AUDIT OFFICE | REPUBLIC OF CYPRUS

Adapting Water Resource Management to Climate Change

AUDITED ENTITIES: WATER DEVELOPMENT DEPARTMENT
DEPARTMENT OF ENVIRONMENT
SPECIAL REPORT: ΠΕ/01/2025

29 April 2025

Contents

Introduction of Auditor General

In Cyprus, the mean temperature has already increased significantly over the last hundred years, by nearly twice the rate of the corresponding global average. There is also a recorded increasing trend in summer days, tropical nights, the number of days with temperatures exceeding 40°C and the occurrence of extreme weather events. Except for the Troodos region, almost all other areas of the island are considered sensitive to desertification. The reduction in rainfall and the increase in evapotranspiration exacerbate the problem of extreme water scarcity. These lead to a decreasing supply of water resources, whereas at the same time, demand is increasing, mainly due to population growth, higher standards of living and the absence of a consumer culture.

The forecasts for the coming decades are not optimistic, as it is expected that the above phenomena will continue and likely intensify, threatening further the quantity and quality of water resources, biodiversity, and, more broadly, the Cypriot economy.

From our audit, we found that the Republic of Cyprus (RoC) in recent decades invested significantly in the development of infrastructure to address water scarcity, such as dams, desalination plants, and wastewater treatment plants and tertiary water treatment systems. Additionally, studies have been conducted that capture the situation and suggest measures to address the issue.

However, it seems that over time, the RoC has been acting rather reactively than proactively, with consequent risks of higher financial costs and greater adverse environmental impact.

This report identifies specific problems such as the absence of a unified pricing policy for domestic water supply, the very low recovery of the cost of irrigation water supply, the failure to promote the cultivation of crops that are less water-intensive, significant water losses due to the ageing network, the operation of desalination plants with conventional fuels, limited use of recycled water mainly due to the lack of infrastructure, the non-connection of all communities to wastewater treatment plants, the non-connection of all households to the sewage system, poor quality of recycled water, insufficient control of water abstraction permits and boreholes, the slow pace of implementing infrastructure projects worth of €1.2 billion, the discharge of desalinated water from the Vasilikos desalination plant into the Southern Pipeline, necessitating its re-refining, the lack of unified management of dams, and the lack of flexibility due to the non-interconnection between water works.

Despite the continuous efforts, it seems that the Republic of Cyprus has not yet developed an integrated national framework for water resources management. This is a critical issue, and therefore immediate and coordinated actions are required to strengthen the resilience of water resources, ensuring their sufficiency and quality for both the present and the future.

Andreas Papaconstantinou
Auditor General
April 29, 2025

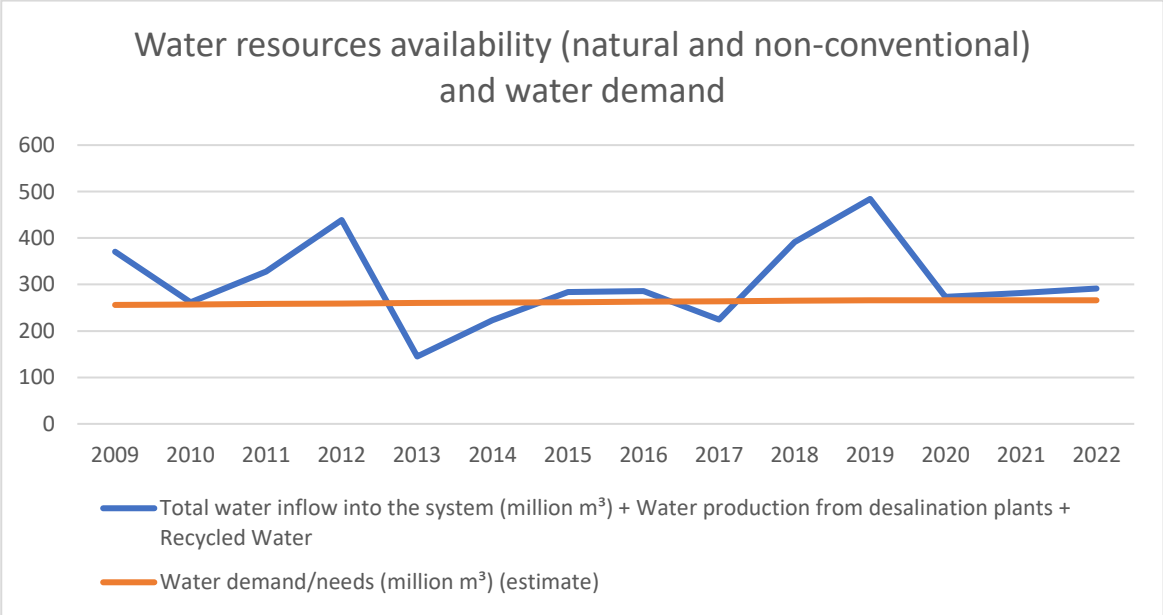
Abbreviations Table

ARDE	Agriculture, Rural Development and Environment
AWMC	Advisory Water Management Committee
DE	Department of Environment
DMP	Drought Management Plan
EMME	Eastern Mediterranean and Middle East
EU	European Union
GB	Groundwater Bodies
GMST	Global Mean Surface Temperature
GWW	Government Water Works
ICOLD	International Commission on Large Dams
IDI	INTOSAI Development Institute
INTOSAI	International Organization of Supreme Audit Institutions
IPCC	International Panel on Climate Change
ISSAI	International Standard of Supreme Audit Institutions
ISSC	Integrated System of the Southern Conveyor
NECP	National Energy and Climate Plan
RBMP	River Basin Management Plan
RCM	Regional Climate Model
RCP	Representative Concentration Pathways
RoC	Republic of Cyprus
SAI	Supreme Audit Institution
SEIA	Strategic Environmental Impact Assessment
UNFCCC	United Nations Framework Convention on Climate Change
UNFCCC Report	Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change United Nations Framework Convention on Climate Change
WDD	Water Development Department
WFD	Water Framework Directive
WGEA	Working Group on Environmental Auditing

1. Summary of results

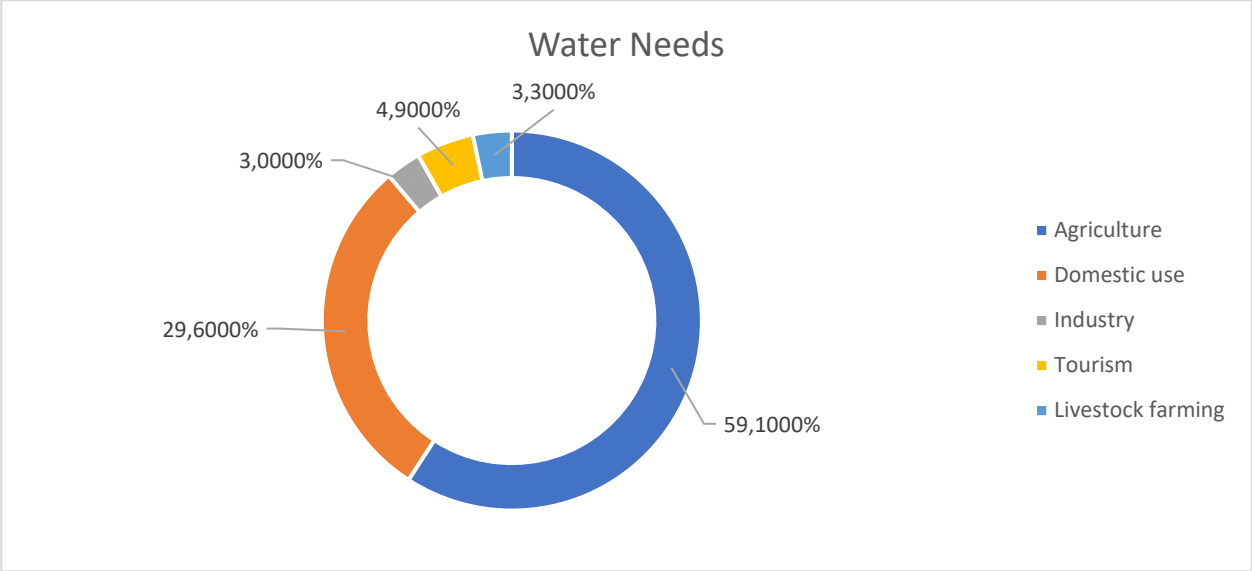
Water in Cyprus has been scarce since ancient times, and its management has consistently been a concern for all the governments of the Republic of Cyprus (RoC). The absence of lakes and rivers with continuous natural flow, along with the exclusive reliance on annual rainfall to meet the needs for domestic and irrigation water supply, combined with water scarcity, highlighted the need for action from an early stage.

Indicative of the importance of managing Cyprus' water resources is the fact that the available natural water resources per capita are, on average, only 390 m^3/per year, while the threshold for extreme water scarcity is set at 500 m^3/per year, and the threshold for water scarcity is set at 1,000 m^3/per year. At the same time, demand continues to rise due to non-climatic factors such as population growth, living standards, and tourism. For instance, during the period from 2019 to 2023, an increase of 14.8% in water demand for domestic use was recorded (+3.5% per year). Therefore, the need to enhance the available water supply through non-conventional sources became urgent, and in recent years, this has been achieved through the production of desalinated and recycled water.



Source: Audit Office of the Republic, based on data obtained from the Water Development Department, 2024.

The total annual water demand is distributed as follows:



Source: Audit Office of the Republic of Cyprus, based on data included in the Strategic Study for Water Management and Drought Mitigation, prepared by the Water Development Department in 2019, 2024.

Of the total arable agricultural land, only 24% can be irrigated, while the remaining 76% relies entirely on rainfall. Irrigation needs are largely covered (73%) by private boreholes, while the remaining 27% is irrigated by Government Water Works (GWWs).

The audit objective was to determine whether the RoC has adequately assessed the expected impacts of climate change on water resources and whether it has planned and implemented measures to address the anticipated risks, given that the overall management of water resources is vital for the RoC.

The audit questions (A - D), as well as the key findings, are briefly outlined below:

A. What have been the overall impacts of climate change on the water resources of Cyprus?

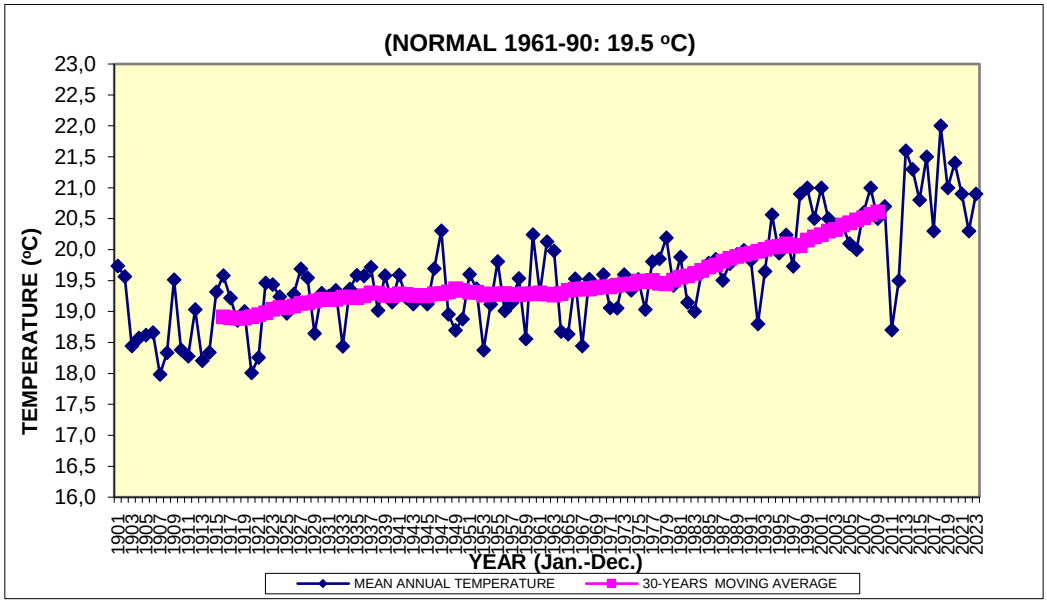
1. Impacts of climate change in the wider region of Cyprus (Eastern Mediterranean and Middle East - EMME)

- The region is warming nearly twice as fast as the global average.
- Rate of temperature increase (1981–2019):
    - EMME: 0.45°C/decade
    - Global average: 0.27°C/decade

2. Impacts of climate change in Cyprus:

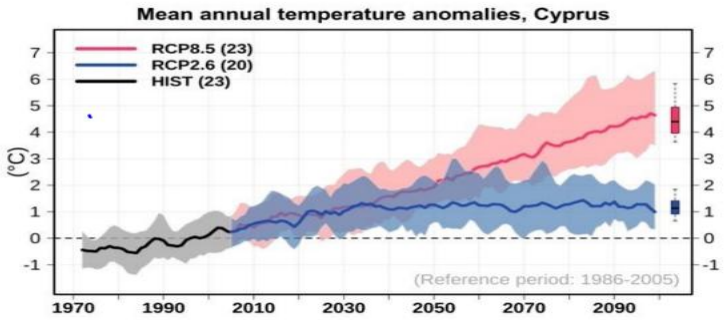
- Significant increase in temperature in the last 100 years, which in Nicosia and Limassol amounted to 1.8°C and 2.9°C, respectively, while the recorded increase in the global mean temperature (1906–2005) is estimated at 0.74°C.

