



NAWAMED

Nature Based Solutions for Domestic Water Reuse in Mediterranean Countries

Thematic objective: B.4 Environmental protection, climate change adaptation and mitigation

Priority: B.4.1 Water efficiency



**STRATEGY FOR THE INTEGRATION OF NON-CONVENTIONAL WATER RESOURCES IN WATER
MANAGEMENT PLANNING: ITALY**

WP5 – A Common Mediterranean Policy Perspective

ACTIVITY 5.2 – Local, National and Regional Strategic Documents

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1. Introduction

Non Conventional Water Resources (NCWR) can provide significant opportunities for optimising the management of water resources by diversifying the available freshwater resource-base. In this way NCWR enable security of water supply to be achieved whilst ensuring the sustainable use of natural freshwater resources.

The role of NCWR within a comprehensive water management framework can have two different (but complementary) aspects:

- (i) that of carrying over water capacity from the wet season to the dry season – and hence primarily rainwater harvesting techniques, and
- (ii) that of supplementing existing natural freshwater resources and making use of such resources in substitution of natural freshwater resources – in particular for cases where lower quality water to drinking water is required – such as landscape irrigation and toilet flushing.

Therefore the application of NCWR can have a different context, depending on the spatial extent of the application typically varying between local and regional/national levels. Application at the local level considers technologies and techniques which can be applied at the point of use, that is at the level of the water user. Typical examples include rainwater harvesting at the field or household level, or decentralised technologies such as green walls and other greywater treatment systems. On the other hand, the regional/national level refers to larger structures, involving significant capital investment. Typically such applications would large dam retaining structures for water runoff, or the construction of water treatment plants such as desalination plants for sea-water or treatment/polishing plants for wastewater. Both levels of application are relevant from the perspective of integrated water management, and can be considered as complementary to each other. This highlights the flexibility in the application of NCWR, where different approaches can be adopted to ensure the integration of NCWR at different water management levels.

NCWR applications related to water reuse also include an element of efficiency in water use, since these applications enable water demands at the local and/or regional level to be met with a lower input volume in the water supply system, entailing lower pressures on natural water resources.

NCWR therefore provide additional flexibility in water management planning particularly under conditions of water stress, particularly where natural freshwater resources are not sufficient to meet water demands. NCWR solutions provide functionality in the diversification of water supply resources, enabling the development of additional water resources to sustain the water supply system, whilst favouring the sustainable use of limited natural freshwater resources. NCWR development however needs to be undertaken in parallel with the development and application of water demand management solutions, to avoid that increases in water supply availability be matched by a corresponding increase in water demand through what is commonly known as the rebound effect.



The adoption of NCWR solutions provides added focus on the links between water and energy, given the energy requirements for the operation of NCWR solutions. Hence the adoption of such solutions will need to be aligned with the availability of energy supplies, and can be particularly relevant to drive the uptake of renewable energy solutions to increase the green credentials of NCWR solutions. The efficient use of energy in the whole urban water management cycle will therefore gain more relevance in water management planning, with energy efficiency measures in water production and distribution becoming increasingly important in water management plans. The adoption of NCWR solutions therefore calls for the increased mainstreaming of the WEFE (Water-Energy-Food-Ecosystems) Nexus in water management planning.

Considerations to the quality of water produced by NCWR solutions is also of relevance, in particular to ensure the safe use of these solutions. Water Quality standards reflect the intended use of the product water, where various uses requiring lower quality (second class) water can be addressed with NCWR solutions, including within an urban context landscape irrigation and applications such as toilet flushing. The development of risk assessment and management protocols during the planning of NCWR solutions is therefore important to ensure that such applications can be implemented in a safe manner which ensures a high level of protection to human health and the environment.

This report provides high level recommendations for the promotion of NCWR solutions at the local or user level in Italy, in alignment with the outcomes of the NAWAMED Project.



2. Country Background

The water supply resources in Italy are primarily based on a mix of conventional water resources (mainly groundwater) and surface waters. Non conventional water resources (sea-water desalination and reclaimed water) are used, at utility scale, to a minor effect. This reflects the relative availability of freshwater resources at the country level.

