Green Paper

on the Regulation of Groundwater Abstraction in the Maltese Islands

GOVERNMENT OF MALTA
MINISTRY FOR THE ENVIRONMENT
ENERGY AND ENTERPRISE

THE ENERGY & WATER AGENCY

ERA
Environment & Resources Authority

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FOREWORD

Groundwater is undeniably a strategic resource of freshwater for ensuring security of supply for our population, economic activities and agriculture. However, this resource has in the last decades suffered from quantitative and qualitative pressures which have threatened its status, and hence its capacity for sustaining Malta's freshwater supply in the future. Over abstraction has resulted in the intrusion of saline waters in the main mean sea level aquifer systems, contributing to the gradual salinization of these important groundwater reserves, whilst the leaching of surface contaminants, such as nitrates has resulted in almost all of our groundwaters exceeding quality standards established under EU Directives.

This Green Paper proposes a way forward to regulate groundwater abstraction and ensure an effective and efficient use of this important resource. *The proposals in this Green Paper are intended to protect bona-fide users of this resource and encourage users to increasingly improve efficiency in use. Importantly, the Green Paper presents a proposal for a way forward, which will be in the coming weeks actively discussed with stakeholders, with a view of together developing a definite proposal for the establishment of a national regulatory framework for groundwater which provides a high level of protection to our groundwater environment, whilst protecting the needs of users whose activities are sustained by groundwater.*

This will also align Malta's groundwater management framework with the EU's Water Framework Directive which requires Member States to take necessary actions to ensure the protection of the natural environment, including through the establishment of water pricing policies intended to promote the efficient use of water resources.

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STRATEGIC IMPORTANCE OF GROUNDWATER FOR SECURITY OF SUPPLY

Groundwater forms an important part of the water resources used to address the national water demand in Malta; accounting for over 60% of the total resource base. Groundwater helps address around 35% of the public water supply and over 80% of the needs of the agricultural sector, which is by far more dependent on groundwater than other sectors, as seen in **Figure 1**. Additionally, commercial activities that are dependent on groundwater for self-supply, including groundwater supplied by private water suppliers (water carriers), should also be taken into consideration.

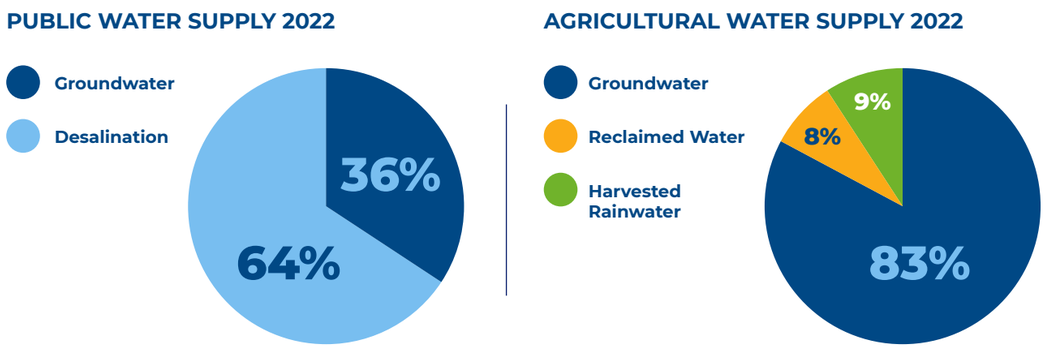

Figure 1. Role of Groundwater resources in addressing Public and Agricultural Water Supply.

The New Water project, undertaken by the Water Services Corporation, aims to further address the water scarcity challenge in Malta, particularly for the agricultural sector. The project aims to make a high-quality alternative water supply available. This supply would be safely used for crop irrigation, with the sole intention of reducing groundwater abstraction.

Even with investments being made at the national level – such as the increase in capacity of desalinated water production and the expansion of the New Water project – these alternative resources will still not have the capacity to fully replace groundwater in the national water supply mix. New Water production has increased year on year, with a combined production of 1.6 million cubic meters in 2022. This capacity only addresses a fraction of the current total water demand of the agricultural sector.