Mean annual temperature (°C) in Nicosia (1901–2023)



Source: Department of Meteorology, 2024.

Predictions for anomalies in the average annual temperature in Cyprus.



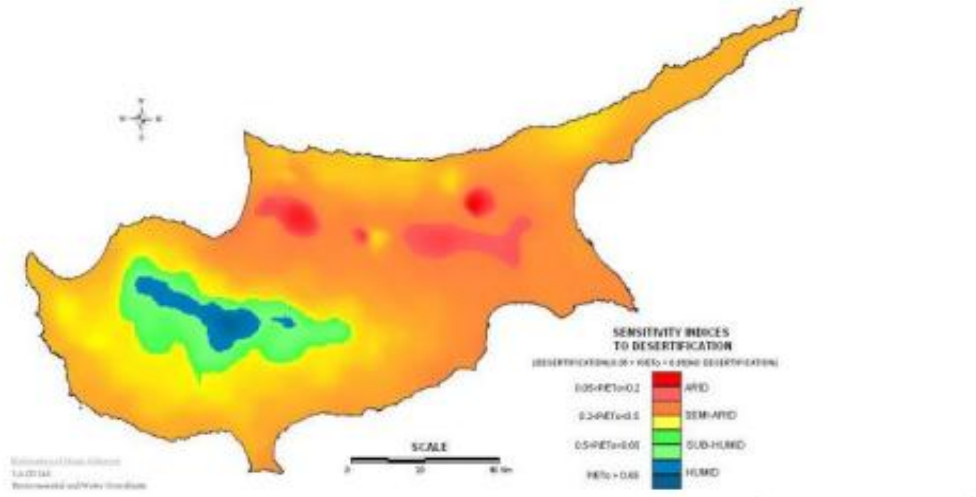
Source: Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

- Increase in extreme temperature records:
    - Heatwaves: +8 to 12 days/decade
    - Summer days: +up to 8 days/decade

- Tropical nights: +up to 13 nights/decade
- Increase in days with ≥ 40°C
- Decrease in days with ≤ 0°C

- Increase in the frequency and intensity of droughts. 91% of Cyprus is characterised as critical or sensitive to climate changes.

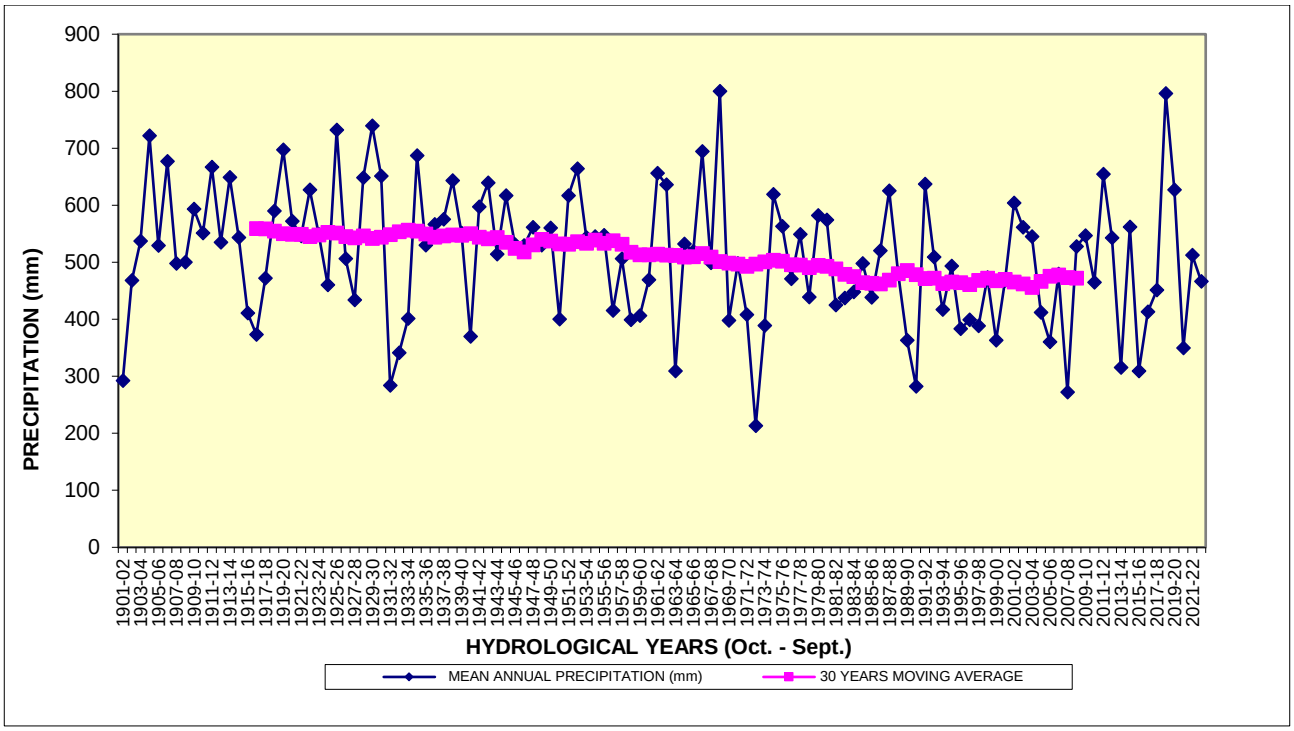
Environmentally sensitive areas to desertification.



Source: National Action Plan for Combating Desertification, Department of Environment and I.A.CO Environmental and Water Consultants Ltd, 2008.

- Decrease in the average annual rainfall (hydrological year Oct-Sep) and high rainfall variability:
  - Years with high rainfall: 800mm (1968–69), 796mm (2018–19)
  - Years with low rainfall: 213mm (1972–73), 272mm (2007–08)

Cyprus: Mean Annual Precipitation (mm) (1901–02) – (2022–23) (Normal 1961–90: 503 mm)



Source: Department of Meteorology, 2024.

- Increase in evapotranspiration: During the period 1971–2000, it is estimated that 86% of the rainfall returned to the atmosphere through evapotranspiration. In additions, in the Troodos River Basin areas, evapotranspiration shows an increasing trend of approximately 0.3–0.7 mm/year.

3. Impacts of climate change on the water resources of Cyprus:

The impacts of climate change on water resources are summarised below:

- Insufficiency of natural water resources:
    - During the years 2010, 2013–17, 2020–22, an insufficiency of natural water resources to meet demand was recorded.
    - During the years 2013, 2014, and 2017, water demand was not fully met even with the use of the produced desalinated and recycled water.
- Depletion & Salinization of Aquifers:
    - Over-extraction in 14 out of 22 Groundwater Bodies (GB)
    - Salinisation (seawater intrusion) in seven out of 22 GB
    - Coastal aquifers are particularly vulnerable.

- Impacts on river flows and the infiltration of water into GB.
- Water loss and qualitative degradation of GB.
- Increase in evapotranspiration: eutrophication, water pollution.
- Biodiversity: reduction in freshwater, destruction of ecosystems, spread of invasive species.
- Reduced agricultural productivity due to:
    - Droughts
    - Extreme weather events
    - Land degradation

B. What are the expected impacts of climate change on the water resources of Cyprus?

1. Reduction in water availability:

- Quantity and quality deterioration of the already scarce water resources (2021-2050 as compared to 2000-2010).
- Continuation of the declining trend in groundwater levels due to reduced rainfall and increased evaporation.
- Reduction in groundwater recharge due to changes in the effective precipitation and the duration of the recharge period.

Predicted anomalies in average annual precipitation in Cyprus.

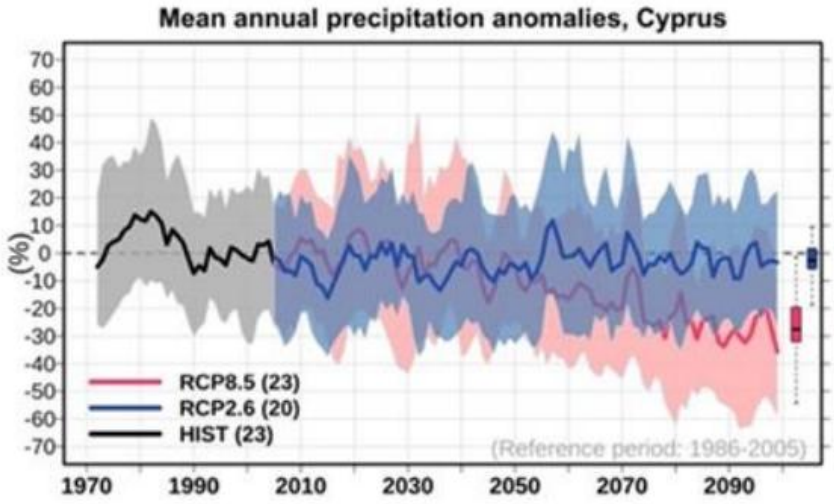


Figure 6.14. Projections of mean annual precipitation anomalies for Cyprus based on the CORDEX-CORE ensemble (see Zittis et al., 2022).

RCP 2.6[1], RCP 8.5[2]

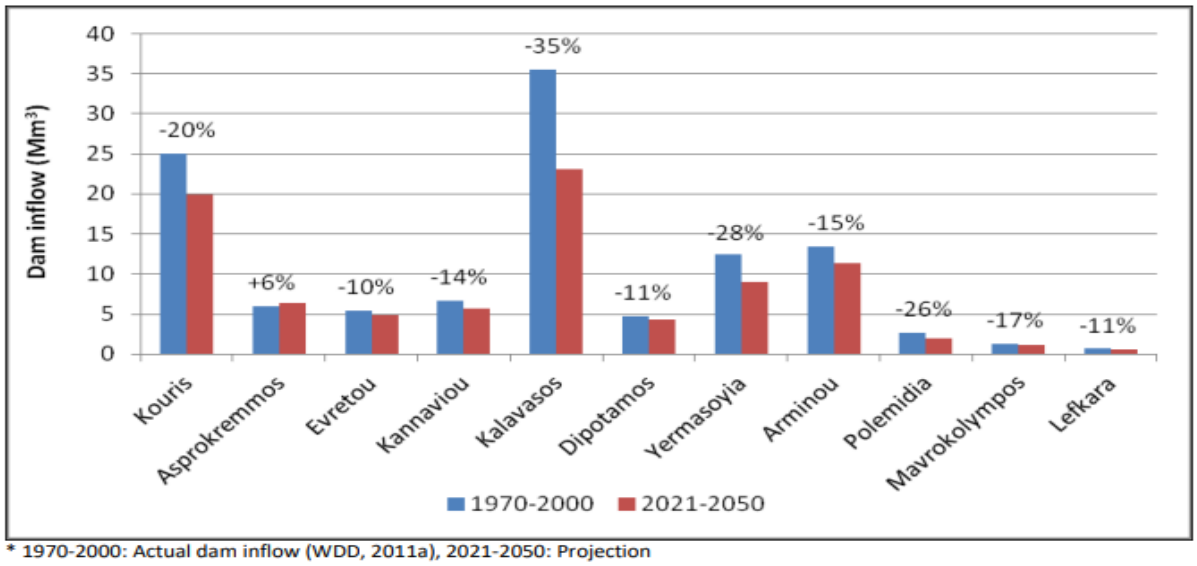
Source: Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

- Impacts on river flows and, subsequently, on the quantity and quality of surface water entering dams and reservoirs.
- Projected reduction in river runoff in the Troodos area (14% to 30% for a 6% to 15% decrease in rainfall).
- Expected decrease in the average annual inflow to dams by 23% (2021-2050 as compared to 1971-2000), despite the smaller estimated reduction in rainfall (5%).

[1] RCP2.6 represents a low greenhouse gas emissions scenario characterized by significant climate change mitigation actions, providing a 67% probability of limiting the increase in GMST to below 2°C by 2100.

[2] RCP8.5 is a high greenhouse gas emissions scenario characterized by the absence of climate change mitigation policies, resulting in a continuous and sustained increase in atmospheric greenhouse gas concentrations. It entails a probability exceeding 50% of GMST rising above 4°C by 2100.

Change in inflow to Cyprus' main dams for the period 1970–2050.



* 1970-2000: Actual dam inflow (WDD, 2011a), 2021-2050: Projection

Figure 6.42. Change in inflow to the main dams of Cyprus for the period 1970-2050

Source: Cyprus Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

- Expected decrease in the base flow of rivers and potential risk of reduction or elimination of spring flows, causing the mountainous communities, which rely on them for satisfying their domestic water supply needs, particularly vulnerable.

- Potential increase in sediment runoff to small dams, resulting in a reduction of their effective volume and consequently increased maintenance costs.

- Potential increase in irrigation water demand due to increased evapotranspiration and/or reduced effective rainfall.

- Further decrease in crop yields due to a combination of high temperatures and reduced water availability. This is also influenced by the fact that, during periods of limited water availability, reductions are imposed on irrigation water supply.

2. Deterioration of water quality:

- Deterioration of the quality of surface water (moderate to high) and GB (high to very high), due to reduced rainfall, increased drought periods, heavy rainfall events, rising water temperatures, sea-level rise, and low runoff. Water bodies that are already in poor quality condition are even more vulnerable to the impacts of climate change.

