



# 3<sup>rd</sup> River Basin Management Plan: MALTA

## 1. Introduction

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### 1.1. Background and scope of the RBMP

The EU Water Framework Directive (WFD) requires EU Member States to develop River Basin Management Plans (RBMP) aimed at the adoption of an integrated approach towards the protection of water, including groundwater, inland surface waters, transitional waters and coastal (marine) waters. This plan, which is subject to updating and reporting to the European Commission on the basis of six-year implementation cycles, focuses on the management of water resources as defined through designated 'water bodies'.

RBMPs constitute the main management tool for the protection of all water resources in Malta, and in fact are considered as National Water Management Plans in their own right. These plans are developed pursuant to the EU Water Framework Directive 2000/60/EC and are updated every six years on the basis of the six-year implementation cycle of the Directive.

The plan describes and assesses these water bodies in terms of their status and pressures thereon. On the basis of such assessment, the Plan puts forward a Programme of Measures targeting the protection and, where necessary, the restoration of water bodies.

The overall aim of the River Basin Management Plan is to ensure the sustainable management of Malta's water resources, and the protection of aquatic ecosystems associated with our natural waters. This is achieved through the definition of a set of measures (Programme of Measures) addressing the most significant challenges that Malta's water resources are facing.

In this regard, the plan describes the status of the water bodies and the pressures affecting water status, whilst also setting environmental objectives to be achieved through the implementation of the Programme of Measures.

### 1.2. Water Resources availability in the Maltese Islands

The Maltese islands experience a typical semi-arid Mediterranean climate with long-dry, hot summers and mild-wet winters. Rainfall, the only source of natural freshwater input in the islands, generally occurs between the months of September and April, with the intervening months being characteristically dry. Annual precipitation tends to average at 500mm per year, with however a high intra-annual variability ranging between 200 and 700mm. The temperate climatic conditions also result in high evapotranspiration rates, with the mean annual potential evapotranspiration value reaching 1300mm – and hence significantly exceeding the annual rainfall levels.

The semi-arid nature of Malta's climate is confirmed through the application of UNEP's (1992) Aridity Index, which is defined as the long-term average annual precipitation to annual potential evapotranspiration ratio. As outlined in Figure 1 below, Malta's climatic conditions predominantly fall within the semi-arid range of this index. Water resources in arid and semi-arid areas are very scarce due to the low rainfall and high evapotranspiration, and hence can be considered as regions facing permanent water-scarcity conditions. Semi-arid conditions therefore go beyond "prolonged

droughts” as envisaged under the Water Framework Directive, in terms of water scarcity being permanent as opposed to a temporary condition.

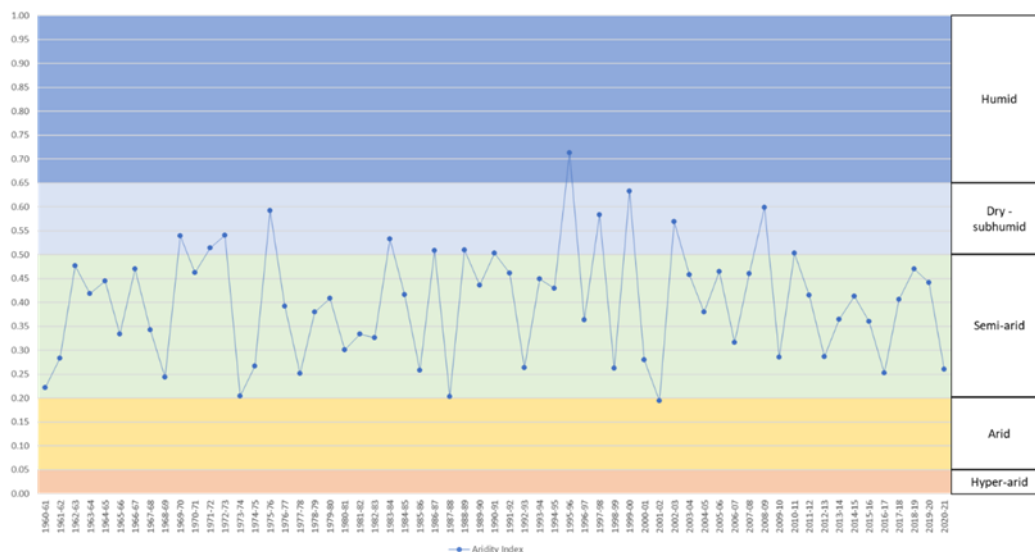


Figure 1: Application of the Aridity Index to the Maltese Islands (1960-2022), highlighting the semi-arid nature of Malta’s climate.