Furthermore:

◆ Groundwater is required as part of the potable water supply mix, enabling the remineralization of desalinated water and the control of chemicals such as Boron. These processes can only be achieved at higher financial cost and energy consumption.

◆ The potential production capacity of New Water will never be sufficient to meet the demands from the agricultural sector. Hence, additional water resources are required to ensure the sustainability of the sector.

With all this in mind, the good status of our groundwater bodies needs to be sustained to ensure a sustainable and reliable water supply for the future.

CURRENT STATUS OF GROUNDWATER

The Maltese islands sustain fifteen hydro-geologically distinct bodies of groundwater – of different sizes and typologies. By far the two most important bodies of groundwater are the mean sea level aquifer (MSLA) systems in Malta and Gozo which, combined, provide over 80% of the sustainable yield of groundwater in Malta. These groundwater bodies practically underlie all the islands and are relatively protected from surface contaminants located at sea-level and they are also covered by a deep unsaturated zone.

The smaller perched groundwater bodies (PA) which are more exposed to surface contamination exhibit poor qualitative status. These were utilized for public groundwater supply up to the 1990s, following which their use was discontinued due to their particularly high content of nitrates and other agrochemicals. This contamination resulted in the loss of a reliable water supply in the country. Due to its higher elevation, this water supply could be sourced (produced) at zero energy, since distribution relied on gravity.

From a qualitative perspective, the mean sea level groundwater bodies also have an average nitrate content exceeding the 50mg/l quality standard established under the EU Groundwater Directive. However, due to their vertical and lateral contact with seawater, these aquifer systems also suffer from the intrusion of seawater because of over-abstraction. As a result, these groundwater bodies are in poor quantitative and qualitative status – with their storage capacity significantly reduced when compared to the first water level data collected in the 1940s **(Figure 2)** when the aquifer systems were relatively unexploited.

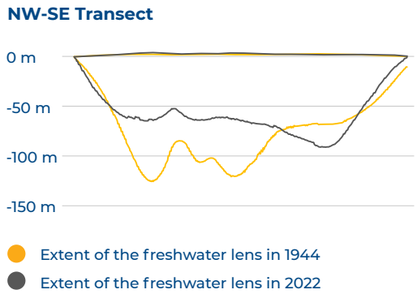

Figure 2. Changes to the extent of the freshwater lens.

Efforts are required to curb this downward trend in the reduction of the storage capacity of these mean sea level aquifer systems through better management of abstraction activities, to achieve a balance between the long-term rate of recharge and annual abstraction levels.

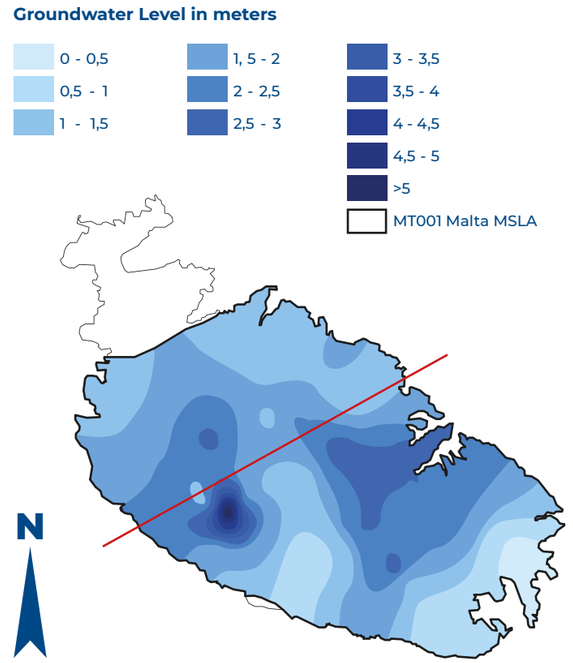

Figure 3. Groundwater level in the Malta Mean Sea Level Aquifer System in 2022.