3. Increase in the frequency and severity of drought events:

- Increase in the frequency and duration of drought periods.
- Increased impacts of drought on the agricultural sector due to reduced soil moisture.
- Greater vulnerability of crops such as the tomatoes, the vineyards, and the olive trees due to their growth cycle being in summer.
- Significant impact of rainfall deficits on winter crops such as potatoes, barley and wheat.
- Extended drought periods also affect other sectors of the economy.

4. Impacts on infrastructure:

- Risk of physical damage and operational disruption of infrastructure (desalination plants and wastewater treatment plants) located in coastal areas, due to heavy rainfall and rising sea levels.
- Impacts from the need for increased desalinated water production on Cyprus's energy balance.
- Increase in the required operational and maintenance costs of infrastructure due to rising sea levels and the potential need for new investments.
- Vulnerability of infrastructure to damages resulting from floods (urban and coastal) and landslides.
- Need for the government to take protective measures against floods (coastal protection works, fishing shelters, dams, sustainable urban drainage systems).

The lack of sufficient data to assess the effectiveness of existing measures and the need for additional measures requires further research for a more detailed evaluation of the vulnerability of infrastructure to climate change.

C. To what extent has the RoC identified and assessed climate change risks to water resources?

References to the risks that climate change is expected to pose to the water resources of Cyprus are identified in the following:

- **Water Policy Report (2011):**
  - ✓ It mentions some risks (e.g., impact on evaporation) but without an extensive discussion of the impacts of climate change.

- ✗ It needs to be updated/revised with more recent data and a clear reference to the risks and impacts of climate change.

- **Climate Change Risk Assessment Report for Cyprus (2016)**

  - ✓ It identified and assessed specific risks to water resources, determining the impact and likelihood of their occurrence.
  - ✓ It focused on areas such as irrigation water supply, the natural environment (drought, productivity loss) and the provision of drinking water.
  - ✓ It recorded risks such as deficits in irrigation water supply, increased water supply costs (due to desalination), and reduced available water quantities for irrigation.
  - ✗ It is now considered outdated and needs to be updated due to the long period of time elapsed since its preparation.

- **Revised Drought Management Plan (2016)**

  - ✗ It mentions the expected climate changes and their impact on water resources, but without reference to their likelihood of occurance or the magnitude of their impact.

- **National Strategy for Climate Change Adaptation (2017)**

  - ✓ It identified the impacts of climate change on water resources (availability, quality).
  - ✓ It generally mentions risks but without specifying or assessing their impact and likelihood of occurrence.
  - ✗ It is outdated and is already undergoing a process of revision and updating.

- **Strategic Study for Water Management and Drought Response (2019)**

  - ✗ It identified the impacts (availability, quality) but did not mention specific risks or assess the potential impact and the likelihood of the occurrence of those risks.
  - ✗ It was not subjected to an environmental impact assessment (EIA).

- **National Energy and Climate Plan (2020)**

  - ✗ It did not include extensive references to the consequences of climate change on water resources nor did it identify risks with an assessment of their impact and likelihood to occur.
  - ✗ It only mentioned the consequences of drought and reduced rainfall.
  - ✗ The non-submission of the final updated National Plan caused the European Commission to initiate an infringement procedure against Cyprus.

- **Eighth National Communication and Fifth Biennial Report of Cyprus under the United Nations Framework Convention on Climate Change (2023)**

  ✓ It assessed the future vulnerability of water resources to climate change (sensitivity, exposure, adaptive capacity).
  ✓ It showed very high sensitivity and exposure of water availability to climate change.
  ✓ It estimated moderate to high sensitivity of surface water and high to very high sensitivity of groundwater to pollution.
  ✓ It predicted very high future exposure of Cyprus to droughts.
  ✓ It evaluated Cyprus' adaptive capacity in various sectors (domestic and irrigation water supply, water quality, drought) as limited to very high, depending on the case.

- **Third Cyprus River Basin Management Plan or Water Management Plan (2023)**

  ✓ It recognizes the need for sustainable use of water and the implementation of measures, taking into account the impacts of climate change.
  x No specific reference to risks or the assessment of their impact and the likelihood of their occurrence.

D. To what extent has the RoC taken actions to manage climate risks to water resources through climate change adaptation actions?

Due to the long-standing problem of water scarcity faced by Cyprus, significant measures have been taken, since the establishment of the Republic, to address the problem. However, these measures were not originally intended to address the risks posed by impending threats of climate change, but merely to address existing problems caused by water scarcity. Therefore, as the identification of measures designed to address climate change is impossible, we set below all the measures that have been implemented and contribute to adaptation to climate change.

- **Water Development Infrastructure:**

  ✓ Construction of dams (108 in total, with a capacity of 332 million m^3) for domestic and irrigation water supply.
  ✓ Construction of five desalination plants (with a total capacity of 235,000 m^3/per day) to eliminate the dependency on rainfall of the domestic water supply. The unit in Paphos was recently destroyed and is currently under restoration.
  ✓ Implementation and operation of works for the utilization of recycled water from wastewater treatment plants.
  ✓ Construction of a new water treatment plant in Choirokoitia and replacement of the Choirokoitia–Famagusta pipeline.

- The project for connecting the Vasilikos desalination plant to the domestic water supply network is under construction, with delays. As a result, the desalinated water produced is being directed to the Southern Pipeline System, leading to the need for re-refining.

Source: Water Development Department, 2021.

- **Water Pricing Policy:**

- Without disregarding the fact that water is a basic necessity and access must be ensured for all, pricing policy is recognized as an effective tool for controlling water demand and, consequently, for its sustainable management. The existing pricing policy for domestic water supply presents inequalities among consumers of different regions, as there are significant discrepancies in the fees imposed by Local Water Authorities.
- Regarding irrigation, the low recovery of the cost of water supplied does not contribute to promoting crops that align with the new climatic conditions in Cyprus (World Bank report 2018, Audit Office of the RoC report 2016).
- The provisions of the relevant regulations for the pricing of water abstracted from boreholes have not yet been fully implemented.
- The effectiveness of the existing pricing policy as an adaptation measure has not been evaluated.

- **Dam and Reservoir Management:**

  - x Fragmented management (Ministry of Agriculture, Rural Development and Environment (ARDE) and Ministry of Interior).
  - x Lack of interconnection between major GWWs, limiting flexibility.
  - x No measures have been implemented to reduce water evaporation from dams and reservoirs, which, according to the latest estimates, stands at 8% of their storage capacity.
  - ✓ Successful application of pilot solutions to limit evaporation (floating membranes), which, however, have not been widely implemented.
  - x Exceeding the approved water abstraction limits from dams (Southern Conveyor System and Paphos GWW) set by the relevant drought indicators.
  - x Delays in the decisions of the Council of Ministers regarding water allocation for irrigation purposes.

- **Desalination Plants:**

  - ✓ Critical contribution to meeting domestic water supply needs, especially during drought periods (up to 81% of consumption).
  - x Increased production costs due to energy dependency on conventional fuels and rising energy costs.
  - x Significant discrepancies in production cost between plants.
  - x Operation of certain plants with reduced production or in standby mode.
  - x Incomplete implementation of the Drought Management Plan (DMP) for determining the operation and standby mode of plants.
  - x Need for technologies to improve efficiency and reduce costs, as well as investment in renewable energy sources.
  - x Need for rapid activation of mobile desalination plants in emergency situations (e.g., plant destruction).

- **Tertiary Wastewater Treatment:**

  - ✓ Utilization of recycled water for irrigation (since 1998).
  - x Maximum production capacity of 53.9 million m^3 annually, however in 2023, 28.2 million m^3 were produced (52.3%).
  - x A large portion of the recycled water remains unused or is discarded.

- **European Commission infringement letters concerning water resources:**

  - The European Commission sent a letter of formal notice to Cyprus on 19.04.2023 for the non-implementation of the European Court's decision, concerning the inadequate application of Directive 91/271/EEC which sets rules for the collection, treatment, and disposal of urban wastewater.
  - The European Commission sent a letter of formal notice to Cyprus on 14.11.2024 for failing to periodically review the water permits it issues in line with the Water Framework Directive (WFD). In Cyprus, the national legislation does not impose any kind of periodic review, as required by the WFD.

  Cyprus is urged to take immediate measures to comply with the above, in order to avoid further sanctions.

General Conclusions/Comments

- The RoC has taken significant adaptive measures for the management of water resources through the construction of infrastructure (dams, desalination plants, wastewater treatment plants).
- The use of desalination has become critical, compensating for the impacts of reduced rainfall and guaranteeing adequacy of water supply for domestic use irrespectively of water conditions.
- Weaknesses were identified in the integrated management of water resources (fragmentation, lack of interconnection).
- The pricing policy, as a tool for encouraging the sustainable use of water resources, is not used effectively.
- Delays have been observed in the implementation of strategies and plans and these are not fully utilized for the optimal functioning of infrastructure.
- It is recognized that there is a need to improve efficiency, reduce costs, and utilize renewable energy sources in desalination plants.
- There is room for improvement in the use of recycled water.

Annex XV presents all the recommendations of our Audit Office included in this Report.

2. Introduction

Climate change is one of the greatest challenges of the 21st century, significantly impacting the natural environment, the economy and society. In Cyprus, the impacts of climate change are particularly severe and affect, among other things, the adequacy, management and sustainable use of available water reserves.

The international community recognized for the first time the need to take collective action to protect people and the environment and to limit greenhouse gas emissions at the Earth Summit held in Rio de Janeiro in 1992, where the United Nations Framework Convention on Climate Change (UNFCCC) was adopted.

With the Paris Agreement (2016), which was established during a meeting of the members of UNFCCC in 2015, countries renewed their commitment to take climate action and agreed on new targets to accelerate efforts to limit global warming. The European Union and all its member states have endorsed it, legally committing to the goal of keeping the planet's temperature within safe limits.

At a national level, Cyprus developed the Climate Change Risk Assessment Report (2016), which assessed specific risks arising from climate change on Cyprus's water resources and identified their impacts and the likelihood of their occurrence. This report presents the potential risks of climate change until the end of the 21st century. The findings, particularly those related to risks requiring timely action, aim to inform and guide the development of adaptation plans by the Government and the relevant Authorities. In addition, within the framework of the commitments of the RoC under the UNFCCC, the eighth National Communication and Fifth Biennial Report of Cyprus was prepared in 2023 (the "UNFCCC Report"). This report provides a comprehensive overview of the activities related to climate change in Cyprus.

The coordination of efforts to implement Cyprus' international and European obligations, is undertaken by the Ministry of ARDE, through the development and implementation of the National Strategy for Climate Change Adaptation.

The framework for water management at the European level is defined in the WFD, which has been fully transposed into national legislation through the Protection and Management of Water Law (L.13(I)/2004). According to L.13(I)/2004, the Ministry of ARDE is the competent authority for implementing the provisions of the WFD and assumes all responsibilities related to it, except for the preparation of the program of measures and the RBMP, which are coordinated by the competent authority and approved by the Council of Ministers.

To assist SAIs in evaluating the measures undertaken by their governments in response to the additional challenges posed by climate change, INTOSAI IDI and INTOSAI WGEA agreed to collaborate in promoting a global performance audit of climate change adaptation actions. In this regard, four

thematic areas related to climate change adaptation actions were identified: disaster risk reduction, water resource management, sea-level rise and coastal erosion and the implementation of adaptation to climate change plans or actions. SAIs that chose to participate in the audit could focus on the area they judge most significant based on their country's specific conditions.

Considering that Cyprus has faced ongoing drought issues for years and that the lack of natural surface water systems, such as lakes and rivers, has historically led to the overexploitation and excessive pumping of groundwater, resulting in the deterioration of aquifers, our Office decided to conduct this audit within the thematic area of water resource management.

Our Office conducted a performance audit in 2016[3] on the management of water resources in Cyprus, with the aim of evaluating the national strategy and policies applicable to the water resources sector and has recently completed a follow-up audit. The issues related to climate change adaptation actions are included in this report, while the remaining issues will be included in a separate Special Report to be published soon.

The fact that Cyprus has historically faced a serious water scarcity problem and has taken measures to address it, makes it very difficult, if not impossible, to distinguish government actions aimed at addressing water scarcity in general, regardless of the impact of climate change, from those focused in preparing to adapt to the additional challenges that climate change poses on water resources in the future.

2.1 Audit scope

We decided to conduct a specialized performance audit with an environmental focus, within which we examined whether the actions promoted by the RoC for water resource management promote adaptation to climate change and have been designed/implemented in an economical, efficient, and effective manner.

We expect that the design and implementation of relevant climate adaptation actions should ensure at least the following:

- **Risk analysis.** Analysis of the impacts of climate change on water resources and identification of the relevant risks, to enable the design, prioritization, and implementation of policies, strategies, and adaptation measures to climate change.
- **Sustainable water resource management.** Implementation of integrated strategies that ensure the sustainable use and distribution of water, taking into account water scarcity and increasing demand.

[3] Special Report "Water Resource Management", Audit Office, 2016.

- **Infrastructure development.** Strengthening and modernizing of domestic water supply infrastructure, sewage, and wastewater treatment infrastructure to reduce leaks and improve system efficiency.
- **Promotion of water recycling and reuse.** Implementation of technologies for the recycling of urban and industrial wastewater, as well as the utilization of recycled water for agricultural and urban uses.
- **Development of monitoring and forecasting systems.** Use of modern technologies for the continuous monitoring of water reserves and forecasting of extreme weather events that affect water availability.
- **Promotion of desalination using renewable energy sources.** Strengthening the production of drinking water through desalination, by utilizing renewable energy sources to reduce costs and minimise the environmental impact.

