

**TRAINING
PROGRAMS
IN
WATER MANAGEMENT
AND SANITATION**

**LIST AND DESCRIPTION
OF MODULES**

**H2O
Maghreb**



USAID
DU PEUPLE AMÉRICAIN

FESTO

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ROYAUME DU MAROC



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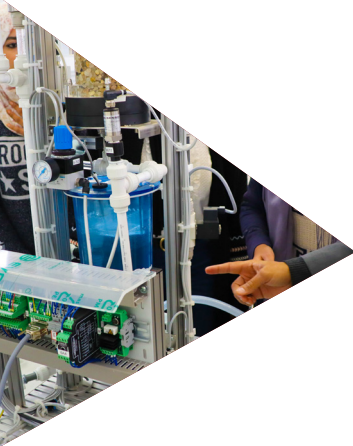
ROYAUME DU MAROC
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DRINKING WATER

Facing the challenges related to drinking water production and distribution is a contemporary priority among societies - and the growing scarcity of water resources requires both the development of new technologies and a permanent adaptation of related skills.

This is why the **H2O Maghreb** Drinking water-related training modules have been designed to build and reinforce knowledge and skills related to water treatment and distribution technologies: from using different types of resources to distributing to consumers, and including the different conventional and alternative methods of drinking water production, such as seawater desalination.



The **4 following modules** have specifically been conceived to help professionals master both basic and operational concepts. They aim at providing trainees with the capacity to work in an efficient and productive manner, through the use of innovative training tools such as Virtual Reality (VR), Environmental Discovery Systems (EDS) and the IEA training platforms.



TRAINING MODULES

WATER RESOURCES

IDENTIFYING WATER RESOURCES

- ▶ Types of water resources
- ▶ Characterization of drinking water standards

CONVENTIONAL TREATMENT METHODS

KNOWING TREATMENT METHODS

- ▶ Pre-treatment
- ▶ Coagulation / flocculation
- ▶ Sedimentation
- ▶ Filtration
- ▶ Disinfection

NON-CONVENTIONAL TREATMENT METHODS

KNOWING THE DIFFERENT METHODS OF SPECIFIC TREATMENT

- ▶ Iron and manganese removal
- ▶ Desalination / demineralization
- ▶ Calcium-carbonate balance

WATER DISTRIBUTION

MASTERING THE MANAGEMENT OF A DRINKING WATER SYSTEM

- ▶ Types and components
- ▶ Connection techniques
- ▶ Metering - leak detection
- ▶ Sectoral division - quality control

DURATION
2
DAYS

DURATION
5
DAYS

DURATION
5
DAYS

DURATION
5
DAYS



SANITATION

The increase in volumes of collected wastewater, evolution in legislature aimed at mitigating environmental degradation and protecting the population's health, as well as the growing scarcity of available resources are among the many factors which stress the importance of a holistic management of the water cycle.



The **H2O Maghreb** training modules related to Sanitation aim at addressing these various challenges, by exploring the specific features of sanitation-related expertise throughout the value chain. The modules tackle the various aspects of wastewater collection and the management of wastewater networks: the different extensive purification methods which are mainly applicable to urban areas, and the alternative methods adapted to on-site sanitation or rural areas. Specific attention is given to treated wastewater reuse, and to the upcycling of sanitation byproducts (biogas).



Through **practical exercises** on training platforms and the use of cutting-edge technology, trainees will therefore be given the opportunity to acquire a specific set of skills and expertise allowing them to work under optimal conditions.

TRAINING MODULES

SANITATION SYSTEMS AND FACILITIES & CHARACTERIZATION OF WASTEWATER

DURATION
3
DAYS

IDENTIFYING AND CHARACTERIZING THE DIFFERENT WASTEWATER COLLECTION AND SANITATION SYSTEMS

- ▶ Understanding wastewater pollution and its impact
- ▶ Characterizing the different types of wastewater
- ▶ Different wastewater collection systems
- ▶ Identification of the components and standard installations of a sanitation system
- ▶ Different types of systems

METHODS OF WASTEWATER PURIFICATION

DURATION
5
DAYS

KNOWING THE DIFFERENT TECHNIQUES & METHODS OF WASTEWATER PURIFICATION

- ▶ General information on wastewater purification
- ▶ Extensive & intensive techniques / Pretreatments
- ▶ Primary treatments
- ▶ Secondary / biological treatments
- ▶ Sludge management

TECHNIQUES FOR ON-SITE/RURAL SANITATION & SMALL COMMUNITIES

DURATION
3
DAYS

IDENTIFYING AND CHARACTERIZING THE DIFFERENT TECHNIQUES OF ON-SITE SANITATION

- ▶ Elements of on-site sanitation
- ▶ Operating principles
- ▶ Other alternative techniques (bed filter treatment, ...)

UPCYCLING SANITATION BY-PRODUCTS

DURATION
3
DAYS

ACQUIRING GENERAL KNOWLEDGE ON DIFFERENT FORMS OF BY-PRODUCT UPCYCLING

- ▶ Reusing treated waters
- ▶ Upcycling WWTP sludge and biogas

OPERATION

The **H2O Maghreb** training modules related to Operation aim at addressing the challenges operators and technicians may be confronted with in the course of their operating activities. Trainees will be able to reinforce their own flexibility and adaptability with regard to Drinking water & Sanitation, as well as their understanding of key concepts related to the **global operation of the water cycle**.



Training sessions are therefore dedicated to the mastery of general processes in the operating function, related to the use of teleprocessing tools, analytical monitoring, optimizing operational performances, and the quality approach.

Specific attention is furthermore given to health and safety, through a module addressing the main risks professionals of the water sector may face, with hands-on simulations in real working conditions and Virtual Reality.