ABSTRACTION OF GROUNDWATER FOR PUBLIC PURPOSES

The abstraction of groundwater for public purposes (drinking water) is undertaken by the Water Services Corporation using 12 pumping stations and 110 boreholes, as shown in **Figure 4**. The volume of groundwater abstracted is fully accounted for, and public groundwater abstraction stations reach a limited depth below mean-sea level to limit the occurrence of seawater intrusion. The quality of abstracted groundwater is also monitored resulting in a reduction of abstraction rates whenever an increase in salinity is detected in a specific abstraction station. This is done so that the sustainability of each groundwater abstraction source can be ensured.

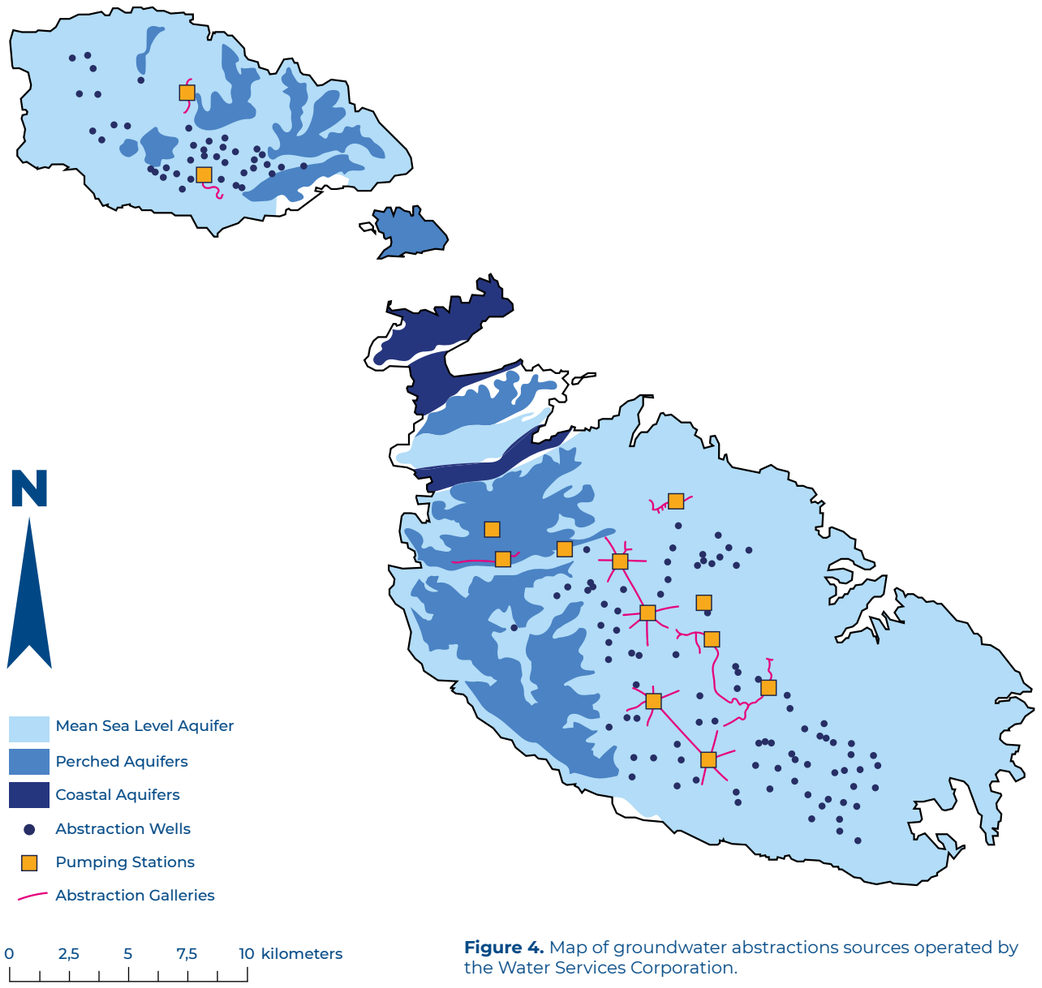

Figure 4. Map of groundwater abstractions sources operated by the Water Services Corporation.