Recognizing that it would be practically impossible for a particular audit to cover all aspects of such a complex thematic, we focused on areas where we believed our audit would add the greatest value. This decision was based on a study and analysis of the strengths, weaknesses, opportunities and threats (SWOT), as summarized in the following table.

Table 1: SWOT analysis

	Internal Environment	External Environment
Positive	**Strengths**	**Opportunities**
	1. **Geographic location:** Cyprus, as an island, has the ability to utilize desalination for the production of drinking water. 2. **Desalination infrastructure:** Cyprus has invested significantly in desalination plants, making it less dependent on natural water sources. 3. **Innovative water management techniques:** Cyprus has been implementing innovative water management techniques such as wastewater recycling and rainwater harvesting. 4. **Legal framework:** Cyprus has established legal frameworks and policies for water management, including regulations on water use, pricing and saving.	1. **Investment in technology:** There are opportunities for investment in advanced technologies for water conservation, desalination, efficient water distribution and reduction of losses due to evaporation. 2. **Regional cooperation:** Cyprus can explore opportunities for regional cooperation in water management, including sharing resources and expertise with neighboring countries. 3. **Renewable energy integration:** Integration of renewable energy sources such as solar power to cover the energy needs of desalination plants can reduce operational costs and environmental impact.
Negative	**Weaknesses**	**Threats**
	4. **Limited natural water resources:** Cyprus faces scarcity of natural freshwater resources due to its semi-arid climate and irregular rainfall patterns. 5. **Infrastructure challenges:** The water distribution infrastructure in Cyprus faces challenges, such as leaks and inefficiencies, leading to water loss. 6. **Climate change impacts:** Climate change poses a threat to water resources in Cyprus, through increased temperatures, reduced rainfall, and prolonged droughts.	1. **Climate change:** Continued climate change and extreme weather events pose threats to water availability and infrastructure resilience. 2. **Political instability:** Political tensions in the region could disrupt water agreements or hinder cooperation on water management initiatives. 3. **Economic constraints:** Economic downturns or budget constraints may limit investments in water infrastructure and technology. 4. **Increased demand:** The rise in demand, for example, due to an increase in tourism or migration flows, could further intensify the demand for water, putting additional pressure on already limited water resources.

2.2 Audit questions

Main audit question: Does the RoC promote climate change adaptation actions in the water resources sector, and have they been designed/implemented in an economical, efficient, and effective manner?

Audit sub-questions:

a. What have been the overall impacts of climate change on the water resources of Cyprus?

b. What are the expected impacts of climate change on the water resources of Cyprus?

c. To what extent has the RoC identified and assessed climate change risks on water resources?

d. To what extent has the RoC taken measures to manage climate risks on water resources through climate change adaption actions?

3. Finding Analysis and Recommendations

Note. The comments and/or responses of the audited entity are presented in full in Annex XIV.

3.1 What have been the overall of climate change on the water resources of Cyprus?

To answer the above question, we recorded the observed climate change events in Cyprus (e.g., rising temperatures, reduced rainfall, extreme weather events), as well as the impacts that arise from these on water availability and quality.

3.1.1 Observed climate change events in Cyprus (e.g., temperature increase, reduction in rainfall, extreme weather events, etc.).

Cyprus is located at the southeastern edge of the Mediterranean and Europe, which is one of the most vulnerable regions globally to climate change. The climate in Cyprus is generally characterized by mild, rainy winters, occasional droughts, and long, hot, dry summers. According to the UNFCCC Report, within Cyprus there are distinct climatic zones, including the cool mountainous areas, the hot and dry plains, and the warm and humid coastal regions[4].

3.1.1.1 Observed temperature changes.

According to the 2023 Special Report of the Intergovernmental Panel on Climate Change (IPCC), the global mean surface temperature (GMST) of the planet increased by 1.1°C from the period 1850–1900 to 2011–2020 (1.15°C between 1850–1900 and 2013–2022), with the temperature rise on land (1.59°C) being higher than over the oceans (0.88°C)[5]. Over the last 50 years, GMST has increased more rapidly than in any other 50-year period in the past 2,000 years. It is estimated that the human-induced GMST increase for the period 1850–1900 to 2010–2019 corresponds to 1.07°C.

According to a report by the Cyprus Institute[6], conducted within the framework of the Republic of Cyprus Initiative for Climate Change, as well as a relevant scientific publication[7], warming in the Eastern Mediterranean and Middle East (EMME) region is occurring nearly twice as fast as that of the global average and faster than in most other inhabited parts of the world. Specifically, the rate of temperature

[4] Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Charge, Department of Environment, 2023.

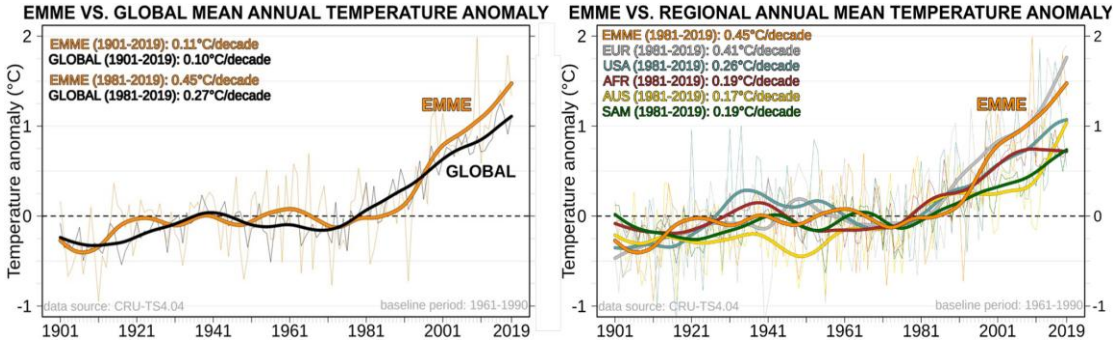
[5] IPCC, 2023: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland, 184 pp., doi: 10.59327/IPCC/AR6-9789291691647.

[6] Executive Summaries of the Reports of the Climate Change Themati Task Forces, Eastern Mediterranean and Middle East Climate Change Initiative of the Cyprus Government (2021).

[7] Review article “Reviews of Geographysics” (Zittis et. al, 2022), Advancing Earth and Space Science.

increase in the EMME region was 0.45°C per decade for the period 1981–2019, compared to the global trend of 0.27°C per decade for the same period.

Diagram 1*:* Eastern Mediterranean and Middle East versus global (left panel) and regional (right panel) temperature anomalies since 1901 (reference period 1961–1990), as annual values (thin curves) and cubic smoothing splines (thick curves).



Linear trends are also presented for Europe (EUR), the United States of America (USA), Africa (AFR), Australia (AUS), and South America (SAM).

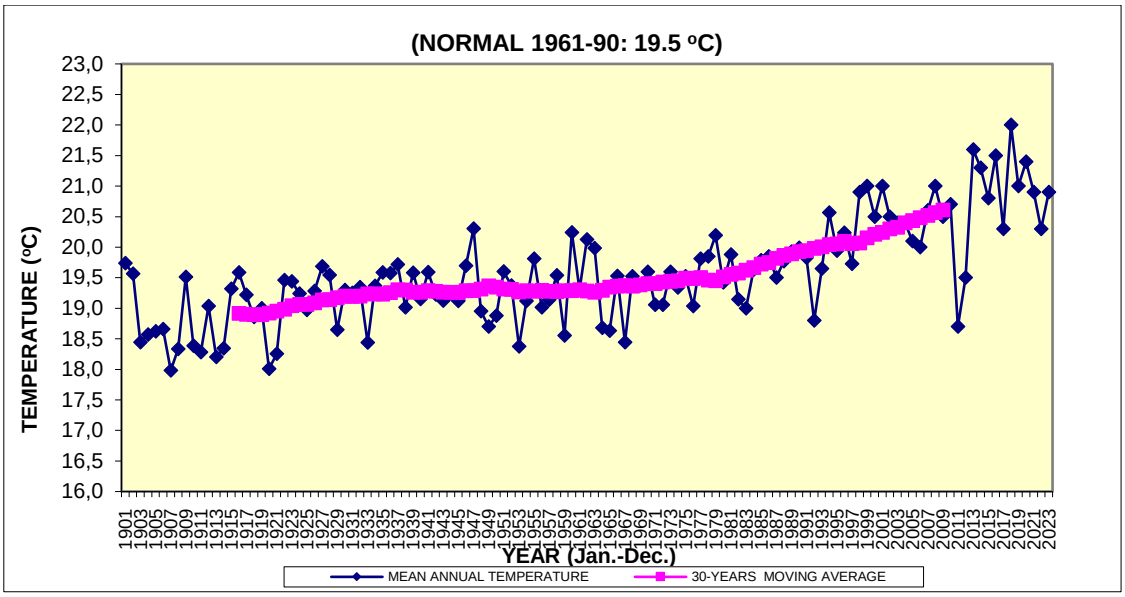
Source: *Review article "Reviews of Geophysics" (Zittis et al., 2022), Advancing Earth and Space Science.*

According to the UNFCCC Report, temperature changes in Cyprus were first studied by Collins Price (1999) and, more recently, for the period 1892–2010, by the Department of Meteorology (2022) and the Cyprus Institute (2011). These studies show an increase in the mean annual mean air temperature of the atmosphere of the order of 1.8°C in Nicosia and 2.9°C in Limassol. As noted, this increase is higher than the rise in the GMST, which was ranging between 0.74°C ± 0.18°C over the last 100 years (1906–2005)[8].

Annex IV presents the relevant diagrams of mean annual temperatures from various stations in Cyprus, which we obtained from the Department of Meteorology. Indicatively, the related diagram for the Nicosia station is shown below.

[8] Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Charge, Department of Environment, 2023.

Diagram 2: Mean annual temperature (°C) in Nicosia (1901–2023)



Source: Department of Meteorology, 2024.

3.1.1.2 Observed changes in precipitation

According to the aforesaid scientific publication (Zittis et al., 2022), precipitation variability in the EMME region during the 20th century was high, with significant fluctuations between drier and wetter periods. However, in recent decades, there is evidence of a shift toward a drier climate, particularly in the Eastern Mediterranean[9][10].

In Cyprus, the mean annual precipitation varies from year to year and across locations[11]. For example, mean annual precipitation reached 800 mm and 796 mm during the years 1968–1969 and 2018–2019, respectively, whereas in 1972–1973 and 2007–2008 it dropped to 213 mm and 272 mm, respectively, leading to severe droughts.

Additionally, observed annual precipitation levels ranged from 200 mm in coastal and central inland areas to 1,100 mm on the Troodos peaks (Zittis et al., 2022)[12]. The wettest months are typically December, January, and February, while the driest months are July, August, and September.

[9] Executive Summaries of the Reports of the Climate Change Themati Task Forces, Eastern Mediterranean and Middle East Climate Change Initiative of the Cyprus Government (2021).

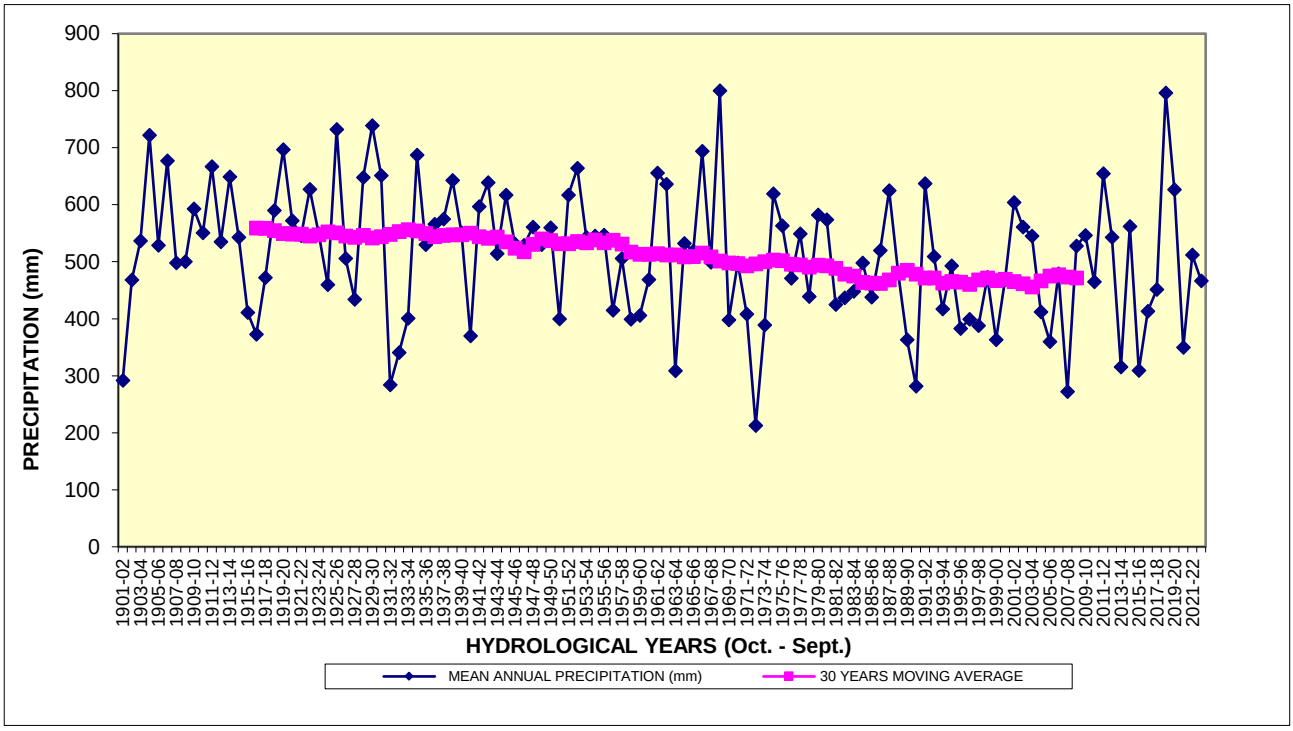
[10] Review article "Reviews of Geographysics" (Zittis et. al, 2022), Advancing Earth and Space Science.