TRAINING MODULES

OPERATING FUNCTION - ANALYSIS

DURATION
2
DAYS

MASTERING THE GENERAL PRINCIPLES OF OPERATION

- ▶ Water sampling techniques
- ▶ Preparation of treatment solution products

OPERATING FUNCTION - TELEPROCESSING / SCADA

DURATION
3
DAYS

MASTERING THE GENERAL PRINCIPLES OF OPERATION

- ▶ Using teleprocessing tools / SCADA
- ▶ Measuring physical and chemical / electrical / hydraulic parameters
- ▶ Using operating data

OPERATION OF PUMPING EQUIPMENT AND STATIONS

DURATION
2
DAYS

GUARANTEEING THE PROPER OPERATION OF A STATION IN MANUAL OR AUTOMATIC MODE, UNDERSTANDING THE PRINCIPLES OF SEQUENTIAL MANAGEMENT

- ▶ Management of start & stop sequences in manual mode and operation in automatic mode

OPERATION OF SANITATION SYSTEMS

DURATION
5
DAYS

MASTERING THE MAINTENANCE OF SANITATION SYSTEMS

- ▶ Tele-inspection of sanitation systems
- ▶ Monitoring tests in sanitation systems
- ▶ Sanitation system cleaning techniques
- ▶ Sanitation system rehabilitation techniques
- ▶ Performing connections to sanitation systems

OPTIMIZING & MONITORING PERFORMANCE OF WWTP

DURATION
2
DAYS

MASTERING THE OPERATING RULES OF WWTP

- ▶ General organization of WWTP operation
- ▶ Regular monitoring
- ▶ Performance monitoring

QUALITY / PROCESSES

DURATION
2
DAYS

RAISING AWARENESS ON QUALITY CULTURE IN A PROFESSIONAL ENVIRONMENT

- ▶ Knowing quality management systems
- ▶ Stock and supply management

HYGIENE AND SAFETY

DURATION
5
DAYS

MASTERING INTERVENTION STANDARDS IN SANITATION FACILITIES

- ▶ Hygiene, health and safety at work
- ▶ Basic first aid and fire safety
- ▶ Electrical hazards
- ▶ Confined spaces / works-at-height / descent into deep installations
- ▶ Identifying risks related to the use of chlorine gas, frequent hazards and general safety rules



MAINTENANCE

Water management-related activities are evolving towards a more autonomous management of human resources, who are increasingly expected to be qualified and responsive regarding issues occurring in the management of hydraulic infrastructures.

The four **H2O Maghreb** training modules related to Maintenance were designed in order to provide trainees with the fundamentals of the maintenance function, notably through the mastery of its technologies, and better exchanges between specialized departments and technicians.



Through this cross-cutting approach, trainees will acquire the autonomy to execute first-level maintenance activities, such as the maintenance of hydro-mechanical and electrical equipment or the calibration of measuring gauges. These modules notably emphasize the importance of reactivity and immediate intervention among technicians, in order to guarantee the proper operation of the facilities they will be in charge of.

TRAINING MODULES

MAINTENANCE FUNCTION

DURATION
2
DAYS

MASTERING THE GENERAL PRINCIPLES OF MAINTENANCE

- ▶ **Types of maintenance**
 - Mastering maintenance-related terminology
 - Identifying the different types of maintenance
 - Differentiating approaches, tools and goals of each type of maintenance
- ▶ **Maintenance methods**
 - Scheduling, execution, spare parts and their specifications
 - Organizing maintenance: entities and information fluxes, intervention requests, work orders, work vouchers, store issue slips
- ▶ **Identifying and calculating maintenance indicators and filling a maintenance log**

ELECTRICAL EQUIPMENT

DURATION
3
DAYS

EXECUTING ROUTINE MAINTENANCE OPERATIONS IN WATER TREATMENT PLANTS

- ▶ **Electrical equipment: main technology**
 - Understanding the distribution of electrical energy and electrical equipment
 - Understanding the necessary conditions for the regular operation of electrical cabinets and equipment
 - Identifying types and components of a MT/BT transformer
 - Identifying components of an induction motor
 - Understanding the necessary conditions for regular motor operation
- ▶ **Electrical equipment: main technology**
 - Knowing routine operations of electrical maintenance
 - Identifying symbols and reading electrical diagrams
 - Performing main electrical measurements
- ▶ **Identifying different types of power failure**

HYDRO-MECHANICAL EQUIPMENT

DURATION
5
DAYS

EXECUTING FIRST-LEVEL MAINTENANCE (+ SECOND LEVEL IF APPLICABLE)

- ▶ **Hydro-mechanical equipment: main technology**
 - Understanding protective and regulating hydro-mechanical equipment technology
 - Understanding pump technology
 - Understanding air compressor and booster technology
- ▶ **Reading supplier manuals and operating instructions**
 - Identifying different types of hydro-mechanical failure
 - Routine maintenance activities

MEASURING INSTRUMENTS AND SENSORS

DURATION
5
DAYS

GUARANTEEING ACCURACY OF MEASUREMENTS (SENSORS, TRANSMITTERS) AND GENERIC INSTRUMENTS IN A WATER FACILITY (ON-LINE SENSORS, FLOWMETERS)

- ▶ Reading PID diagrams, process diagrams
- ▶ Technology of main sensors used in the water industry
- ▶ Maintenance and calibration of sensors

MORE INFO:

The **H2O Maghreb** trainings are delivered at the Institut International de l'Eau et de l'Assainissement (IEA), in Rabat, Morocco.



REGISTRATION:

Receive the next training session calendar and register via:

E-mail: H2O-Maghreb@unido.org



For more information on the programs and accessibility criteria, please contact H2O Maghreb via:

E-mail: H2O-Maghreb@unido.org
Website: www.lkdfacility/H2O-Maghreb/