



Experiences from the
*Non Conventional
Water Resources
Programme in the
Mediterranean*

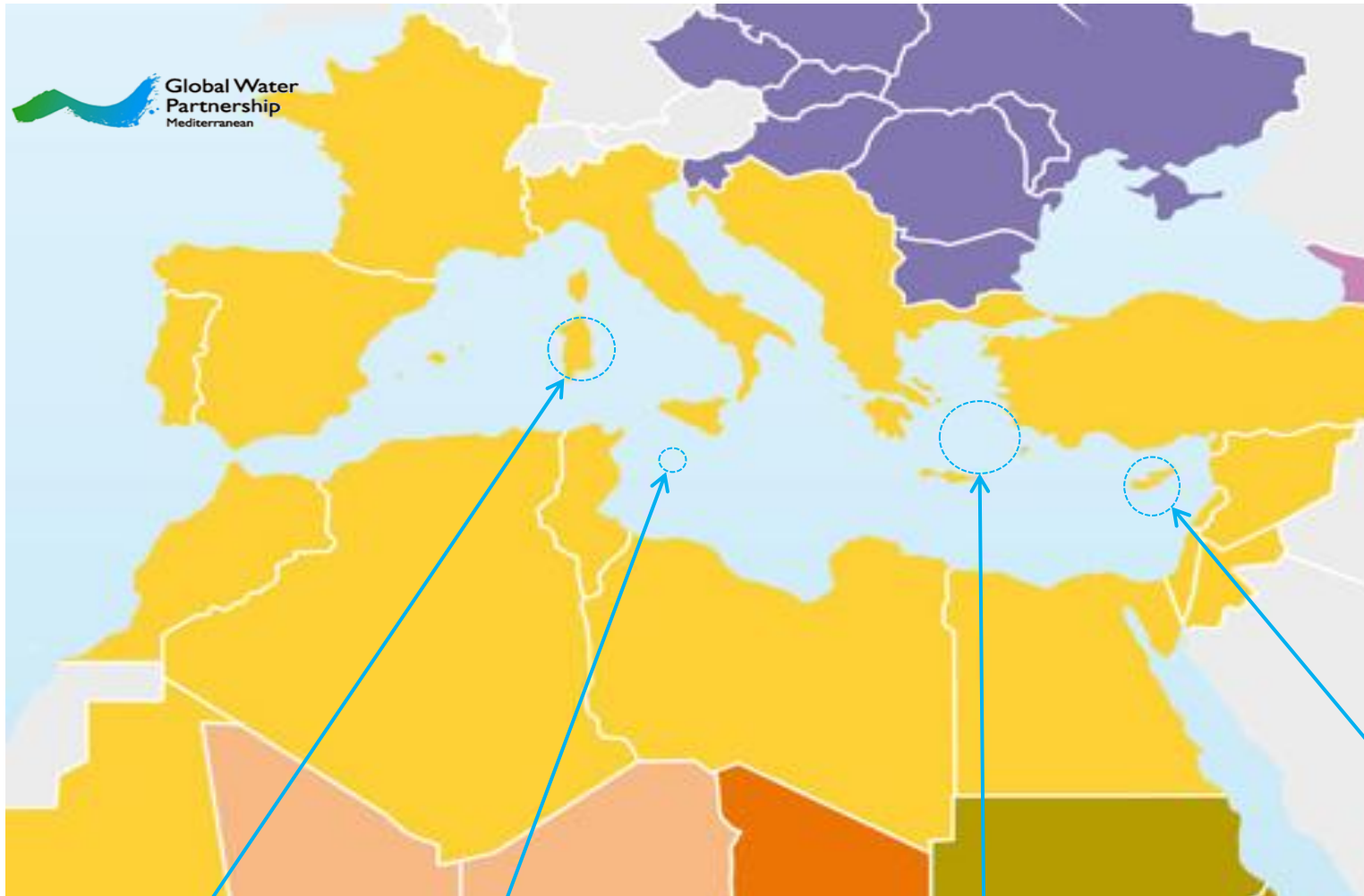
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GWP-Med*