[11] Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Charge, Department of Environment, 2023.

[12] Climatic vulnerable areas in Cyprus Assessment of Climate Change Effects on Pollution Transport in Cyprus ("ACCEPT"), Cyprus Institute, 2022.

Data from the Department of Meteorology indicate that rainfall in Cyprus has been decreasing annually, although the observed changes in precipitation were found to be statistically insignificant. According to a statistical analysis of precipitation conducted by the said Department, annual rainfall in Cyprus has decreased by an average of 87 mm over the past 92 years, corresponding to a 15.6% reduction, as shown in the diagram below:

Diagram 3: Cyprus: Mean Annual Precipitation (mm) (1901–02) – (2022–23) (Normal 1961–90: 503 mm)



Source: Department of Meteorology, 2024.

According to the European Environment Agency, Cyprus experienced the worst seasonal water scarcity conditions among European countries in 2019, as measured by the Water Exploitation Index Plus (WEI+).

Annex V presents the Mean Annual Precipitation Charts from various stations across Cyprus.

3.1.1.3 Evapotranspiration.

As reported by the Cyprus Institute, based on an unpublished analysis of water balance data from 38 catchments in the Troodos region during the period 1980–2015, a statistically significant increase in evapotranspiration was observed, ranging from 0.3 mm to 0.7 mm per year.

3.1.1.4 Observed changes in extreme weather events (heatwaves, droughts, floods).

According to the UNFCCC Report, since 1950 there has been an increasing number of heatwave events worldwide and a rise in the number of warm nights. Additionally, larger areas of the planet have been affected by droughts due to a combination of reduced rainfall and increased evapotranspiration.

Regarding intense rainfall events, whilst the number of tropical storms in the Eastern Mediterranean, varies annually, they have generally increased in intensity and duration since the 1970s. However, studies focusing on the EMME region have shown mixed results.

a. **Heatwaves.**

According to a 2022 report by the Cyprus Institute prepared under the project "Assessment of Climate Change Effects on Pollution Transport in Cyprus"[13], trends of all extreme temperature-related indices in Cyprus have shown an increase over recent decades. Specifically, a significant increase of 8 to 12 heatwave days per decade was observed, alongside an increase in maximum and minimum temperatures. The study notes that the highest maximum daily temperatures occur in the island's central inland areas, while the lowest minimum temperatures are recorded in the Troodos Mountain range at elevations above 1,000–1,500 meters.

The UNFCCC Report highlights that rising trends in maximum and minimum temperatures are more pronounced in semi-mountainous areas. Seasonal trends emphasize significant temperature increases during the warm seasons (spring and summer). Additionally, there has been a notable rise in the number of summer days (up to 8 additional days per decade) and tropical nights (up to 13 additional nights per decade). Moreover, the number of days with temperatures of 40°C or higher has increased, while the number of days with temperatures of 0°C or lower has significantly decreased.

b. Droughts.

According to the World Bank's 2018 report, *"Securing Potable Water under Extreme Scarcity: Lessons and Perspectives from the Republic of Cyprus"*[14], droughts in Cyprus occur frequently, with two, three, or even up to six consecutive dry years, with exceptionally low rainfall being common. Also, the aforesaid Report notes that historically, droughts occurred every two to three years, but over the past 50 years, they have increased in both magnitude and frequency. Over the last two decades, three major drought periods lasting over one year were recorded, severely impacting the country: in 1990–1991 (two years), 1996–2000 (five years), and 2006–2009 (four years).

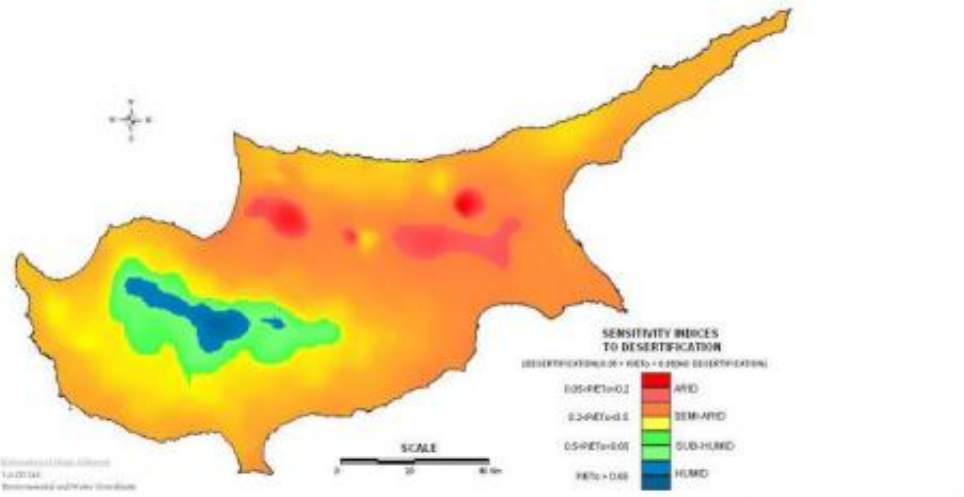
[13] Climatic vulnerable areas in Cyprus Assessment of Climate Change Effects on Pollution Transport in Cyprus ("ACCEPT"), Cyprus Institute, 2022.

[14] "Securing Potable Water Supply under Extreme Scarcity, Lessons and Perspectives from the Republic of Cyprus", World Bank Group, 2018.

The UNFCCC Report refers to a 2008 European Commission study covering the period 1976–2006, which identified Cyprus as one of the areas with the highest drought frequencies in Europe, with large portions of its territory affected during drought events.

To assess Cyprus's vulnerability to drought, the Department of Environment ("DE") commissioned a study in 2007 to identify areas at risk of desertification. According to this study, 91% of Cyprus's total area was classified as critical or sensitive, as illustrated in the diagram below:

Figure 1: Environmentally Sensitive Areas to Desertification



Source: Cyprus Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change*, Department of Environment, 2023*.

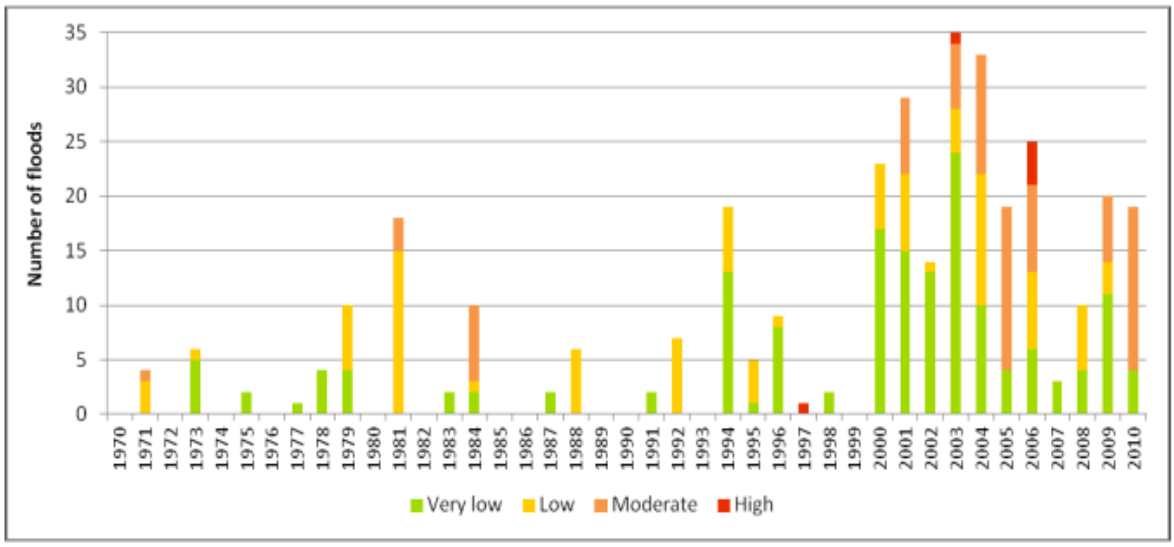
c. Extreme rainfall - floods

According to the aforesaid 2022 report by the Cyprus Institute[15], extreme weather events related to rainfall were found to be statistically insignificant. For example, the number of rainy days per year decreased by one day per decade, while the maximum duration of dry periods per year also slightly decreased, indicating changes in the distribution of rainfall throughout the year.

The report highlights that, despite Cyprus being characterized by prolonged and frequent periods of drought, it also suffers from floods. As illustrated in the diagram below, the frequency of floods increased significantly during the period 2000–2010 compared to 1970–2000, with 61% of all recorded floods occurring during this time.

[15] Climatic vulnerable areas in Cyprus Assessment of Climate Change Effects on Pollution Transport in Cyprus ("ACCEPT"), Cyprus Institute, 2022.

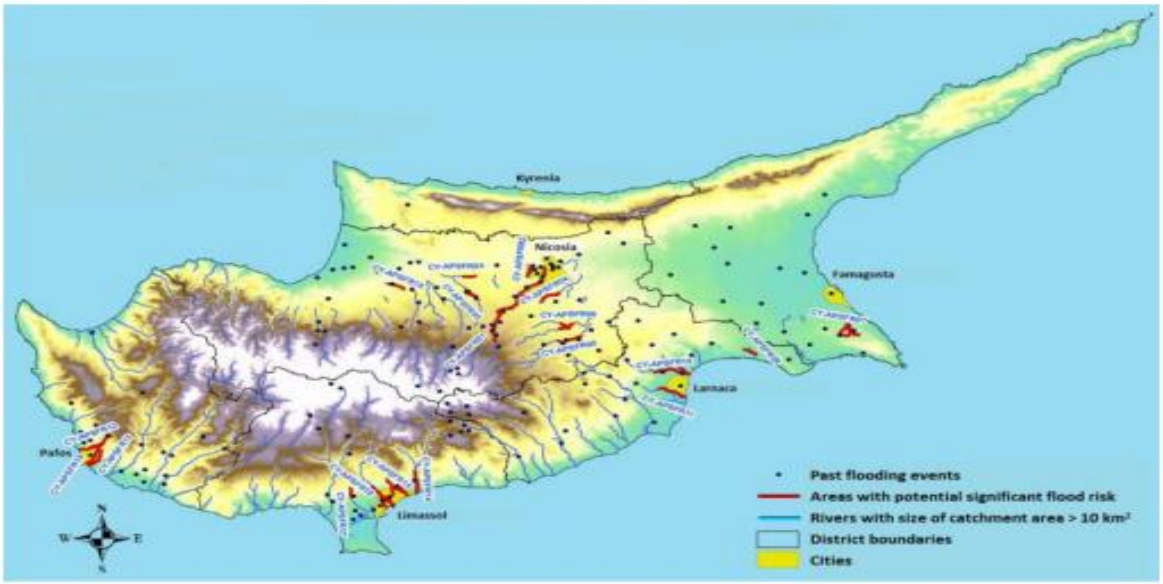
Diagram 4: Number of floods per year in Cyprus (1971–2020).



Source: Cyprus Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

As mentioned in the UNFCCC Report, according to the Water Development Department (WDD), recorded floods in Cyprus for the period 1859–2011 included urban floods (37%), flash floods (20%), river floods (16%), pluvial floods (13%), or a combination of the above.

Figure 2: Areas with potential significant flood risk in Cyprus.



Source: Cyprus Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

3.1.2 Impacts of climate change on water resources in Cyprus

3.1.2.1 Relationship between climate factors and water resources.

As noted in the National Climate Change Adaptation Strategy of Cyprus (2017), water resources are directly linked to climate, as the hydrological cycle is significantly influenced by climate factors[16]. Additionally, according to the report, the processes of evaporation, condensation, precipitation, infiltration, runoff, and groundwater flow are largely dependent on climate factors, such as temperature, radiation, sea level rise, and wind[17].

Changes in the volume and timing of precipitation and changes in evaporation result in alterations in river flows. Furthermore, the climate affects soil moisture and consequently the infiltration of water into GB. Extreme climate events, such as droughts, heavy rainfall and floods, impede water storage, leading to significant water losses and water quality degradation. The increase in temperature and decrease in precipitation lead to higher evapotranspiration, condensation, and exacerbation of various forms of pollution, such as eutrophication, while rising sea levels pose a threat of salinization to coastal GB. The availability of natural water resources is almost exclusively dependent on precipitation, which is variable and characterized by prolonged periods of drought. Additionally, the already limited water resources are considered more vulnerable to climate change.

The impacts of climate change on natural water resource systems have repercussions on both society and ecosystems. As such, the water resources and agricultural sectors are considered particularly vulnerable to the effects of climate change. According to "The Cyprus Climate Change Risk Assessment Evidence Report" (2016)[18], the agricultural and tourism sectors are the most vulnerable, as their activities are more prone to water shortages and/or increased water supply costs.