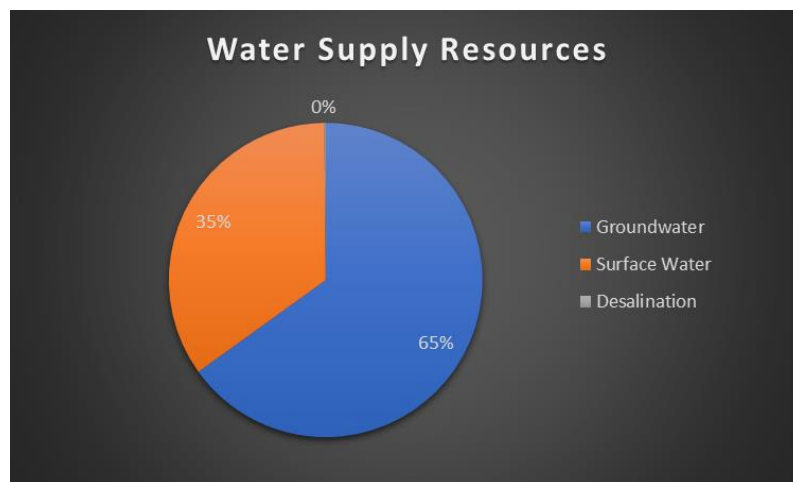


Figure 1: Classification of water supply resources in Italy

The population of the country is concentrated in urban centres, with over 77% of the 59.1 million persons living in urban areas. Urban areas include the main cities and towns, which are all connected to the municipal water supply systems, whilst rural areas refer primarily to small countryside villages.

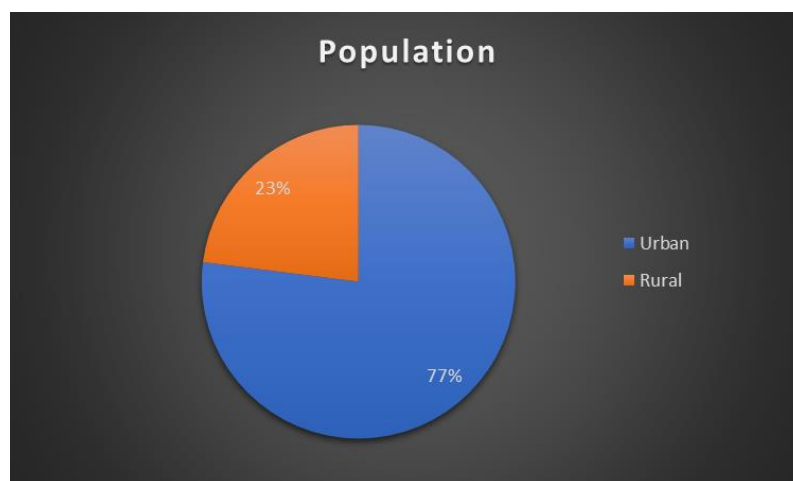


Figure 2: Classification of population between urban and rural areas



Municipal water use accounts for around 28% of the national water demand in Italy. The largest water consuming sector is the agricultural sector with around a 50% share of the national water demand.

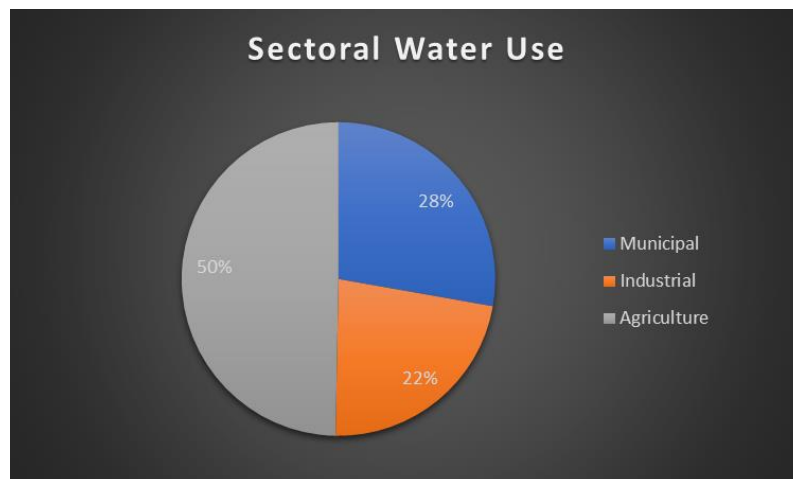


Figure 3: Sectoral water use in Italy

Household water use follows similar trends as other Mediterranean countries, where second class (non potable) water can address up to around 50% of the household water needs such as toilet flushing, washing and garden irrigation, thereby opening up opportunities for the use of greywaters generated on site. The per capita consumption of water in Malta stands at around 220 litres per capita per day.