Figure 5 illustrates how the total volume of groundwater abstracted from these stations has also progressively decreased over the years to ensure better management of existing groundwater sources. However, the decrease also reflects the general degradation in the quality of the aquifer systems.

Replacement of groundwater by desalinated water comes at a cost for the Water Services Corporation since the cost of abstracting groundwater is significantly lower than that of producing water from alternative sources such as seawater desalination. In terms of energy consumption, producing 1 cubic meter of desalinated water requires around 4 times the energy required to abstract the same volume of groundwater.

Groundwater is an important component in the drinking water blend, providing important minerals as well as reducing levels of specific parameters in desalinated water. This would otherwise require a more energy intensive desalination process to ensure the achievement of the quality levels required under the Drinking Water Directive. From an operational perspective, the continued use of groundwater limits the cost and the energy requirements for the production of potable water and therefore has a strategic role that needs to be safeguarded for the future.

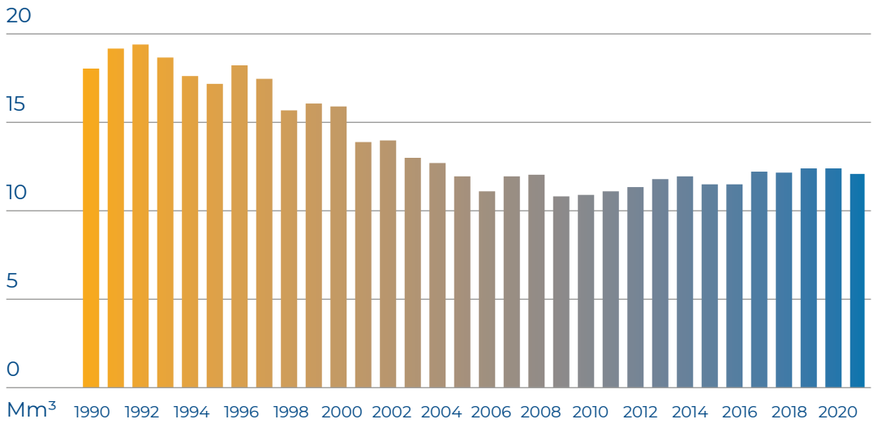

Figure 5. Development of groundwater abstraction by the Water Services Corporation (1990 to 2022).

ABSTRACTION OF GROUNDWATER FOR PRIVATE PURPOSES

Groundwater abstraction is undertaken by different sectors, including agriculture and the commercial sectors in support of a variety of activities. These activities, which include operators in the food industry (including water/drink bottlers), hospitality, construction and other manufacturing industries, require a reliable supply of water. While the agricultural sector is unsurprisingly, the one with the highest overall groundwater demand, the commercial sector's needs are becoming increasingly relevant as shown in **Figure 6** below.

PRIVATE GROUNDWATER ABSTRACTION

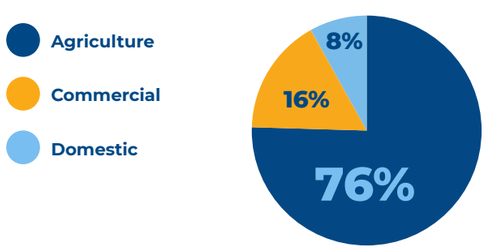

Figure 6. Relative importance of private groundwater abstraction by sector.

The agricultural sector is highly dependent on a reliable supply of water to sustain arable agricultural and/or animal husbandry activities. Demand analysis of the sector indicates that it is highly dependent on groundwater (for around 80% of its water demand) sourced primarily from boreholes (or spieri) located at the point of use. Several agricultural activities do not have an alternative water supply to groundwater and are not served by an alternative source of water supply. Groundwater is supplemented by harvested rainwater and, more recently, by access to New Water. The agricultural sector operates 3,553 boreholes and a number of low yielding groundwater sources including spieri and natural springs.

The commercial sector supplements its access to the municipal water supply with groundwater, which is considered a cheaper alternative. Operations in this sector include commercial activities where water is a primary resource in the production process; such as water bottling, and the construction industry, as well as activities where water is used for a secondary purpose such as process cleaning activities and/or landscaping. In addition, private water suppliers abstract groundwater and distribute this water to other commercial, agricultural and domestic activities through water tankers. Overall, 245 boreholes are registered for commercial activities in Malta.

