

Nawamed

Nature Based Solutions
for Domestic Water Reuse
in Mediterranean Countries

Iridra
Italy
-
Fabio Masi



MEDWAYCAP

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HOW

The use of green walls for the treatment of grey waters involves a double advantage: reducing water and the energy footprint of green walls currently used in architecture; and generating potentially reusable waters for non-potable uses (e.g. refilling of toilet flush cisterns, green areas irrigation, yard cleaning).



media link



more info



project

Hence, green walls are considered among the most promising green architecture solutions capable of combining the need for wastewater treatment and recovery and the acceptance by residents of the inclusion of decentralised treatment solutions in urban environments.

Two types of greenwalls for greywater treatment and reuse are tested: living walls with pot modules and green facades.

The green facades solution decreases the investment cost in comparison to the treated flow rate of living walls, indeed, it basically is a vertical flow constructed wetland planted with ornamental and climbing plants. The solution is highly innovative and the suitability for greywater treatment as well as the survival of climbing plants were recently successfully reported from Greek experiments.

NAWAMED foresees the implementation of green facades at the university premises in Amman and Beirut, taking the grey water from students' dormitories. The treated water is pumped back into the buildings, reducing drinking water use. In Beirut, the green facade and a living green wall are integrated into the same building, facilitating the comparison of the two solutions.