Hence Malta’s 3<sup>rd</sup> River Basin Management Plan (3<sup>rd</sup> RBMP) primarily addresses the prevailing conditions of permanent scarcity of natural water resources as experienced in the Maltese islands. The 3<sup>rd</sup> RBMP can therefore be considered as a Drought Management Plan in itself, given that it addresses a water management context which is significantly different than that experienced in mainland Europe, a context of permanent scarcity of natural freshwater resources which goes beyond the impact of temporary droughts – but results in the permanent scarcity of natural freshwater resources.

### 1.3. The National Water Resource Base

Naturally renewable freshwater resources in the Maltese islands are not sufficient to meet the national water demand, even if such demand is kept at highly efficient levels. This condition arises due to natural factors such as the climatic and geomorphological conditions prevailing in the islands as well as due to the islands’ high population density – which is by far the highest amongst the Member States of the European Union. This is not a recent development, and in fact, the insufficient availability of freshwater resources has historically been considered as a limiting factor for the social and economic development of the country.

The first reference to the unavailability of freshwater resources in Malta dates to 1536, in a description of the Maltese Islands authored by Knight Quintinus Haedus which reported that *“The water is salty and putrid but there are good springs which are probably due to rain fallen in wintertime. The origin of these springs is not very deep, they often disappear in summer, but they always diminish in volume. One generally drinks rainwater collected in tanks or in ditches.”* Descriptio Insulae Melitae apud Thesaurus Antiquitatum, Vol. XV.

Addressing water scarcity has remained a national priority ever since, addressed by the different administrations of the islands. In this regard, one can note the development of rainwater harvesting facilities with the aim of balancing water availability between the wet and dry seasons, the progressive development of groundwater abstraction resources in the perched and subsequently in the early 1800's in the mean sea level aquifer systems, followed by the installation of the first sea-water distillation plants in the 1880's and the first reclamation plants for treated wastewater used in landscape irrigation developed in the 1950's.

The production of alternative (additional) water resources has therefore been a feature of the development of the water sector in Malta over the last centuries, with the aim of developing a sufficient freshwater production capacity to supplement available groundwater resources to meet the ever-increasing national water demand and ensure that natural groundwater resources are used in a sustainable manner.

#### 1.4. Development of the national water demand

The main factors which contribute to the water demand in the Maltese islands can be identified as population growth, the development of the agricultural sector and the industrial/commercial sectors, including tourism. In addition to the actual water requirements of these sectors, the demand of the distribution system, in terms of losses during the conveyance of water from the production source to the point of use also needs to be taken in consideration.

The population of the Maltese islands has seen a continued increase, registering an increase of around 20% over the last decade. This recent change has occurred due to an expanding economy which has resulted in an increase in the foreign workforce. This provides added challenges from a water management perspective, not just due to the actual increase in population numbers but also due to the different water use practices.

The Gross Domestic Product (GDP) of the Maltese islands shows an increasing trend, reflecting the expansion of the economy and its progressive transformation to a services-oriented economy. An increasing GDP is also considered to be reflected in a generalized improvement in the standard of living of the population. From a water demand perspective, economic development needs to be considered from two diametrically opposite but complementary perspectives namely one which sees an expanding economy as requiring a higher supply of water, and another where the transformation of the economy into a service oriented one would see a reduction in high water requiring economic activities and hence an associated reduction in the water demand.

The development of the agricultural sector in the Maltese islands is characterized by two opposing factors, namely the reduction in the overall land under agriculture but which is complemented with an increase in the coverage of irrigated land. The local climate enables multi-season cropping, whereas cultivation of crops during the spring and summer seasons requires substantial volumes of irrigation water. Increasing the area under irrigation, and its use during the spring and summer seasons, can potentially lead to an increase in the water demand of the agricultural sector.