Groundwater is used also for domestic purposes, primarily through 1,395 spieri located in old households overlying the perched aquifer systems. These spieri have a limited abstraction capacity controlled by the natural limited flow of water within the perched aquifer systems. Most of these systems were constructed in the early 1900's or before. In specific cases, boreholes are also being used for the abstraction of groundwater to address the water needs of swimming pools and the irrigation of extensive domestic gardens.

OUTLINE OF CURRENT REGULATORY FRAMEWORK

The regulation of Groundwater Abstraction Sources is entrusted to the Malta Resources Authority – MRA (www.mra.org.mt) and is outlined through the following Subsidiary Legislation published under the Malta Resources Authority Act.

- ***Notification of Groundwater Sources Regulations*** (S.L. 423.12 of the Laws of Malta), which require the reporting of all groundwater abstraction sources with the authority. It is noted that any groundwater abstraction source which is not notified to the MRA is considered an illegal groundwater abstraction source.

- ***Borehole Drilling and Excavation Works within the Saturated Zone Regulations*** (S.L. 423.32 of the Laws of Malta), which set the regulatory framework for drilling activities in the saturated zone, including the drilling of sea-wells. It is noted that these regulations set a moratorium for drilling activities for new groundwater abstraction sources.

- ***Groundwater Abstraction (Metering) Regulations*** (S.L. 423.40 of the Laws of Malta), which require each notified groundwater abstraction source to be fitted with a flow meter to enable the Authority to monitor the volume of abstracted groundwater.

- ***Users of Groundwater Sources (Application) Regulations*** (S.L. 423.45 of the Laws of Malta), which enable modifications to the information on users of groundwater sources to notifications submitted under S.L. 423.12.

Additionally, the management of groundwater resources is regulated through the European Union's Water Framework Directive, with the relative obligations transposed under national legislation as the Water Policy Framework Regulations (S.L. 549.100 of the Laws of Malta). This legislation is enacted under the Environment Protection Act (Cap. 549) and is implemented jointly by the Environment and Resources Authority - ERA
www.era.org.mt

and the Energy and Water Agency - EWA
www.energywateragency.gov.mt

The main objective of the Water Policy Framework Regulations is the achievement of good groundwater quantitative and qualitative status. The regulations require the development of a Programme of Measures at the national level with specific measures addressing the achievement of the good status objectives. From a quantitative perspective, the Regulations mandatorily require the establishment of water pricing policies for the provision of water services, such as those provided by the Water Services Corporation.

Groundwater Quantitative Status (2022)