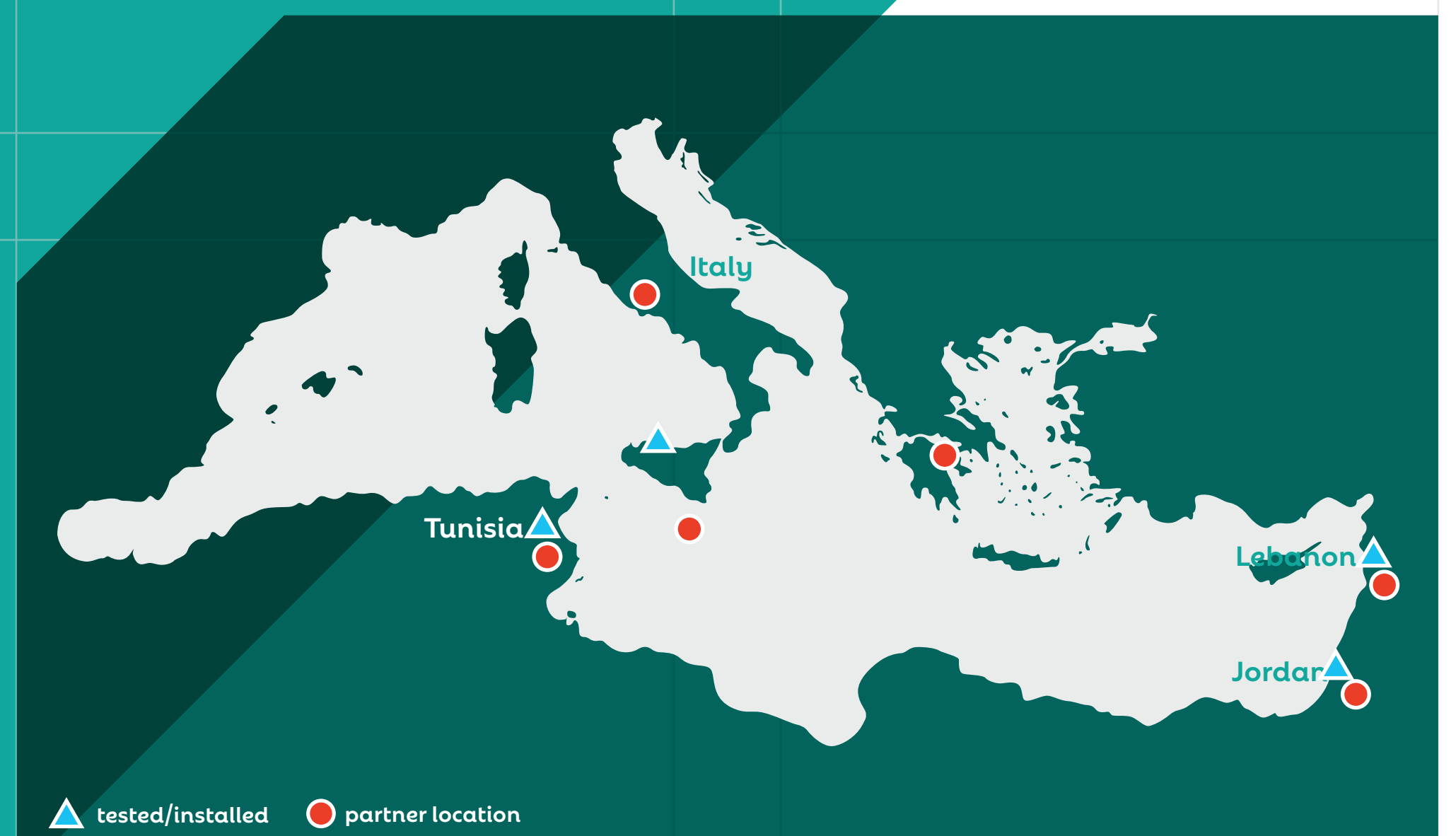


WHAT

Nature-based solutions for greywater treatment

The technique used for the treatment of the greywater in living walls, green facades, and green roofs, derives from the constructed wetlands technology. Whenever possible, vertical submerged subsurface flow systems have been chosen for the following key reasons: limited weight, reduction of evapotranspiration (the project will be implemented in water-scarce arid environments), and a wide choice of plant species.