The table below, based on the Revised Drought Management Plan (DMP)[19] (2016), presents the correlation of observed and projected changes in the climate factors of Cyprus and their respective impacts on water resources.

[16] National Strategy for Climate Change Adaptation, Department of Environment, 2017.

[17] Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Charge, Department of Environment, 2023.

[18] "The Cyprus Climate Change Risk Assessment Evidence Report", Department of Environment, 2016.

[19] Revised Drought Management Plan, LDK Symbouloi Technikon kai Anaptyxiakon Ergon A.E and ECOS Μελετική A.E., on behalf of Water Development Department, 2016.

Table 2: Relationship between climate change and impacts on the water sector.

Potential Climate Changes	Impacts
Increase in air temperature	– Increase in water temperature
	– Increase in evaporation and transpiration
Increase in evapotranspiration	– Reduction in runoff to the hydrological network
	– Lower rates of groundwater recharge (lower groundwater levels)
	– Salinization of groundwater due to reduced infiltration
Decrease in precipitation and increased frequency of drought periods	– Reduction in available runoff
	– Increased water scarcity due to decreased availability of water resources under a persistent state
	– Increased water pollution and quality degradation due to lower dilution of pollutants, resulting in higher concentrations (nitrogen, phosphorus, dissolved organic carbon, pathogenic microorganisms, pesticides, salts)
	– Lower rates of groundwater recharge (lower groundwater levels)
	– Salinization of coastal aquifers due to sea level decline and seawater intrusion
Increase in rainfall variability	– Increase in the deviation of annual runoff from the mean and an increase in reservoir overflow periods as well as periods of very low runoff
Increase in intense rainfall	– Increased frequency of flood events
	– Degradation of surface water quality due to soil erosion in flood flows
	– Lower rates of groundwater recharge, particularly in mountainous areas due to increased runoff
Increase in surface water temperature	– Increased growth of harmful algae and reduced levels of dissolved oxygen in water bodies, potentially leading to eutrophication
	– Prolonged thermal stratification in lakes, with a decrease in nutrient concentration in the upper layers and extensive oxygen depletion in the deeper layers
	– Changes in mixing patterns and self-purification capability
	– Salinization of water resources
Sea level rise	– Salinization of coastal aquifers
	– Contribution to increased frequency of flooding in coastal areas

Source: **Revised Drought Management Plan, Water Development Department, 2016.**

According to the UNFCCC Report, the impact, vulnerability, and assessment of adaptation concerning Cyprus's water resources in relation to observed climate changes over recent years have highlighted the following key vulnerabilities:

a. Water availability for irrigation,

b. water availability for domestic use,

c. groundwater quality, and

d. frequent occurrences of droughts.

3.1.2.2 Impacts of climate change on water availability.

a. General.

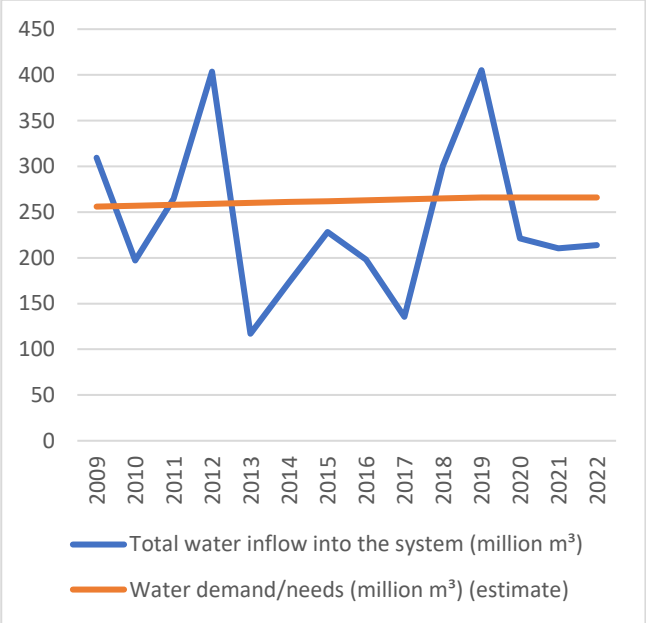
According to the UNFCCC Report, Cyprus is already below the water scarcity threshold of 1,000 m^3/year per capita. As noted in the aforesaid 2018 World Bank Report[20], the availability of natural water resources is only 390 m^3/year per capita, which is below the typical threshold for extreme water scarcity of 500 m^3/year per capita.

According to Cyprus's water balance for the period 2009–2022 (the most recent data available from the WDD during the audit) (Annex 3), defined as the balance between water demand (needs) and the available water supply, it is evident that the natural water resources of Cyprus have not been sufficient to meet water needs in most years (2010, 2013–2017, 2020–2022). In 2013, 2014, and 2017, water needs were not met even with the use of non-conventional water resources, as illustrated in the diagram below. In 2024, the then Director of the WDD emphasized, during a meeting of the Water Management Advisory Committee on February 6, 2024, the severe water situation that Cyprus was facing, which was expected to worsen in 2025 and 2026.

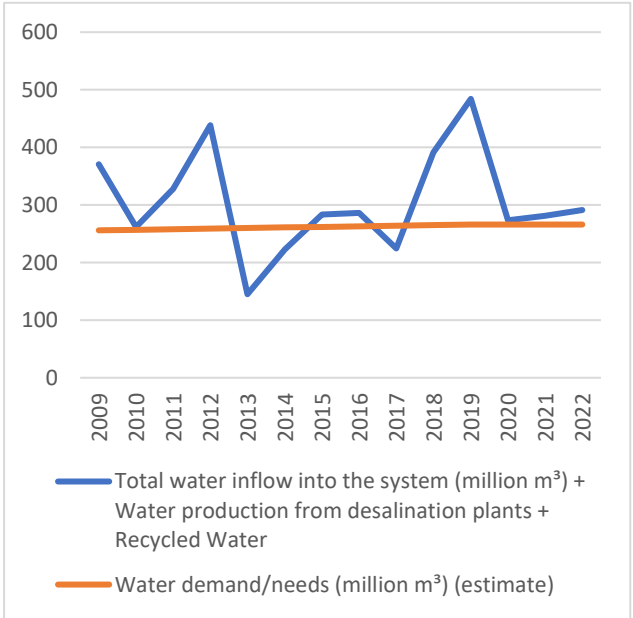
During periods of extreme drought, irrigation needs are rarely met, as, according to the Water Policy[21], water is limited, and a fundamental principle is to prioritize domestic use over other competing uses.

Diagram 5: Water Resource Availability.

Water resource availability and water demand



Water resource availability (natural and non-conventional) and water demand



Source: Audit Office of the Republic, based on data obtained from the Water Development Department, 2024.

[20] "Securing Potable Water Supply under Extreme Scarcity, Lessons and Perspectives from the Republic of Cyprus", World Bank Group, 2018.

[21] Water Policy Report, Water Development Department , 2011.

By auditing the parameters used for preparing the water balance, we observed that water demand is estimated on the basis of the 2011 Water Policy Report[22] (258 million m^3), adjusted on the assumption that expected increases in potable water consumption are 1 million m^3 annually. Since 2020, following WDD's consultations with relevant Authorities, the adjustment is not imposed. It is noted that, as explained below, according to the Revised DMP, the water demand for the years 2010–2014 was estimated at an average of 267.5 million m^3 (257, 258, 259, 260, 261 million m^3 for the years 2010–2014, respectively, according to the water balance), whilst the Strategic Study for Water Management and Drought Mitigation[23], prepared in 2019, estimated water demand for 2019 at 270 million m^3 (266 million m^3 according to the water balance). We also found that the water demand used for the calculation of the water balance is not based on updated data and, therefore, does not represent the actual water needs, which would negatively impact the water balance for the referenced years.

We also noted the high evaporation rates recorded, as, according to the UNFCCC Report, it is estimated that, during the period 1971–2000, 86% of precipitation returned to the atmosphere through evapotranspiration. The Deputy Director of the WDD mentioned in a meeting of the Water Management Advisory Committee on June 15, 2021, that the Department had been studying and monitoring the issue of evaporation for years but had not identified any best practices worldwide. She noted that the Department was considering, in collaboration with the Ministry of Energy, Commerce, and Industry, the possibility of installing floating solar panels on certain reservoirs. A review of Water Management Advisory Committee minutes up to July 16, 2024, indicated that this topic had not been revisited. A relevant reference to the methods of reducing evaporation is made in chapter 3.4.1.2(d)(v) of this Report.

b. Groundwater and surface water bodies.

The natural recharge of GB and the inflow of water into surface water bodies in Cyprus depend exclusively on rainfall[24].

In Cyprus, there are 23 GB, one of which is located in the occupied areas of Cyprus. Therefore, all the data we refer to hereafter pertains to the 22 GB located in the areas where the Republic of Cyprus exercises effective control.

The natural recharge of GB in areas under the effective control of the RoC is approximately 250 million m^3 per year (period 2008–2013). Regarding surface water bodies, the storage capacity of reservoirs in 1960 was 6 million m^3, approximately 300 million m^3 in the early 1990s, and about 330 million m^3 today.

[22] Water Policy Report, Water Development Department , 2011.
[23] Strategic Study for Water Management and Drought Mitigation, Water Development Department, 2019
[24] 3rd River Basin Management Plan, consortium "ECOS Meletitiki A.E., ENM A.E., Lever A.E.", on behalf of WDD, 2023.

However, the direct impacts of observed climate change, such as reduced precipitation and increased evapotranspiration with consecutive years of drought, have led to a reduction in the natural recharge of GB and decreased inflows to reservoirs. This has resulted in the depletion of surface water resources stored in reservoirs and the overexploitation of many aquifers, particularly for agricultural irrigation purposes.

It is noted that, pumping in 14 out of 22 GBs exceeds the permissible level of extraction from groundwater resources, resulting in a decline in the groundwater quantities. Additionally, seawater intrusion is observed in seven GBs. A detailed table is presented in Annex VIII.

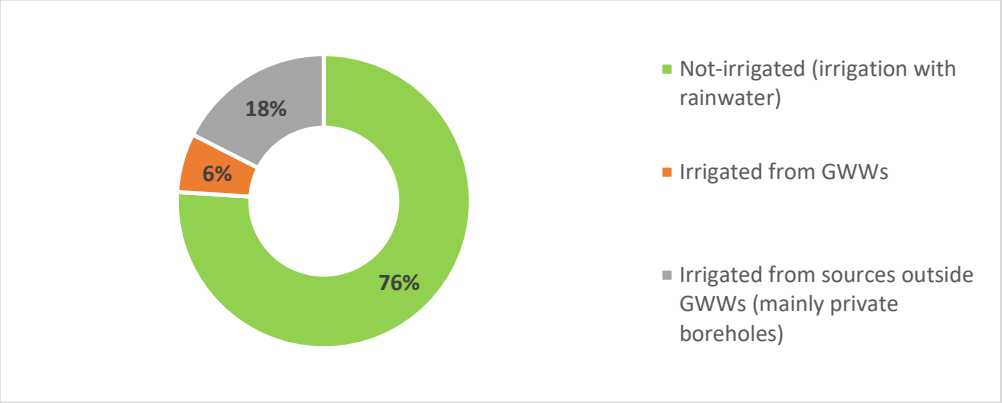
It is also noted that, in certain areas of Cyprus with favorable conditions, artificial groundwater recharge has been gradually developed. Specifically, artificial recharge is applied in the Germasogeia area with water from the Germasogeia Reservoir and in the Akrotiri and Ezousa aquifers, which have experienced seawater intrusion (salinization), using recycled water.

Additionally, recycled water is used, under certain conditions, for irrigating agricultural and livestock crops and green spaces.

c. Impacts of climate change on agriculture within the context of water resource availability.

Agriculture depends on water availability. According to the UNFCCC Report, 24% of the total arable land in Cyprus is irrigated (mainly vegetables, citrus fruits, potatoes, melons, table grapes, deciduous fruits, bananas), while the remaining 76% is non-irrigated, relying on rainfall (cereals, fodder crops, olives, carobs, wine grapes, almonds). Furthermore, it is noted that 73% of irrigation water supply is met by non-governmental water works (NGW), mainly private boreholes, with the remaining 27% provided by GWWs, which primarily include surface water resources. As stated in the UNFCCC Report, the above figures are based on data and studies prepared in 2009 and 2010. According to the National Climate Change Adaptation Strategy (2017), irrigation water demand is not always met. In the diagram below, we present the aforementioned data.