NCWR Animated Video



<https://www.youtube.com/watch?v=hxxyVDFWaXY&t>

Non Conventional Water Resources Management in the Mediterranean



**Italy, Sardinia
(2017-2018)**

**Malta
(2011-2016)**

**Greece, Cyclades & Dodecanese
Islands (2008-2018)**

**Cyprus
(2013-2017)**

- 3.5% of the European citizens live in islands
- More than 50,000 islands on the European Continent
- 500 islands are larger than 20 km² and they have a total area of over 700,000 km² or more than 7 per cent of Europe's surface area
- Fragile ecosystems
- Limited fresh water resources due to small size
- Irregular and uncertain rainfall patterns
- Frequent over-exploitation of aquifers
- Water supply infrastructure under increased pressure due to climate change uncertainties
- Greek islands (2000-2010): about €80 million spent for water transfer



Image Credit - Konstantina Toli

- Increased demands for water are met through desalination and water transfers by tankers
- Climate change impacts: Increased temperatures lengthen the summer period
Water supply problems in tourist resorts are increasingly common
- Agriculture is an important economic activity, threatened by water scarcity, drought and salinisation
- Increasing salinity of groundwater reserves has implications on crop cultivation, especially along the coast



Image Credit - Konstantina Toli

Non Conventional Water Resources Programme in the Mediterranean

- ❑ Aims at promoting Non-Conventional Water Resources Management (NCWRM) and especially rainwater harvesting, stormwater collection & grey water reuse as cost effective practices for water availability and climate change adaptation at local level. The programme focus lays on insular communities and is expanding to coastal cities of the mainland; projects are located mainly in settlements and urban or peri-urban areas.
- ❑ The Programme's objectives are:
 - To demonstrate innovative & cost effective NCWR solutions, through demo micro-projects
 - To train teachers to educate students on NCWR and increase awareness on sustainable water use
 - To enhance the capacity of the local authorities in NCWRM & IUWM
 - To train local technicians on the application of modern NCWR systems and materials, and build their capacity to install and/repair such systems and share their expertise at local level.
 - To promote multi-stakeholder partnerships for local NCWR initiatives.
 - To promote knowledge and sharing of experiences on aspects of integrated approached to urban water management.
 - To advance regional dialogue among Mediterranean countries on how to advance the use of NCWRM & IUWM.

Non Conventional Water Resources Programme in the Mediterranean



Countries: Greece, Cyprus, Malta, Italy

Duration: 2008-2018

Total Budget > 5.255 million USD

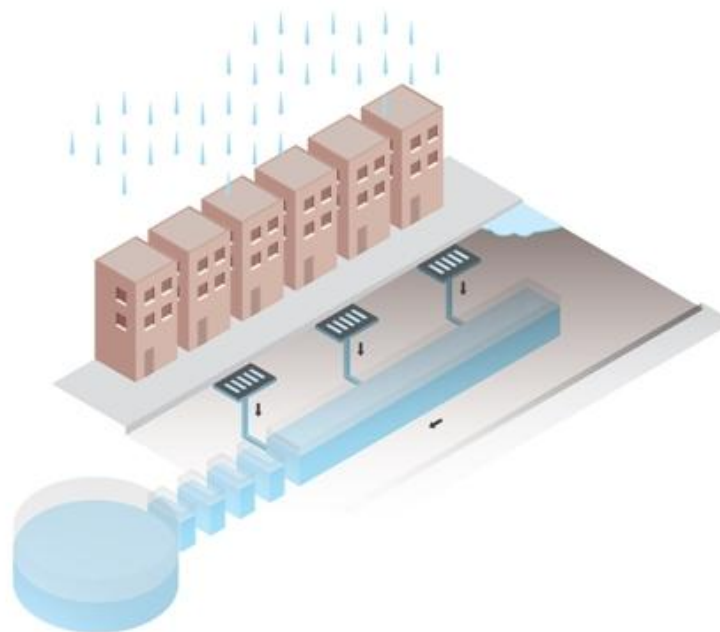
Coca-Cola Foundation Grant

- Increase local water availability
- Water suitable for various non-potable uses
- Traditional method for islands in the Mediterranean