LIVING GREEN WALLS
CONSTRUCTED WETLANDS
NATURE-BASED & LOW-COST SOLUTIONS
NON CONVENTIONAL WATER
PHYTODEPURATION



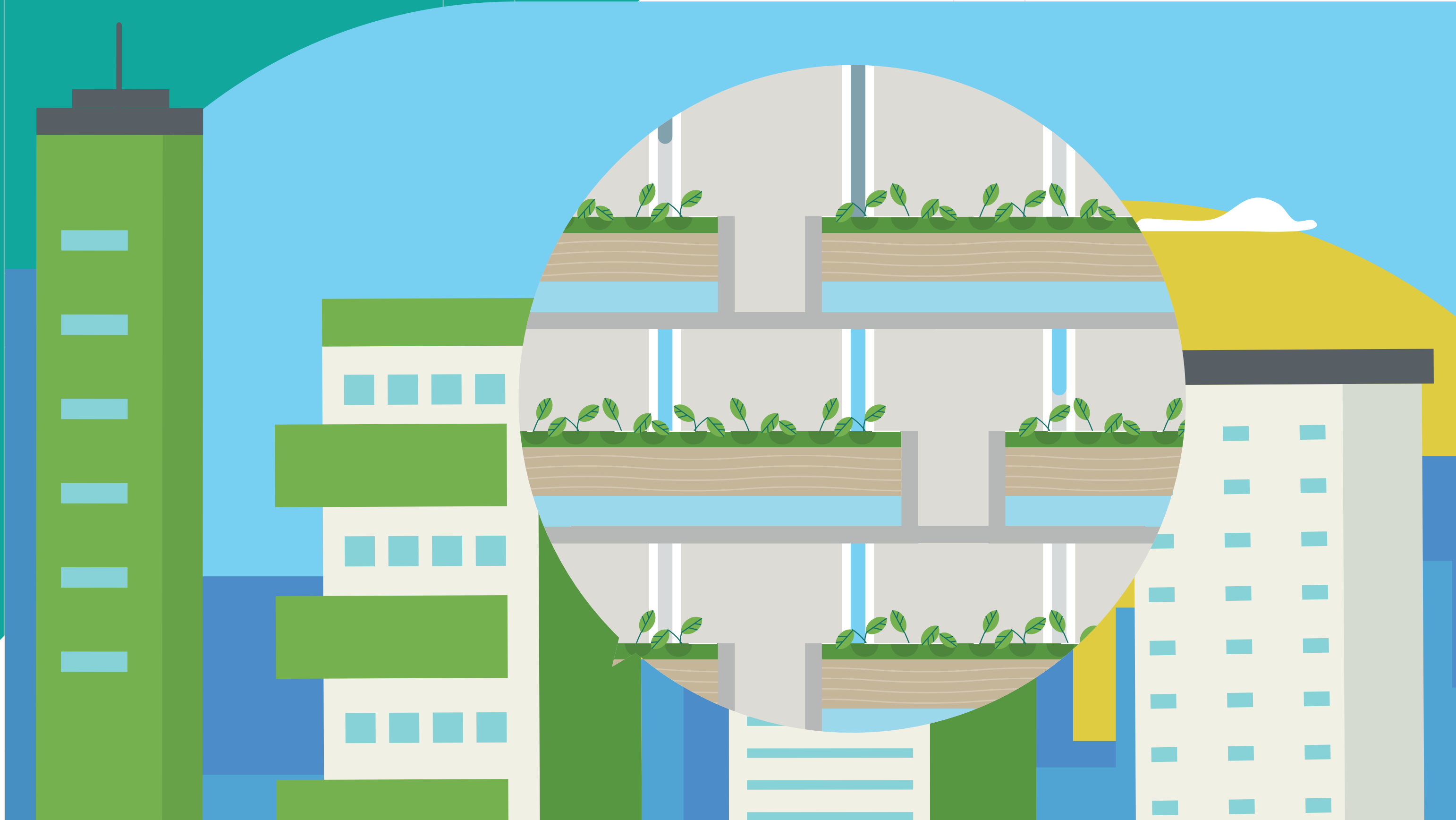


WHAT



Living wall

Living walls with pot modules are an innovative solution and many of the experiences available to date are still on a pilot scale in laboratories under controlled conditions, technologic innovation is proceeding rapidly, leading to already having several full-scale applications reported in literature as well as full-scale demonstratives, such as the demonstrative realised within the CONSUMELESS project, where a green wall was implemented for the treatment and reuse of greywater in a beach resort.



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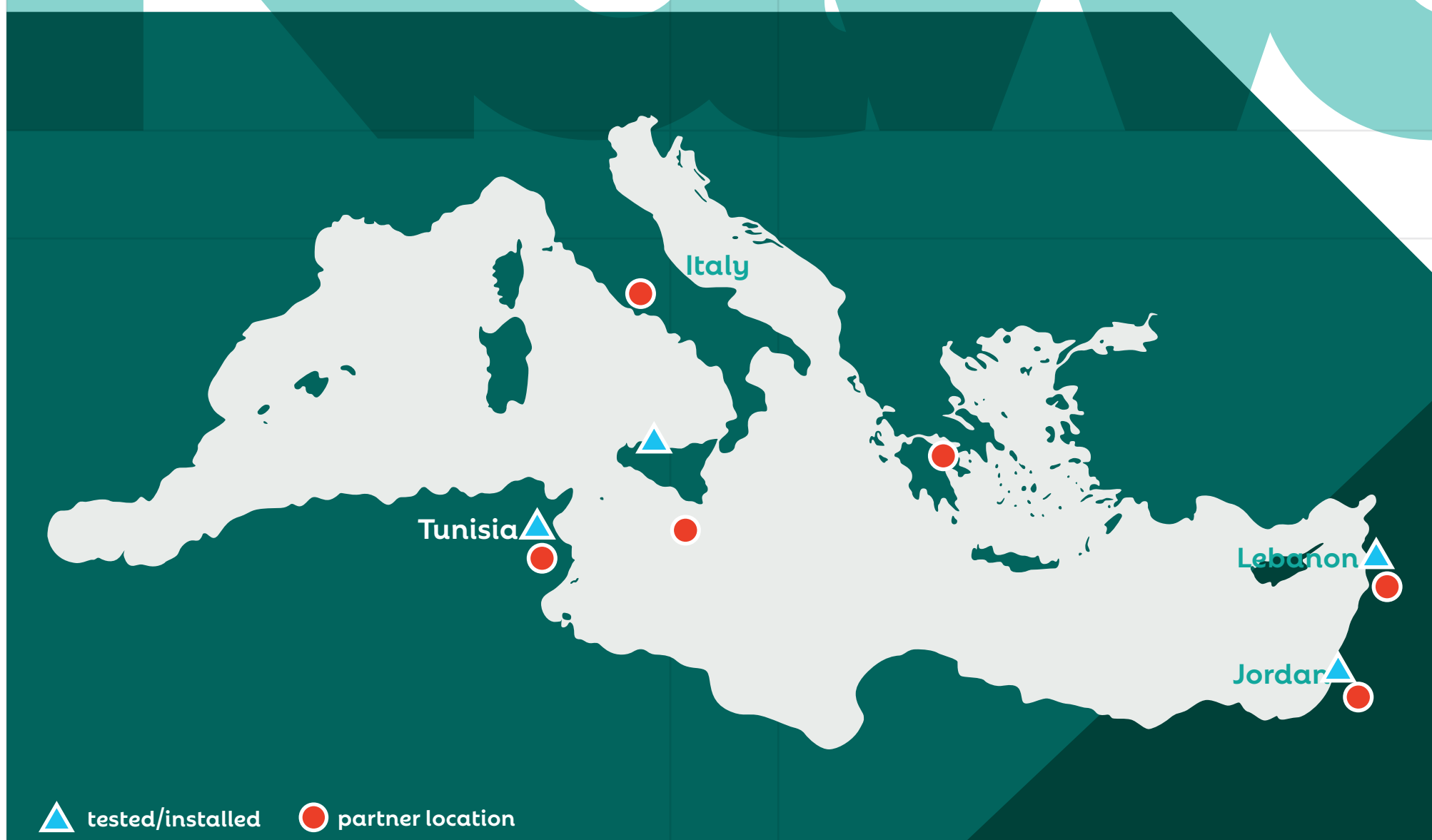