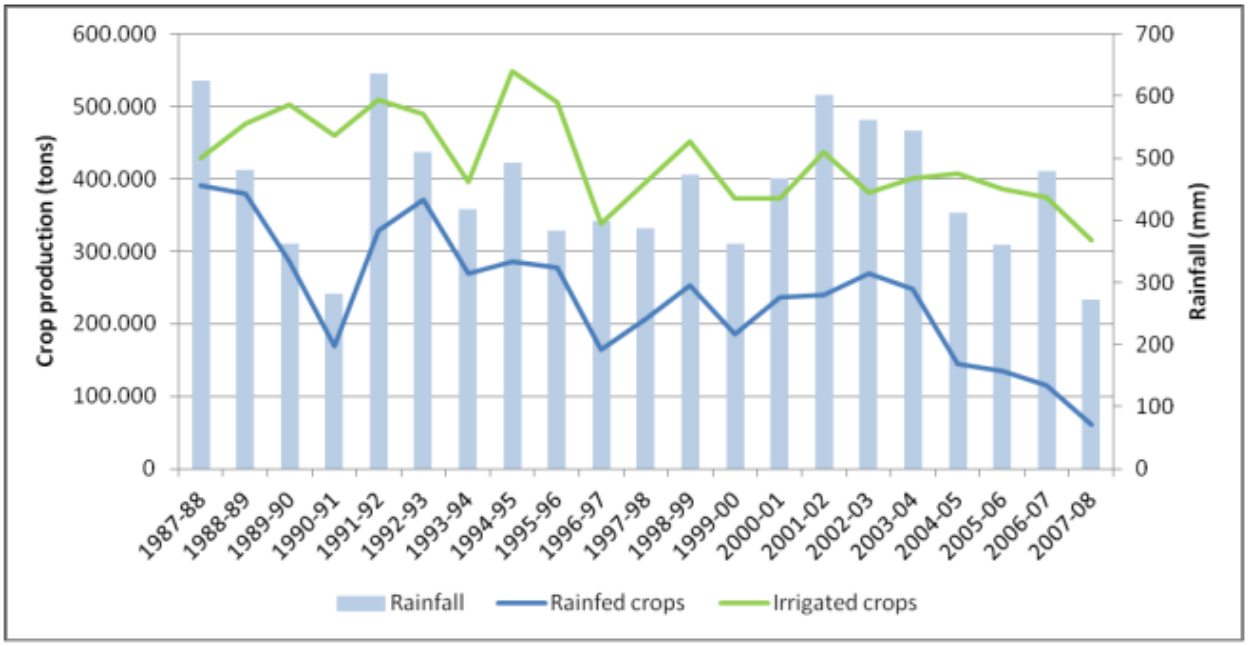
Diagram 6: Irrigation of total arable agricultural land.



Source: Audit Office of the Republic of Cyprus, based on data and studies prepared during the years 2009 and 2010 and included in the UNFCCC Report.

The diagram below illustrates irrigated and non-irrigated agricultural production and annual precipitation for the period 1987/88–2007/08, according to the UNFCCC Report.

Diagram 7: Irrigated and Non-Irrigated Agricultural Production and Precipitation for the Period 1987/88–2007/08.



Source: Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

According to a Special Report by the European Court of Auditors[25] regarding the sustainable use of water in agriculture, irrigation acts as a protective shield for farmers against irregular rainfall and contributes to increased sustainability, productivity, and quality of crops.

According to the UNFCCC Report, the main areas of vulnerability for the agricultural sector of Cyprus, and consequently for food availability, observed in the recent past with respect to the impacts of climate change are: reduced crop yield/productivity due to limited water resources (drought conditions), damage to crops caused by extreme weather events, and a decline in soil fertility.

Specifically, it is noted that crops in mountainous areas, although limited in extent, are irrigated exclusively by groundwater resources. Thus, in addition to the risk of overexploitation of groundwater, these resources depend on climate factors such as precipitation, evapotranspiration, soil moisture, and runoff. Therefore, crops located in mountainous areas are highly sensitive to climate change, especially during prolonged drought periods (lasting over one year).

[25] Sustainable water use in agriculture: CAP funds more likely to promote greater rather than more efficient water use, European Court of Auditors, 2021.

On the other hand, although precipitation in the plains and coastal areas is lower than in mountainous areas, crops in these regions are primarily irrigated by GWWs, which are also linked to desalination units. However, the availability of water, especially for irrigated crops, depends on Cyprus's water allocation policy during drought conditions. Additionally, some coastal areas are irrigated with low-quality (saline) water from private boreholes.

d. Water Needs/Demand

Non-climatic factors, such as the historical increase in population in Cyprus, changes in living standards, and tourist influx, particularly in the summer, have significantly impacted water and food demand. Annex VII presents diagrams from the Statistical Service showing the historical increase in Cyprus's population and annual tourist arrivals.

As stated in our Report titled *"Water Resources Management"* (2016), the WDD, in collaboration with the United Nations Food and Agriculture Organization (FAO), prepared a study in 2002 entitled *"Reassessment of Water Resources and Water Demand in Cyprus."* The purpose of the study was to reassess the quantities of available water and water demand (needs). According to updated estimates of water needs included in the above study, within the context of studies and reports prepared for compliance with the provisions of the WFD, which were included in the final Water Policy Report completed in 2011, the estimated annual water demand for areas under the control of the Republic of Cyprus was 252 million m^3, of which 64% was for the agricultural sector, 25% for domestic water supply, and the remaining 11% for the industrial (3%), tourism (4%), and livestock (3%) sectors, respectively.

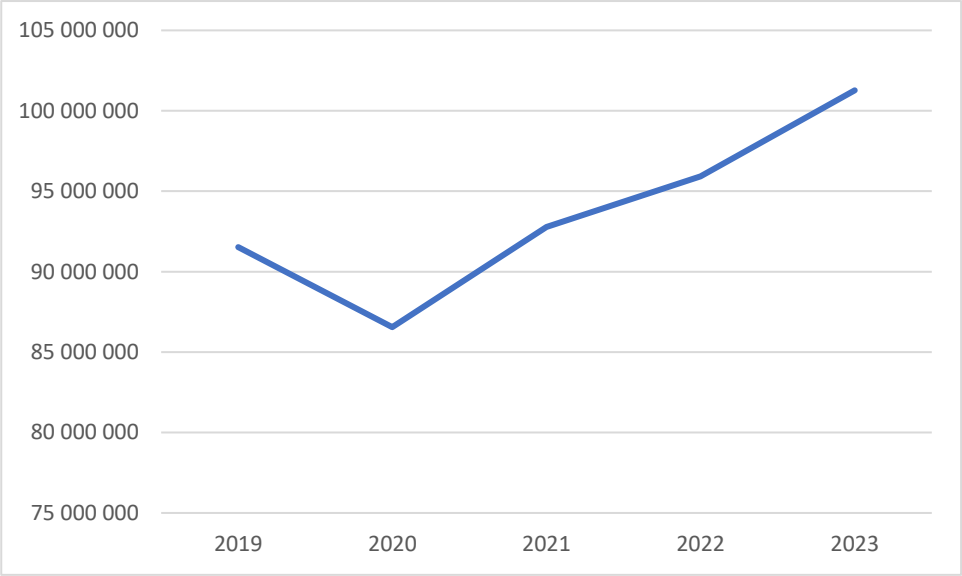
According to the same study, 85% of total water supply for domestic use is provided by GWWs, while, as stated in the 3rd RBMP, the remaining percentage is drawn from potable water boreholes of certain Local Authorities. Additionally, according to the study, 30% of total irrigation needs are met by GWWs. The remainder, as noted in the 3rd RBMP, is primarily sourced from private farmers' boreholes and a smaller portion from the networks of small local irrigation organizations (reservoirs and water tanks).

Based on the above, water demand was updated in 2016 in the Revised DMP and set at an average of 267.5 million m^3.

Water demand was further updated in 2019 in the Strategic Study for Water Management and Drought Mitigation, according to which the estimated annual water demand for areas under the control of the Republic of Cyprus was 270 million m^3, of which 59.1% was for the agricultural sector (even though its contribution to the Gross Domestic Product is only 2.3%), 29.6% covered the domestic water supply needs, and the remaining 11.3% was for the industrial (3.0%), tourism (4.9%), and livestock (3.3%) sectors, respectively. The above-mentioned data was also used in the 3rd RBMP, which was prepared in 2022.

The table below presents the domestic water demand from GWWs based on data provided by the WDD:

Diagram 8: Domestic Water Demand Nationwide from Government Water Supply Systems.



Source: Audit Office of the Republic, based on data obtained from the Water Development Department, 2024.

As evident from the diagram above, an increase in domestic water demand of approximately 10.7% (2.6% annually) from 2019 to 2023 was observed. According to the 3rd RBMP, although domestic water needs follow those for irrigation, the absolute numbers show a rapid increase in domestic water demand from GWWs over recent years (2% per year), as more Communities connect to government water supply systems due to prolonged drought conditions and the lowering of their own water well levels. A review of the Water Advisory Management Committee minutes for 2020–2023 showed that, during this period, one more Community joined the GWWs.

e. Conclusions

(i) Water needs in Cyprus are increasing. According to the findings of the 2018 World Bank study titled "Securing Potable Water Supply under Extreme Scarcity, Lessons and Perspectives from the Republic of Cyprus," should be a priority focusing on demand management, particularly for potable water The per capita household consumption, estimated at 140 liters per day in major urban areas, indicates significant potential for raising awareness among the Cypriot population for water conservation.

(ii) The methodology used for calculating and updating the total water needs of Cyprus is based on the actual consumption from the GWWs recorded by the WDD for the purposes of both water supply for domestic use and irrigation separately, and on the fact that these consumptions, according to estimates made in the context of the 2011 Water Policy Report, correspond to 85%

and 30% of the total water needs for domestic water supply and irrigation, respectively (the remaining water needs are covered by sources outside the GWWs).

(iii) The WDD does not maintain comprehensive data on water consumption outside GWWs. Specifically, the Department does not keep data on consumption from networks managed by the Irrigation Departments, while data on extractions from private boreholes are limited, as detailed in caption 3.4.1.5 of our Report. Additionally, the WDD informed us that it does not monitor the management of water drawn by Communities from their boreholes.

(iv) Despite the measures taken by the RoC, the abstractions from the groundwater bodies exceed the permissible levels.

Audit Office Recommendations:

Water needs should be calculated taking into account the total actual consumption, both within and outside of GWWs (including private boreholes and Irrigation Departments which are not connected to GWWs).

Additionally, the WDD should maintain data on water consumption outside the GWWs, which would contribute to the integrated and rational management of water resources. We noted that, according to Article 128(1) of the Law, the WDD may require, among other things, an Irrigation Department or Irrigation Association to provide such information regarding the quantity, quality, and use of water, or regarding their water infrastructure, and in such time and manner as the Director may reasonably specify in the relevant request. Furthermore, the use of technology could contribute to a more cost-effective, efficient, and effective process for maintaining the data in question, such as the use of smart meters connected to the water billing system, direct input of consumption data from the Irrigation Departments to the system, etc.

The WDD informed us, among other things, that the obligation to maintain complete and constantly updated consumption data for each water source outside the GWWs may result in disproportionate administrative burden, without providing significant benefits to the management of the GWWs, which is the main focus when planning and implementing the annual strategy.

WDD also noted that, primarily concerning Irrigation Departments receiving water from the GWWs or other organizations connected to the GWWs, the WDD is already exercising its right to obtain information, in accordance with Article 128(1) of the Law. For the other Irrigation Departments not receiving water from GWWs (ie. Not connected to GWWs), the WDD receives information only from those Irrigation Departments that apply for grants through the De minimis Scheme Addressing Irrigation Department Issues.

Regarding the private boreholes of the Irrigation Departments, the WDD informed us that it has already requested a consolidated report from the Ministry of Interior concerning all the Irrigation Departments in order to update their water abstractions permits, as most of these permits were issued when the responsibility of these was under the District Administrations, so that they can be monitored through the water abstraction permits, as provided in Part VIII of the Law.

Additionally, in a meeting held on 14.11.2024, focusing on promoting water conservation actions/reducing losses in water distribution networks between the WDD and the Ministry of Interior, which was attended by the District Local Government Organisations and the Nicosia District Administration, it was decided that all actions of the Irrigation Departments and Irrigation Associations should be recorded by the District Administrations, with the aim of identifying the water sources they rely on and the number of their consumers. Furthermore, in a new meeting held at the Ministry of ARDE on 17.1.2025, it was decided that the Ministry of Interior, through the District Administrations, should assess and categorize the Irrigation Departments and Irrigation Associations as sustainable or non-sustainable.

We emphasized that the WDD, as the competent authority for managing all water resources of the Republic and not just those connected to the GWWs, should ensure, as a minimum, that it receives information regarding the consumption of Irrigation Departments/Associations not connected to the GWWs, in order to assess the impact on the overall water needs. Additionally, since the Department is responsible for the billing of all private boreholes (including those of Irrigation Departments/Associations), it should have access to their consumption data. Regarding specifically the consumption of the Irrigation Departments/Associations networks not connected to the GWWs, which are the jurisdiction of the District Administrations, we noted that the information requested by the Department does not concern their consumption.

3.1.2.3 Impacts of climate change on water quality.

The UNFCCC Report references the 4th Assessment Report (AR4) of the IPCC, which states that higher water temperatures, increased rainfall intensity, and prolonged periods of low runoff exacerbate many forms of water pollution. However, there is no data correlating climate change with changes in water quality.

According to the UNFCCC Report, higher water temperatures and reduced runoff due to decreased precipitation have made water systems in Cyprus more susceptible to eutrophication, stratification, and low dissolved oxygen levels. Additionally, intense rainfall and flooding negatively affect water quality. Reduced recharge rates due to decreased precipitation are more pronounced for GB, making them more vulnerable to climate change.

The UNFCCC Report also notes that in Cyprus, there is a trend of water quality degradation, particularly in groundwater resources, due to low recharge rates combined with the low permeability of some

sedimentary aquifers in Cyprus, leading to the dissolution of soluble salts and increased salinity. Additionally, rapid urbanization in various parts of Cyprus over the past 30 years, uncontrolled waste disposal, excessive use of fertilizers and pesticides, and overexploitation of many coastal aquifers have gradually degraded the quality of Cyprus's groundwater.