I. Rainwater Harvesting & Stormwater Management:

Installation or reinstatement of innovative or traditional **rainwater** and **stormwater harvesting systems** in public buildings in urban and peri-urban areas, site specific solutions, adapted to local needs. Key elements: **collection & use** of water for secondary uses, **innovative, cost-effective, replicable** solutions



NCWR Programme: Demo projects (I)

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Sikinos, GR



Iraklia, GR



Syros, GR



Santorini, GR

NCWR Programme: Demo projects (I)

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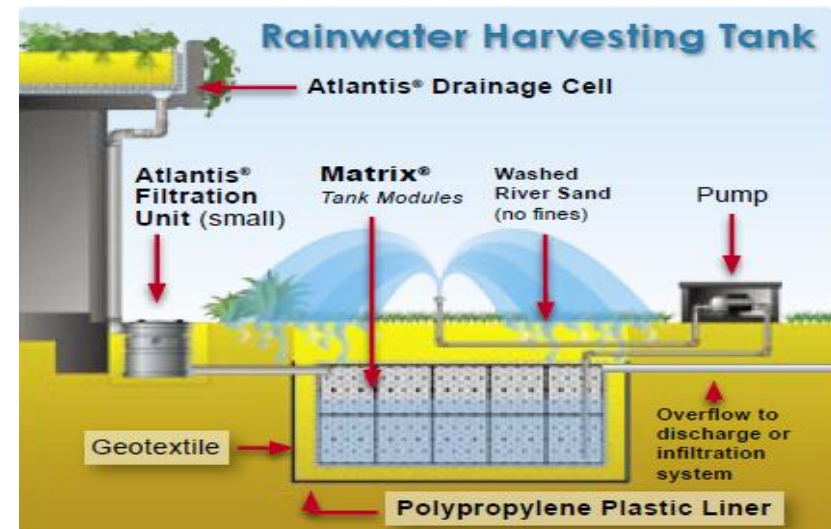
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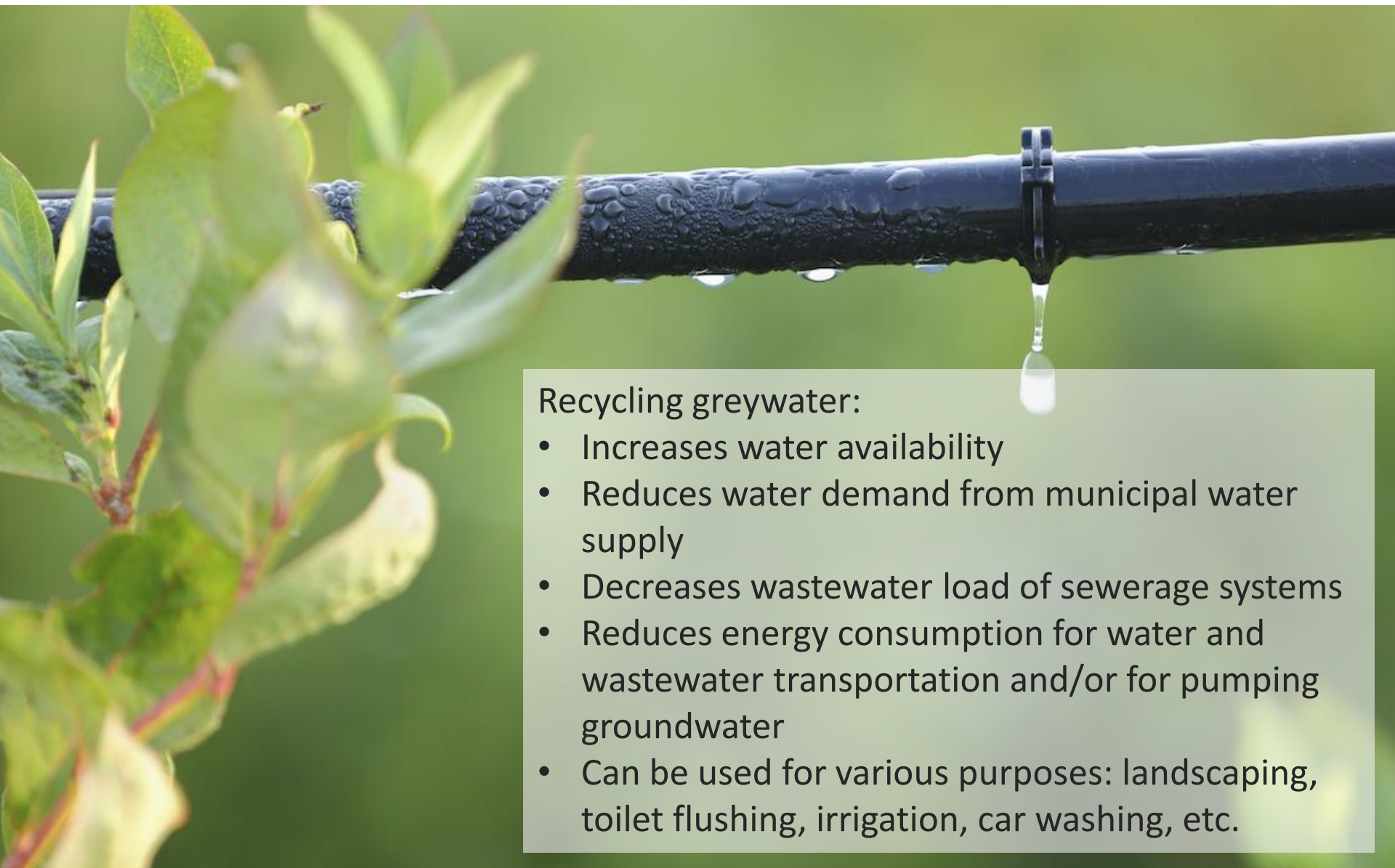