HOW

The first installation of this solution was set in Ferla (IT). The system involves collecting grey water (mainly from the wash basins) in a small tank from which it is pumped to feed the green wall. The water flows into the pots, where it undergoes purification treatment. It is then collected in a tank for later reuse to flush toilets instead of using drinking water. The green wall consists of modules hanging on the wall madeup of vases whose filling material encourages the development of bacterial biofilm, which plays a key role in the treatment processes. The plant species housed in the pots play several roles: to encourage bacterial biodiversity; to allow the water to distribute evenly in the pots, ensuring purifying efficacy; and to provide an aesthetic and refreshing function.

Before being sent to the drainage cisterns for reuse, the purified water is disinfected with an ultraviolet light lamp. The green wall covers an area of approximately 30 square metres, facilitating maintenance by municipal technicians, thus reducing running costs. With this system, it is estimated that around 1,000 litres of drinking water are saved per year per student (around 200).

NAWAMED also foresees the implementation of Living green walls at the university premises in Tunis and Beirut, taking the grey water from the campus facilities and students' dormitories. The treated water is pumped back into the buildings, reducing drinking water use. In Tunis, the pot modules will be hung on the building walls and wood structures designed to create a recreational area.



△ tested/installed ● partner location

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Horizontal constructed wetland systems consist of earthen basins sealed with geotextile coverings filled with gravel of a suitable size in which rooted macrophyte plants are planted. Similar to natural wetlands, constructed wetlands act as a biofilter and can remove a range of pollutants (such as organic matter, nutrients, heavy metals) from the water.

The planted vegetation and the filter bed, consisting usually of sand and gravel, play an important role in contaminant removal. Vegetation in a wetland provides a substrate (roots, stems, and leaves) upon which microorganisms can grow as they break down organic materials. Different species of aquatic plants have different rates of heavy metal uptake, a consideration for plant selection in a constructed wetland used for water treatment.

Constructed wetlands are one example of nature-based solutions. They are constructed with flow regimes, micro-biotic composition, and suitable plants in order to produce the most efficient treatment process.

NAWAMED foresees the implementation of two constructed wetland systems. In Lebanon, at the Beeka Valley university campus, the CW treats greywater from the students' dormitories. The treated water is pumped back into the buildings for flushing toilets. In Latina (Italy), the system collects rainwater and treats it to make it available for other uses, such as cleaning and washing.

Furthermore, NAWAMED foresees constructing an innovative transportable CW to be deployed in refugees' camps. This solution is based on Aerated CW technology, in which innovative components are included to improve the treatment performances and reduce the footprint area.



WHAT

Constructed wetland for greywater and rainwater treatment.

A constructed wetland (CW) is an artificial wetland to treat sewage, greywater, stormwater runoff or industrial wastewater. Constructed wetland systems are highly controlled engineered systems that intend to mimic the occurrences of soil, flora, and microorganisms in natural wetlands to aid in treating wastewater.

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