From a system demand perspective, Malta has achieved significant progress in managing the municipal water distribution networks significantly reducing leakage levels. Over the past twenty

years, the national water utility, has lowered its ILI from 19.95 (in 1995) to less than 2.0 (in 2020). These results have led to a significant reduction in the water production for municipal purposes, in spite of population increase and the expanding economy, as is illustrated in Figure 2 below. The agricultural sector primarily operates using multiple on-site water sources, therefore reducing the importance of distribution losses. This will however change in the coming years, when leakage management in the network supplying reclaimed water to the agricultural sector will increasingly gain importance in order to ensure the effective use of this resource.

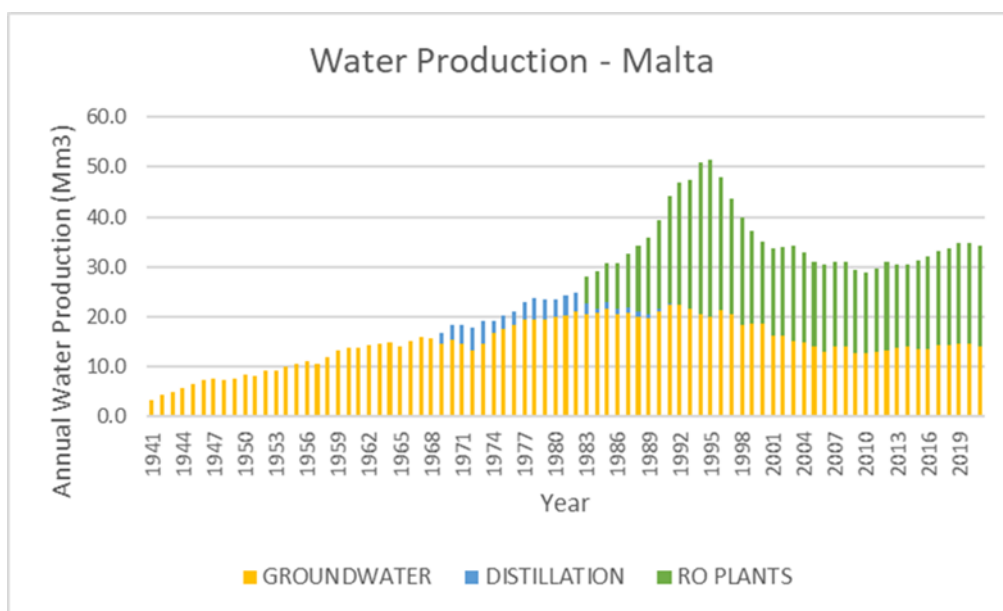


Figure 2: Water Production - Municipal Supply in Malta

In addition to the above internal factors, external factors such as Climate Change need also to be considered when assessing the development of the national water demand. Climate Change is expected to result in a reduced rainfall depth as well as a change in the rainfall patterns favoring more high intensity rain events, two factors which are expected to result in a reduction in the mean annual recharge to groundwater. Furthermore, increased temperatures will be expected to result in increased water demands whilst also entailing increased natural losses from evapotranspiration. Overall, Climate Change is expected to result in exacerbating the current water scarcity conditions prevailing in the Maltese Islands.

### 1.5. The importance of Malta's surface waters

The RBMP as the main management tool for the protection of all water resources in Malta should be seen in the wider context of the importance of these waters.

Malta's surface waters encompass inland surface waters, transitional waters at the coastline, and coastal waters that surround our islands. These waters are important from an ecological but also socio-economic point of view.

Malta's inland fresh surface waters are very small streams, water courses or standing waters, while transitional waters are brackish waters found at the mouths of valley catchments and in close proximity to the sea, and are typically wetlands or marshlands.

The watercourses are parts of larger valley systems, locally known as 'widien', and the level of water and flow within these watercourses varies seasonally, while some are linked to springs that outflow from perched aquifers and tend to be present throughout the year. Given Malta's Mediterranean climate and geology, these waters are important because they support habitats and freshwater aquatic species that are found in very few places within the Maltese islands, such as the endemic Maltese freshwater crab (*il-qabru*) and galleries of white willow and white poplar trees.

Malta's transitional waters also support particular habitats and species, and are important resting grounds for migrating birds. The waters are hence popular for bird watching, eco-tourism and education, apart from being unique landscape features that support biodiversity and provide flood protection.