Stormwater Management: Introducing new technologies

Modular Tanks

- 100% recycled polypropylene
- Withstand 25tn/m²
- Can be assembled in various shapes & sizes
- Void space 95%
- Require limited preparatory works
- Sealed with geomebrane (welded) & geotextile.
- Ideal for integrated urban water management & creating green & recreational areas, open space areas, parking lots etc





Recycling greywater:

- Increases water availability
- Reduces water demand from municipal water supply
- Decreases wastewater load of sewerage systems
- Reduces energy consumption for water and wastewater transportation and/or for pumping groundwater
- Can be used for various purposes: landscaping, toilet flushing, irrigation, car washing, etc.

II. Greywater Recycling

Installation of **greywater recycling systems**: demo applications in public buildings (stadiums, schools), which have significant water saving benefits, with emphasis on the replication potential of the applications

Gozo Football Stadium, MT



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Malta College of Arts, Science & Technology, MT

Greywater recycling

Sequential tank system



- Used in public buildings & sports facilities to recycle greywater from sinks & showers
- Fast installation
- Previously subsidized system
- Numerous applications
- Treated water used for irrigating green spaces & fields



Greywater recycling

Ultrafiltration Membranes



- Used in sports facilities to recycle greywater from showers
- Removes suspended solids, bacteria and viruses bigger than 0.03 micron
- Compact “plug & play” system, quick and easy installation



Water Kiosks: Small Desalination Units

- **RO units**, with capacity $\sim 6\text{m}^3/\text{day}$
- Custom-made systems
- Used in small villages and remote locations, only for drinking purposes
- Operate with coins – authorities decide on the cost per litre (usually 0.2-0.5 €/5L)
- Revenue covers operation and maintenance costs

