum development in digital water (integrating topics like IoT, AI, hydro-informatics into university courses) – Research methodologies for digital water (data collection protocols, modeling techniques, interdisciplinary research design combining IT and water engineering) – Knowledge of industry best practices: case studies of successful digital implementations, current and emerging technologies (e.g. digital twins, blockchain in water)	– Train-the-trainer workshops: intensive courses for professors and trainers to learn new content and pedagogical techniques. – Webinars and lecture series: delivered by the consultant on specialized topics, made available to academia through the CoP. – Publication and case study development: mentoring academic participants to publish case studies or papers on digital transformation experiences in their country (building regional knowledge base).
Civil society and NGOs	– Digital literacy in water context: understanding basic concepts (e.g. what is a sensor, how data is used in water management) – Advocacy and transparency: how digital platforms (open data portals, dashboards) can improve transparency of water services, and how to advocate for data access – Participatory monitoring: methods for communities to be involved in data collection (citizen science) and feedback to utilities	– Awareness workshops: community-oriented training events, possibly country-level or sub-regional. – Peer networking: connect NGOs across countries through the CoP so they can share strategies (e.g. how one NGO in Country A used an open data portal to hold utilities accountable, etc.).

Multi-year capacity building roadmap: overview

- A phased approach to implement the strategy in an organized and sustainable manner.
- June 2025 – December 2026
- Each year has specific themes, milestones, and activities, ensuring logical progression from foundational understanding to advanced application.

Phase 1: Jun – Dec 2025

Initiation and foundations: "Building Awareness and Baseline Capacities“

Focus: Laying the groundwork for next-generation digital capacity, emphasizing AI, cloud-based platforms, and real-time data systems. Launch of the Community of Practice.

Proposed activities:

- Kick-off regional workshop: Introducing the program, showcasing AI/IoT/ML benefits, and validating country priority topics.
- Identify the capacity needs of each country
- Organize a series of online training sessions tailored on the needs identified.

Foundational training modules:

- Introduction to water data management, IoT principles, AI in water resources. Delivered through regional workshops.
- Piloting one **mutual learning exchange review** study with a water utility: developing methodology, concept note, managing a learning exchange team, national workshop, and drafting report.

Outputs for Phase 1

- Training materials for foundational modules developed.
- List of trained personnel per country established.
- Community of Practice (CoP) platform operational with initial membership and content.
- Pilot project plan document prepared.

Phase 2: Jan – Dec 2026

Knowledge consolidation: "Institutionalization and Scaling Up“

Focus: Consolidating gains, evaluating impact, and ensuring sustainability through institutional integration and planning for scale-up.

Proposed activities:

- Refresher and gap-filling training sessions: addressing any identified gaps through webinars by experienced countries.
- Institutional embedding: supporting national agencies to integrate ongoing capacity building (e.g., establishing Digital Water Units). Enabling early trainees to become trainers.
- Pilot evaluation and replication plan: Reviewing pilot results, assessing impact, and developing a roadmap for replication in other contexts.

Outputs for Phase 2

- Advanced training course modules and manuals developed.
- Mutual learning exchange results
- Conference proceedings documenting best practices exchanged.

Core curriculum modules

Module A: Foundations of digital water systems (sensors, SCADA, telemetry, real-time data, data backbone for AI/ML).

Module B: AI-driven analytics and decision support (cloud databases, GIS, open-access platforms like Google Earth Engine for hydrological analysis).

Module C: Strategic digital governance and policy (institutional readiness, digital water strategies, legal frameworks, financing, change management, regulatory reforms for AI).

Module D: Emerging technologies for the water sector (digital twins, AI-powered leak detection, computer vision, smart irrigation, blockchain, cost reduction, resilience).

Module E: Operations, maintenance, and cybersecurity in the digital era (predictive maintenance, digital asset management, field digitization, cybersecurity threats, data protection).

Module F: Case studies and practical applications (real-world examples, scenario-based simulations, reviewing successful implementations like PipePredict, FIDO Tech, GEE).

Monitoring and evaluation framework

A robust M&E framework ensures effectiveness and adaptive management.

Basic monitoring data: Participant statistics (country, gender, stakeholder type), training duration, material covered. Input indicators like "Number of professionals trained" with yearly targets. CoP platform usage monitoring (active users, knowledge products shared).

Evaluation forms and assessments: Post-activity evaluations, pre- and post-training self-assessments or quizzes to measure knowledge improvement (e.g., SCADA understanding).

Key Performance Indicators (KPIs): Development of SMART KPIs to measure outcomes and impact of capacity building initiatives for digital water transformation.

Q&A

Thank You!

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