In view of their small scale and characteristics, Malta's inland surface waters and transitional waters support a relatively small percentage of the total economy. Economic sectors that are dependent to some extent on these waters include agriculture, tourism, entertainment, research and coastal defence, and it is estimated that 0.1% of the total economy (or €10.82 million) and around 300 jobs depend on these waters. In fact many ecosystem services that these waters provide cannot be valued in monetary terms. Their key value is for non-market activities such as recreational uses, including bird-watching and outdoor walks, their aesthetic and landscape value, as well as the role they have in terms of supporting biodiversity, coastal and flood protection (in the case of wetlands), and maintaining hydrological flows and aquifer recharge.

Malta's coastal waters on the other hand support a range of economic sectors as well as recreational activities, providing fish and seafood, a means for the transport of goods and services, space for leisure and recreation, and a sink for key utilities' waste streams.

Dependence on the marine environment of the various economic sectors varies, from 100% in the case of fisheries, aquaculture and shipping to lower, but still significant percentage, for electricity generation, water production, sewerage, motion pictures, telecoms, accommodation and real estate among others.

Fisheries and aquaculture make use of marine resources as a direct input and rely on the good environmental state of our seas in order to function. Transport of goods by shipping is dependent on the sea, as is the provision of telecommunications that rely on underwater cables between Malta and Sicily that provide for a substantial part of its service provision.

A significant part of tourism activity in Malta entails sea-based entertainment, with tourists making use of the sea both directly, in the activities they engage in, as well as indirectly, since the pleasure reaped in consuming certain goods and services are greater given that the sea is accessible and visible.

The same can also be said to apply for the economic sectors that encompass restaurants, real estate, and movie/TV production, for which the aesthetic and visual amenity of seascapes contribute to the intrinsic value of sites and settings.

Key utilities such as wastewater treatment, electricity generation and desalination depend on the sea, as a direct input for their processes and/or a sink for their discharges. Electricity generation makes use of the sea for the provision and discharge of cooling waters, water production through desalination is dependent on seawater as a direct input as well as a sink for the resulting brine discharges, while treated wastewater from the national urban wastewater treatment plants is also discharged to sea. These sink services do not have an economic cost assigned, but without them these utilities could not function.

Approximately 15% of Malta's economy and 12% of jobs have been estimated to depend on the marine environment, equivalent to €1,636 million GVA<sup>1</sup> and 27,639 jobs<sup>2</sup> in 2018<sup>3</sup>. This share may seem high when compared to the 1.3% contribution of the Blue Economy to the EU<sup>4</sup>, but it reflects the central role that the sea has in Malta's economy as an island state.

In addition, there are non-market activities such as the recreational use of the sea made by locals which does not always feature in national output figures, but which are central to our quality of life, such as enjoyment of the sea for swimming, diving, boating, fishing, and coastal activities such as walking, picnicking, climbing, and angling.

Other services provided by marine ecosystems, that are not factored into economic statistics, include the mitigation of storm surges, coastal erosion and flooding by seagrass meadows, habitats for marine species to breed, feed and shelter as provided by seagrass meadows, caves and reefs, as well as the bioremediation, filtration and dispersion of waste, toxins and other nuisances.

## 1.6. National Water Policy Framework

The above considerations highlight the need for water management in Malta to be considered from a starting point of gross unavailability of natural freshwater resources, where available resources are not sufficient to meet the national water demand. This is a different context to water management than that prevailing in mainland Europe. Water management in Malta is not just about managing available water resources, but also about creating the additional water resources required to address the gap between available naturally renewable supplies and demand.

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<sup>1</sup> Gross Value Added (or Net Output) is the value of output less the value of intermediate consumption; it is a measure of the contribution to the gross domestic product made by an individual producer, industry or sector. At factor cost, value added is the gross income from operating activities after adjusting for operating subsidies and indirect taxes.

<https://nso.gov.mt/metadata/ConceptDetails.aspx?id=924>

<sup>2</sup> As Full Time Equivalents

<sup>3</sup> E-Cubed & ADI Associates (2020) Economic and Social Analysis of Marine, Coastal, Inland Surface and Transitional Water Bodies in Malta. Unpublished.