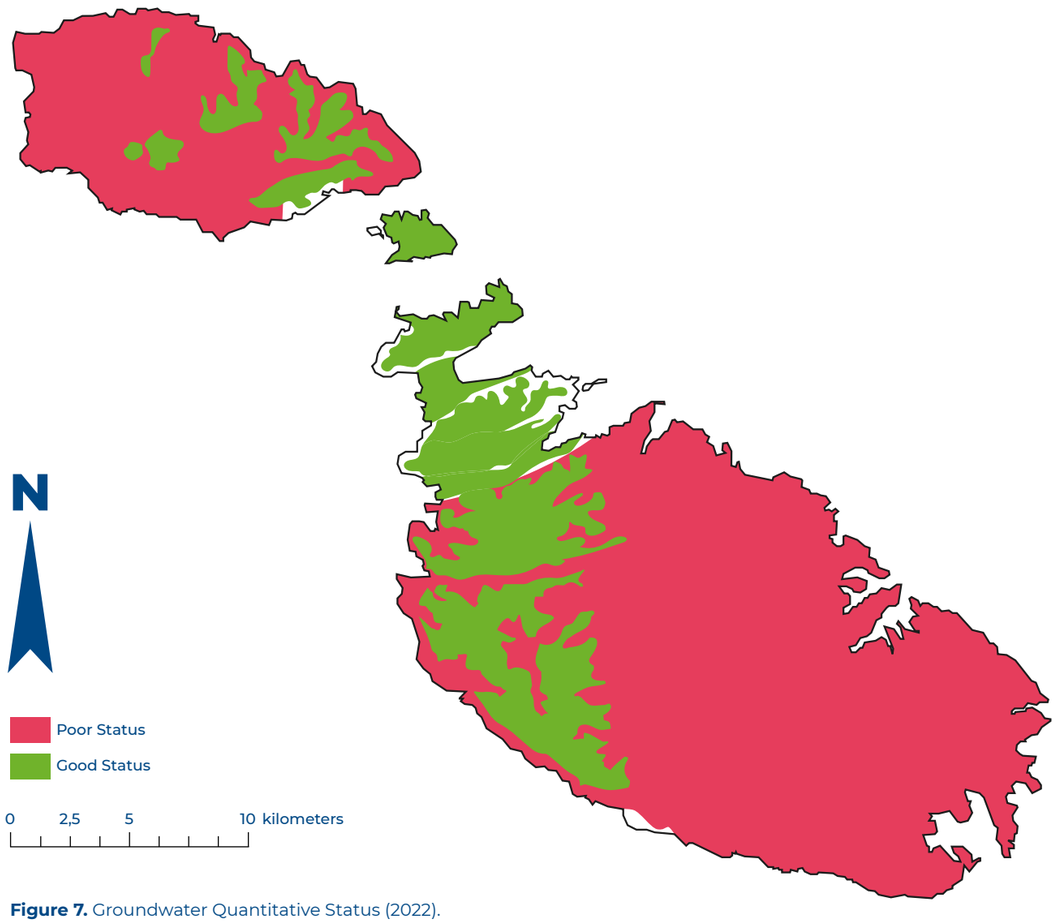

Figure 7. Groundwater Quantitative Status (2022).

In terms of groundwater abstracted for self-supply purposes, the establishment of water pricing policies becomes mandatory under the Regulations whenever good groundwater quantitative status is not achieved through the application of other water supply augmentation or water demand management measures. The aim of these water pricing policies under the Regulations ensuring an efficient use of water resources. **Figure 7** is a representation of the quantitative status of groundwater bodies in Malta in 2022.

LICENSING OF GROUNDWATER ABSTRACTION

Following the implementation of Malta's first two River Basin Management Plans (Water Catchment Management Plans), it is substantially clear that good groundwater quantitative status will not be achieved for Malta's main bodies of groundwater (the Malta Mean Sea Level and Gozo Mean Sea Level groundwater bodies).

The EU's Water Framework Directive requires River Basin Management Plans to assess water status, identify gaps to the achievement of good status and propose the measures required for the achievement of such status. (These measures need to reflect the realities experienced in the particular member state.) In addition to measures aimed at increasing water supply, Malta's 3rd River Basin Management Plan, will also include a measure related to the development of a groundwater abstraction licensing framework (including a water pricing policy for water uses,) as part of its demand management measures portfolio. This follows the requirements for the establishment of such policies outlined under Article 9 of the Water Framework Directive, where such policies are intended to promote the efficient use of groundwater resources. In this regard, a new legislation is proposed to establish a licensing framework for groundwater abstraction with applicable tariffs aimed primarily at addressing the misuse of groundwater.

Regulation, protection, and management of groundwater resources in a sustainable manner is vital. Following the enactment of the legal framework, no groundwater source will be utilized for the abstraction of groundwater unless an abstraction permit or clearance has been issued by the Environment and Resources Authority (ERA).

The implementation of the groundwater licensing framework will be led by the Environment and Resources Authority (ERA) supported by the Energy and Water Agency (EWA), the Water Services Corporation (WSC) and the Ministry for Agriculture, Fisheries and Animal Rights (MAFA). The framework will be applicable to groundwater abstractors (water users operating in the agricultural, commercial, and domestic sectors). It is being proposed that permit conditions will be renewable for defined fixed term periods, and conditions will reflect the risk of failing the achievement of the environmental objectives (good quantitative status) of the Water Policy Framework Regulations on a national basis. These conditions will also consider changing conditions arising due to Climate Change impacts.