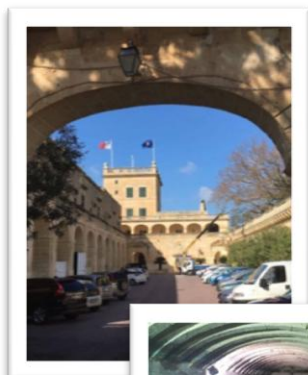


Increase Desalination Capacity

- Increase the capacity of existing units
- Additional membranes for increasing capacity
- Additional capacity of $\sim 100\text{m}^3/\text{day}$ in Astypalea
- Installed in small islands, only for drinking purposes
- Operated by the water utilities



Reinstatement of Traditional & Historic Reservoirs



- Historic value & appreciation of traditional techniques
- Make reservoirs or cisterns operational
- Relatively low cost intervention to increase water availability locally

Maintenance works & increase of storage capacity in existing water supply systems

- Prevent facility deterioration & leakages
- Improve regulation of water supply, particularly in high demand periods (touristic summer periods)
- Utilize existing water infrastructure
- Increase water supply reliability
- Prevent water transfers



Urban projects & Green/Blue infrastructure

- Integrated Urban Water Management
- Stormwater collection for irrigation
- RWH systems paired with efficiently irrigated urban green spaces (e.g. drip irrigation green walls)
- Efficient water use & increase of quality of life in the urban grid



Water saving kits (aerators): Sets of aerators (2 for faucets and 1 for shower) distributed to households in small islands. Data indicate a decrease in water consumption by 20-30%.

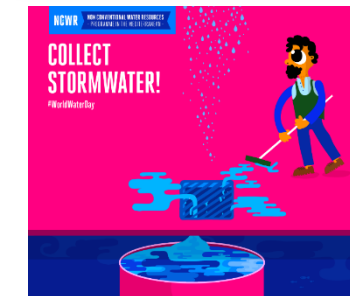


Water saving equipment: Discourage wasteful behaviour of users in facilities of increased consumption, e.g. swimming pool showers



NCWR Awareness Raising Communication & Dissemination – Tools & Materials

- Programme's microsite:
<http://www.gwp.org/en/NCWR>
- Social Media for dissemination of the Programme results (e.g. Twitter, Facebook)
- Factsheets
- Infographic
- Alter Aqua Game (ENG/GR/IT)
- 3 animated videos featuring NCWR technologies
- ID animated video animation





- Training for local technicians to increase local know-how on NCWR technologies, installation, retrofitting and maintenance
- Potential to expand the green market
- Need and potential for water related jobs (esp. in O&M) in the Mediterranean



Image Credit – Roger Mommaerts ([Click](#)).

- In cooperation with the Ministries of Education
- In-school hands on activities for primary & kindergarten students
- Teacher training
- Country-specific educational material
- Variety of materials: educational packages, video games, posters, etc.



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Non Conventional Water Resources Programme in the Mediterranean



Outcomes & Outputs

Contribute to local water security

- Address water scarcity: More than 250,000 m³ of water harvested/recycled annually for secondary uses for more than 110,000 beneficiaries
- Prevent floods through stormwater applications in urban & peri-urban environment

Showcase smart NCWR solutions in IUWM context

- Urban applications in the context of green/blue infrastructure through IUWM approach: innovative RWH & stormwater management applications; green roofs; greywater reuse
- RWH & Greywater recycling systems for domestic use

Foster regional & national dialogue on NCWRM & IUWM

- National Water Management Plan for the Maltese Islands (2016)
- Regional Dialogue on IUWM in the Mediterranean

Enhance Education, Raise Awareness, Share Knowledge

- A new water culture for over 26,500 sensitised students, 4,300 trained teachers and the general public on critical water challenges and water conservation
- Green jobs potential through vocational training of 270 local technicians
- Knowledge & Experience sharing within and beyond our region

The challenges are numerous; strong collaborations and a shared vision for improved water management across disciplines can make the difference.

Thank you!

For more information:

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