<sup>4</sup> The EU Blue Economy Report 2019 based on 2017 data. European Commission (2019). The EU Blue Economy Report. 2019. Publications Office of the European Union. Luxembourg

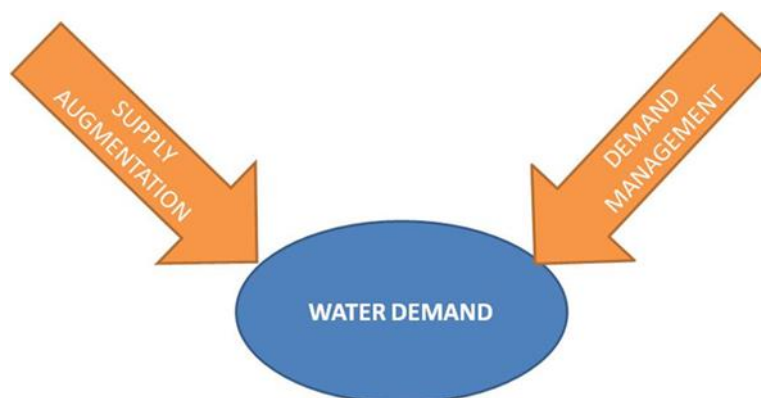


Figure 3: Schematic of Malta's water policy framework, addressing water demand through the conjunctive use of water demand management and water supply augmentation measures.

Malta's national policy framework therefore focuses on the containment of water demand – through water demand management measures applied at the national and the user level, intended to achieve a high level of water use efficiency. However, cognizant of the remaining gap between the availability of natural freshwater resources and an efficient national water demand, the policy framework aims to address this gap through the development of Non Conventional Water Resources, thereby ensuring that water supply security is continually achieved hence supporting the continued social and economic development of the country, in a progressively sustainable manner.

The need to produce water increases the linkages between the water and the energy sectors, where energy efficiency in water production and efficiency in water use itself become important factors for reaching policy targets which go beyond the water sector, such as decarbonization targets. In fact, the progressive reduction of the specific energy for the production of desalinated water enabled other aspects of energy use in the national municipal water cycle to gain increased relevance, including energy use in the distribution of water, the pumping of groundwater and the energy requirements of wastewater treatment. In fact, Malta's 3<sup>rd</sup> RBMP will be addressing these issues with a view of ensuring a holistic and comprehensive consideration of the water sector and its linkages with broader national targets.

This is in line with adopting a water management framework based on the principles of the Water-Energy-Food-Ecosystems Nexus. The interlinkages between these four nexus cornerstones are important policy elements, and the 3<sup>rd</sup> RBMP will broaden the linkages between water and energy to food production, in particular through the diversification of water supply resources for agriculture. Furthermore, the resulting eventual decreased reliance of the agricultural sector on groundwater will open up opportunities for protecting groundwater flows sustaining important groundwater dependent ecosystem hubs.

### 1.7. Defining the Significant Water Management Issues for the Malta River Basin District

Within this broad water management context which is being introduced through the 3<sup>rd</sup> River Basin Management Plan, a number of Significant Water Management Issues (SWMI) addressing the specific characteristics of this water scarce river basin district will be given priority in the Programme of



Measures. The identification of these SWMIs was based on a consultation with key stakeholders, a process which highlighted that water management in Malta needs to be considered from the “unavailability perspective” that is one when natural freshwater resources are permanently not sufficient to meet demand, a context where water scarcity does not occur because of droughts, but because of the natural semi-arid climatic conditions experienced in the river basin district.

The priority SWMI to be addressed in the 3rd RBMP are:

#### Quantitative Water Management Issues

- Energy Efficiency in Water Services
- Optimisation of wastewater treatment and conveyance infrastructure
- Water management in the urban environment
- Management of Groundwater resources

#### Water Quality Management Issues

- Addressing contaminants of emerging concern
- Improving the use of agricultural fertilizers
- Understanding surface water status
- Addressing Marine Litter

#### Horizontal Issues

- Improving the understanding of water’s contribution to the economy
- Promoting Research and Innovation in the water sector
- Alignment of National Policies related to the water sector
- Addressing extreme events – reducing flood risk