The proposed permitting framework is intended to lead to the establishment of a publicly available register of groundwater abstractors, where operators of private groundwater abstraction sources will be required to maintain a license plate in a highly visible position close to the abstraction point. These actions are intended to facilitate the regulation and enforcement of the provisions of this new legislative framework.

ABSTRACTION LICENSING FRAMEWORK

This Green Paper is proposing that the establishment of a Groundwater Abstraction framework be based on the principles outlined below. The main objective of this framework is that of ensuring the long-term availability of a reliable source of water to bona fide users while simultaneously developing an effective protection to the groundwater environment to ensure that resources can retain their strategic water supply role in the future.

Owners of Low-Yield Groundwater Abstraction Sources (spieri)

Operators of low-yield groundwater abstraction sources (spieri) located in domestic or agricultural tenements will be subject to a general binding rule requiring them to acquire a groundwater abstraction clearance. The number of registered low-yield groundwater abstraction sources amounts to 3,405. No volumetric tariffs will be applied to these operators because most of these sources do not have fixed pumping equipment to which water flow meters can be attached.

Agricultural Sector

A quota will be established for the water needs of operators in the agricultural sector. The quota will be based on agricultural factors such as land-area, crops cultivated, and farm-size as well as environmental factors. It will also consider crop-plans to be carried out annually, prepared through an approved Farm Advisory Service provider. Livestock farmers will be provided with an annual quota depending on the livestock units on the farm.

Farmers will be able to source the water volume allocated under the quota through groundwater and/or New Water, in those places where it is available. No volumetric tariffs will be applied to water use within this quota. Groundwater and New Water use in exceedance of this quota will be charged at a volumetric rate close to the real cost of groundwater.

It is noted that because abstraction of groundwater is estimated to already carry an operational cost of around €0.25/m³, the water pricing policy will incentivize the use of New Water over groundwater, given that New Water below the established quota will be provided at no charge to consumers in the agricultural sector.

Operators in the agricultural sector will be provided with advice, through capacity building initiatives undertaken by the Ministry for Agriculture, Fisheries and Animal Rights (MAFA), on techniques and practices that can support them in using water resources more efficiently in their operations. Opportunities for financial support under the CAP Strategic Plan for the adoption of efficient water use techniques, as well as harvesting and storage of rainwater, will also be sought to encourage the agricultural sector to invest in water efficient technologies.

Commercial Sector

A volumetric tariff for water use will be established for operators of groundwater abstraction activities in the Commercial Sector, with the tariff set at the real cost of groundwater.

Domestic Sector

A volumetric tariff will similarly be established for operators of groundwater abstraction activities in the domestic sectors, referring specifically to those operators of boreholes sustaining leisure activities such as swimming pools and the irrigation of landscaped areas. The tariff in this case will be set at a higher level than the tariff applied by the Water Services Corporation for domestic consumers to disincentivise the use of groundwater for domestic purposes and promote the provision of water from WSC which is a more sustainable alternative.

The process of setting quotas and volumetric tariffs will be periodically reviewed to ensure that groundwater abstraction remains within the estimated safe yield, hence effectively contributing to the achievement of the good quantitative status objectives underlined by the Water Policy Framework Regulations.

The Groundwater Abstraction Licensing Framework will not be applicable to groundwater sources operated by the Water Services Corporation, given that the Corporation is moving towards the achievement of a net-zero impact on the groundwater environment through its operations. Annual groundwater abstraction levels by the Water Services Corporation will be capped at a maximum level of 14 Mm³ up to 2030.

INCENTIVIZING EFFICIENT USE OF WATER

The Water Policy Framework Regulations require Water Pricing Policies for promoting the efficient use of water. As such, the development of the groundwater abstraction licensing framework in Malta will be accompanied by a series of measures aimed at incentivizing the effective and efficient use of abstracted groundwater. These will include:

Free water (and energy) consumption audits for SMEs will be provided by the Energy and Water Agency to support them in identifying opportunities for optimizing their water use, and therefore limiting their dependence on groundwater resources. Non-SMEs will be granted financial support for the undertaking of the same audits.