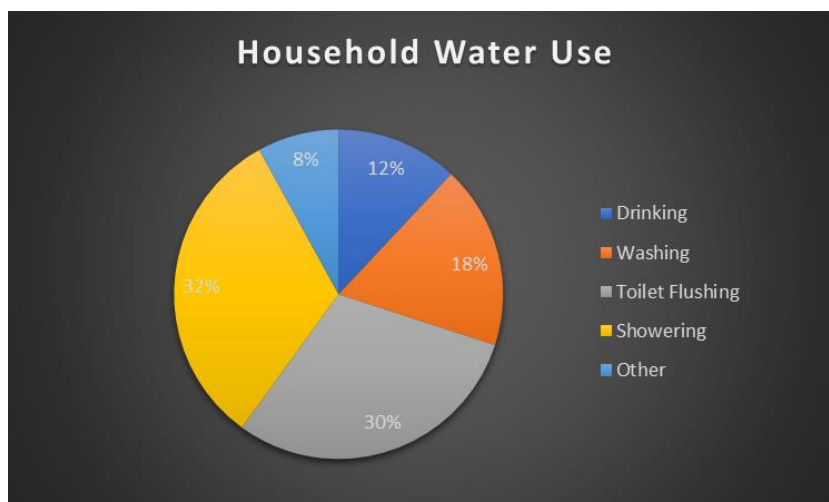


Figure 4: Classification of (average) household water consumption in Italy

Water tariffs vary across the country, where an average tariff of Eur2 per cubic metre can be assumed for comparative purposes.



From a permitting perspective, no specific permits are required for the installation of NCWR technologies in private buildings, where the designer takes the responsibility for the design which must however be approved by the Municipality. For public facilities (schools, sports facilities etc) an advisory opinion is required by the Provincial Health Authority.

On a national level, the Ministry of the Environment in 2003 issued the Ministerial Decree 186 on technical standards for the use of wastewater in implementation of Article 26, para 2 of the Legislative Decree of 11 May 1999, n.152. The decree identifies the possible uses (irrigation, civil and industrial), identifies the chemical, physical and microbiological parameters of the recovered water, provides information on dual distribution networks, provides information on monitoring activities and specifies how to address the economic costs of the wastewater treatment and recovery.

The decree contains comprehensive standards developed specifically for water reuse practices. The standards D.M. 185/2003 include maximum limit values for physical-chemical parameters that have to be met for all the intended uses of reclaimed water. Some parameters have limit values similar to those designated for drinking water, even if the reclaimed water is used for uses such as irrigation of green areas. Regarding industrial uses, limit values should, as a minimum, comply with limit values set for discharges to surface water (Legislative Decree 152/2006).



3. Strategic Approach

Following the discussions and analysis undertaken in the national stakeholder water tables undertaken through the NAWAMED project, the following strategic approach for promoting the mainstreaming of NCWR solutions in national water management planning is being proposed in the case of Italy, based on the following four measure typologies:

- Implementation Actions
- Governance Actions
- Financial Support Actions
- Capacity Building Actions

(i) Implementation Actions

The adoption of NCWR solutions in Italy, given the territorial, climatic and demographic characteristics should focus on two main aspects:

- Promotion of green-NCWR solutions such as green walls to treat greywater in communal or public buildings, with the treated water being used for landscape irrigation and other secondary uses such as toilet flushings. Communal or public buildings are indicated due to their higher generation capacity of greywater, and
- Small scale closed system NCWR solutions should be promoted at the single household level. These systems are generally appliance type high-tech installations which treat shower/washing water for subsequent reuse on site. Support should focus on facilitating the market entry of these technologies to increase their future availability.

(ii) Governance Actions

A review of Ministerial Decree 186 to include considerations for greywater treatment in urban areas is recommended. This process could be led by the Ministry for the Environment (to be applicable at the national level) and would lead to the drafting of a national guidance document which establishes installation designs, establishes quality standards and risk management protocols. The availability of national guidelines would facilitate the development of safe NCWR systems facilitating the development of the market for these technologies.

(iii) Financial Support Actions

Opportunities for the development of additional financial support schemes for greywater treatment NCWR installations should be considered based on an economic analysis of the impact of NCWR installations which takes into consideration the environmental and social benefits of these installations and the foregone costs in subsidising the water consumption avoided through the installation of these solutions.

(iv) Capacity Building Actions

In order to develop the necessary awareness and technical capacity on the application of NCWR solutions the following actions are recommended:

- Inclusion of training on NCWR solutions in University Courses for Engineers and Architects, who are expected to be on the forefront of building design. Training courses for existing Engineers and



Architects on the application of NCWR solutions are also to be introduced through cooperation with the respective representative bodies (such as Chamber of Architects and Chamber of Engineers).

- Long term (multi-year) promotional campaign on the application of NCWR solutions in communal buildings is to be undertaken by the Ministry of the Environment, and its representative agencies in the different regions, targeting municipalities and the general public to raise awareness on the effectiveness of these solutions. Ideally the promotional campaign would also highlight the specific financial support actions set for promoting NCWR solutions.

Finally it is recommended that the high level coordination of the above action plan is led by the Ministry for the Environment to enable the actions to be integrated in the national water management plan.