The outcomes of these audits will also provide links to funding opportunities provided by Malta Enterprise to support the implementation of identified water saving measures. A 25% rebate on the annual cost of groundwater abstraction will be applied to enterprises fully implementing the water demand management measures identified in said audits for a 3-year period following the date of commissioning of these measures. Certification by the Energy and Water Agency will be required to qualify for this rebate.

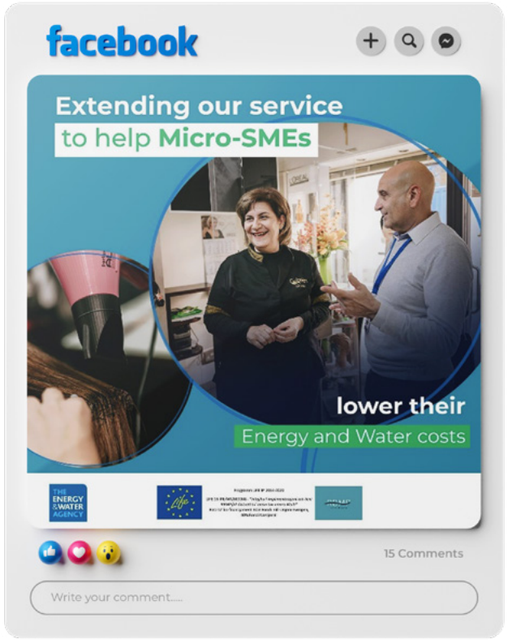

Figure 8. Energy and Water audit schemes for SMEs managed by the Energy and Water Agency.

Enterprises will be encouraged to undertake Corporate Social Responsibility initiatives addressing the optimization of groundwater resources.

Such initiatives can focus on the conservation of water resources (such as the rehabilitation of public rainwater harvesting reservoirs in urban areas), the management of water features in valleys (like the rehabilitation of catchment areas behind valley dams to optimize their water catchment capacity) or the development of green urban infrastructures (such as permeable surfaces which encourage the filtration of rainwater in the urban environment). Enterprises carrying out CSR initiatives certified by the Energy and Water Agency will qualify for a lower groundwater abstraction tariff for the period in which the CSR initiative will be active.

Enterprises will also be encouraged to adopt non-conventional water resources such as the reuse of greywaters or in the case of enterprises located at the coast – seawater desalination facilities.

This measure will first target accommodation establishments, as they are relatively big water consumers. In this way these enterprises will be encouraged to move away from the use of groundwater (provided by third party suppliers or self-abstracted) and switch to a lower-cost and more environmentally friendly water supply.

Figure 9. The Alteraqua Project – an example of an effective water-based CSR initiative by the private sector in Malta.

Operators in the agricultural sector will be provided with advice through capacity building initiatives undertaken by the Ministry for Agriculture, Fisheries and Animal Rights (MAFA) on techniques and practices that can support them in using water resources more efficiency in their operations. Opportunities for financial support for the adoption of water efficient techniques will also be sought to encourage the agricultural sector to invest in water efficient technologies.

WAY FORWARD

This Green Paper proposes an outline for the development of a Groundwater Abstraction Licensing Framework intended to protect both bona-fide users of groundwater as well as the groundwater environment itself.

Stakeholders and water users are invited to provide comments to this Green Paper via email to *era.policy@era.org.mt* (up to 6 weeks after the publication of this Green Paper). Feedback received by stakeholders and water users will then be used to support the drafting of a Legal Instrument enacting a national Groundwater Abstraction Licensing Framework. The draft Legal Instrument will also be issued for public consultation as part of the process of its official enactment.

This Green Paper signals the start of a process aimed at ensuring the effective and efficient use of our groundwater resources while protecting the needs and requirements of bona fide users. This is being done with the aim of ensuring that groundwater remains an important source of freshwater, sustaining the achievement of national water supply security in the future.

THE ENERGY &WATER AGENCY

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