Furthermore, coastal aquifers are particularly susceptible to salinization due to seawater intrusion caused by overexploitation. It is noted that according to the 3rd RBMP, seawater intrusion is observed in seven out of 22 ground bodies.

Further details are provided in Part 3.4.1.5 of this Report.

3.1.3 General Conclusion:

From the above, it is evident that climatic factors such as temperature increases, changes in precipitation, higher evapotranspiration, and increased frequency and duration of drought periods have affected the availability and quality of natural water resources in Cyprus despite measures taken by the country to face water scarcity.

A significant portion of precipitation (86%–90%) in Cyprus continues to be lost through evaporation, and the country has exhibited a water deficit even after utilizing non-conventional water resources. Already limited water resources are increasingly vulnerable to the impacts of climate change. GB are under pressure due to over extraction (14 out of 22 GB), as well as to seawater intrusion (seven out of 22 GB) in coastal areas.

The sector most affected is agriculture. Irrigation needs are not always met, as water reserves (from both surface and non-conventional water sources) are prioritized for domestic water supply.

Additionally, more and more Communities are connecting to the GWWs for the supply of water domestic use due to the prolonged drought and the lowering of the levels of their own boreholes.

Furthermore, water needs are continuously increasing due to factors such as population growth and tourism flows, which creates additional pressure on the already limited water resources.

3.2 How are the expected impacts of climate change on the water resources of Cyprus?

To answer the above question, we recorded the expected future changes in the climate (e.g., rising temperatures, reduced rainfall, extreme weather events) and the way they are predicted to affect, water resources in Cyprus in terms of water availability and quality, the frequency and severity of drought events, and infrastructure.

3.2.1 How are climate change phenomena in Cyprus (e.g., temperature increases, reduced rainfall, extreme weather events) expected to change?

The UNFCCC Report assessed anticipated changes, focusing on temperature, precipitation, and extreme weather events for the periods 2021–2050 (near future) and 2071–2100 (far future), compared to the reference period of 1961–1990.

Calculations based on high spatial resolution simulations using Regional Climate Models (RCMs) demonstrate existing climate trends, including increasing temperatures, decreasing precipitation, and worsening extreme weather events.

As noted, RCMs generally predict consistent overall warming and drying of Cyprus, with significant impacts among others on water resources.

Intense warming and reduced rainfall are also evident from temperature and precipitation time series derived from representative locations in Cyprus for the period 1951–2100.

3.2.1.1 Predicted Changes in Temperature.

The Cyprus Institute developed updated climate predictions for Cyprus[2627]. To evaluate climate change, it used projection scenarios based on Representative Concentration Pathways (RCPs)[28]. RCPs are scenarios comprising emission and concentration time series for all greenhouse gases, aerosols, chemically active gases, and land-use changes, typically extending to the year 2100.

According to the latest climate projections, a scenario approaching the main targets of the Paris Agreement (e.g., RCP2.6[29], which limits the global mean temperature increase to 2°C) predicts a rise in the annual average temperature of the region by 0.5°C during 2021–2040 and by over 1.5°C, during 2041–2060 and 2084–2100.

[26] Assessment of Climate Change Effects on Pollution Transport in Cyprus (ACCEPT), Climatic Vulnerable areas in Cyprus, The Cyprus Institute, 2022.

[27] Assessment of Climate Change Effects on Pollution Transport, in Cyprus (ACCEPT), Future Extreme Events in Cyprus, The Cyprus Institute, 2024.

[28] The term "representative" indicates that each RCP scenario represents only one of many possible pathways that could lead to different levels of global warming (characterized by the magnitude of radiative forcing). The term "pathway" emphasizes that it is not only the long-term concentration levels that matter but also the path followed over time to achieve this outcome.

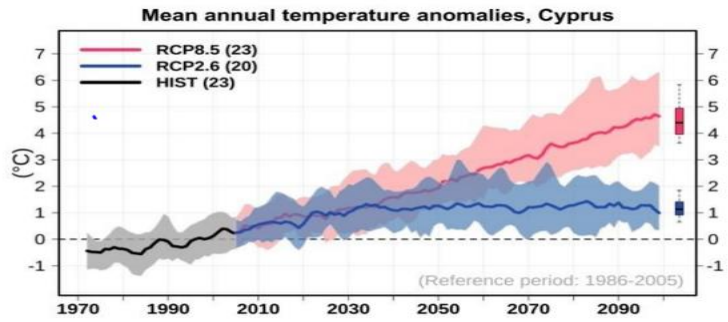
[29] RCP2.6 represents a low greenhouse gas emissions scenario characterized by significant climate change mitigation actions, providing a 67% probability of limiting the increase in GMST to below 2°C by 2100.

Conversely, under an unconstrained global mean temperature increase scenario (RCP8.5[30]), where temperature rise exceeds 4°C, the annual average temperature is projected to increase by 1.5°C and 2.5°C during 2021–2040 and 2041–2060, respectively, and surpass 5°C during 2084–2100.

Temperature increases are expected to be more pronounced in inland areas of the island, including its capital, Nicosia, and during the summer months.

Additionally, during the spring and summer months, temperature increases are expected to be more intense in the Troodos Mountain range, compared to the rest of the island.

Diagram 9: Predictions for anomalies in the average annual temperature in Cyprus.



Source: Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

3.2.1.2 Predicted changes in precipitation

As stated in the UNFCCC Report, the projected changes in precipitation for Cyprus exhibit significant variability across models and scenarios. Consequently, the report emphasizes that precipitation patterns in Cyprus should be interpreted with caution due to substantial temporal variability and the inherent limitations of climate models in accurately simulating the hydrological cycle and significant discrepancies among models.

Regarding precipitation, the results of climate model simulations indicate that year-to-year variability and the range of variability are expected to increase significantly compared to the reference period of 1986–2005, as illustrated in the diagram below.

[30] RCP8.5 is a high greenhouse gas emissions scenario characterized by the absence of climate change mitigation policies, resulting in a continuous and sustained increase in atmospheric greenhouse gas concentrations. It entails a probability exceeding 50% of GMST rising above 4°C by 2100.

Diagram 10: Predicted anomalies in average annual precipitation in Cyprus.

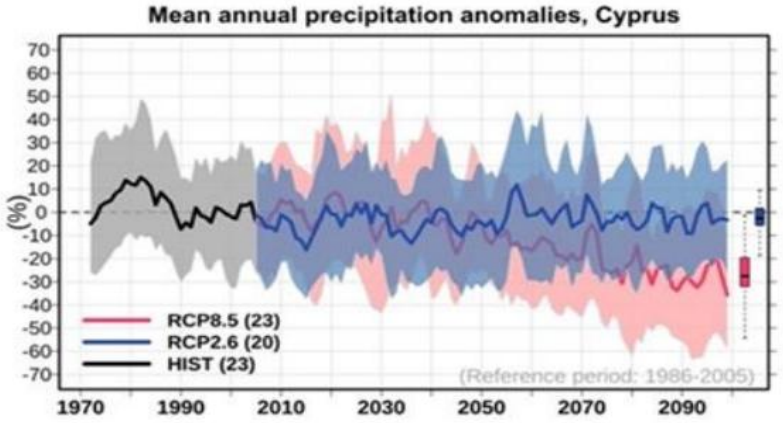


Figure 6.14. Projections of mean annual precipitation anomalies for Cyprus based on the CORDEX-CORE ensemble (see Zittis et al., 2022).

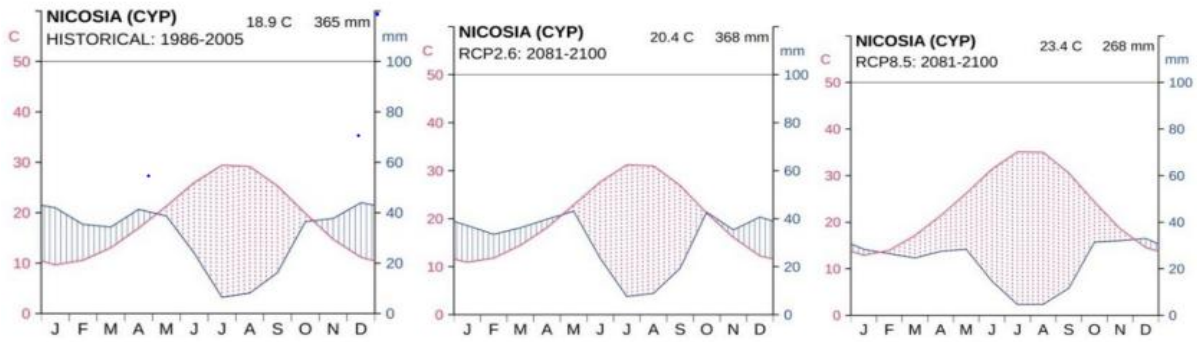
Source: Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

Specifically, under the aforesaid RCP2.6 scenario, the anticipated changes in precipitation are less pronounced and comparable to the natural variability of the climate.

However, under the RCP8.5 scenario, a reduction in annual precipitation of 20–30% is projected compared to the reference period of 1986–2005. This reduction is expected to be more significant during the wet season, which is also the most critical period for the replenishment of the island's water resources.

Furthermore, according to the high-emission RCP8.5 scenario, a substantial expansion of the dry season is anticipated. During the 2021–2060 period, the dry season is expected to extend from April to October, whereas for the 2081–2100 period, it will extend from March to November, as shown in the diagram, below.

Diagram 11: Climate projections of the dry season in Nicosia for the historical period 1986–2005 (left chart) and the future period 2081–2100 under scenarios RCP2.6 (middle chart) and RCP8.5 (right chart).



Source: Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

3.2.1.3 Evapotranspiration

As stated in the UNFCCC Report, evapotranspiration generally decreases with reduced rainfall but increases with higher temperatures. It is estimated that during the period 1971–2000, 86% of rainfall returned to the atmosphere as evapotranspiration. The KNMI[31] model projected an overall annual reduction in evapotranspiration ranging from -3% to -7% for the period 2021–2050 compared to 1970–2000.

3.2.1.4 Predicted changes in extreme weather events

Extreme weather events in the broader region are expected to intensify in terms of frequency and duration. According to UNFCCC Report, events affecting Cyprus include heatwaves, droughts, and, less frequently, extreme rainfall events that may lead to flooding.

a. Heatwaves

Heatwaves in the region are expected to occur more frequently, last longer, and feature higher maximum temperatures. This holds true across all scenarios and timeframes. However, under the RCP8.5 scenario, unprecedented extreme events are anticipated to become commonplace within the next two decades. Such events could persist for several weeks, with maximum temperatures likely exceeding 50°C, even in moderate climate scenarios.

b. Drought

Future droughts present a significant challenge in the Eastern Mediterranean, identified as a global hotspot for severe droughts. This results from the combined effects of rising temperatures, decreasing rainfall, and changes in rainfall characteristics (e.g., seasonality).
For instance, in a high-emission scenario (RCP8.5), the number of rainy days in Cyprus is expected to decrease significantly. Specifically, in the island's western regions and the Troodos Mountain peaks, this reduction is projected to reach or exceed an average of 20 fewer rainy days annually. Furthermore, the maximum duration of dry periods is expected to increase across the island, with drought phenomena extending by 30 to 40 days annually, particularly in southeastern areas.

c. Extreme Rainfall and Flooding

According to the UNFCCC Report, in addition to the overall reduction in rainfall, a warmer world, including Cyprus, could experience individual rainfall events of unprecedented intensity, posing additional flood risks. Furthermore, UNFCCC Report, citing the IPCC, states that flash and urban floods caused by locally intense rainfall events are likely to become more frequent across Europe.
The report also highlights that the climate simulation model used for Cyprus does not provide specific estimates regarding the frequency and intensity of future floods. While a slight increase in rainfall

[31] Climate prediction model of the Royal Netherlands Meteorological Institute (KNMI).

intensity is projected in the future (potentially associated with flood risks), these are expected to exacerbate the phenomenon. However, due to their localized nature and the short timescales involved, the ability of current advanced climate models to predict such events remains relatively low.

3.2.2 How are climate change phenomena expected to impact water resources in Cyprus?

3.2.2.1 General overview.

The combined effect of reduced rainfall and rising temperatures will pose significant challenges to Cyprus' already limited water resources.

The future impacts of climate change on water resources can be summarized in the following categories, which are analyzed in more detail below:

a. Reduction in water availability.

b. Deterioration of water quality.

c. Increase in the frequency and severity of droughts.

d. Infrastructure

3.2.2.2 Reduction in water availability.

Cyprus' already scarce water resources are highly vulnerable to climate change. According to indicators cited in the UNFCCC Report, the qualitative and quantitative constraints on water resources, due to the reduced volume of available water, are expected to worsen during the period 2021–2050, compared to 2000–2010[32].

a. Groundwater resources.

The downward trend in groundwater levels is expected to continue into the future, as a large proportion of GB are already directly or indirectly exposed to climate change.

Decreased rainfall and increased evaporation will lead to a decline in groundwater resources. Additionally, changes in the amount of effective rainfall and the duration of recharge periods will alter recharge rates. Simultaneously, intense rainfall events favor surface runoff over groundwater replenishment.

[32] Cyprus Eighth National Communication and Fifth Biennial Report – under the United Nations Framework Convention on Climate Charge, Department of Environment, 2023.

b. Surface water resources.

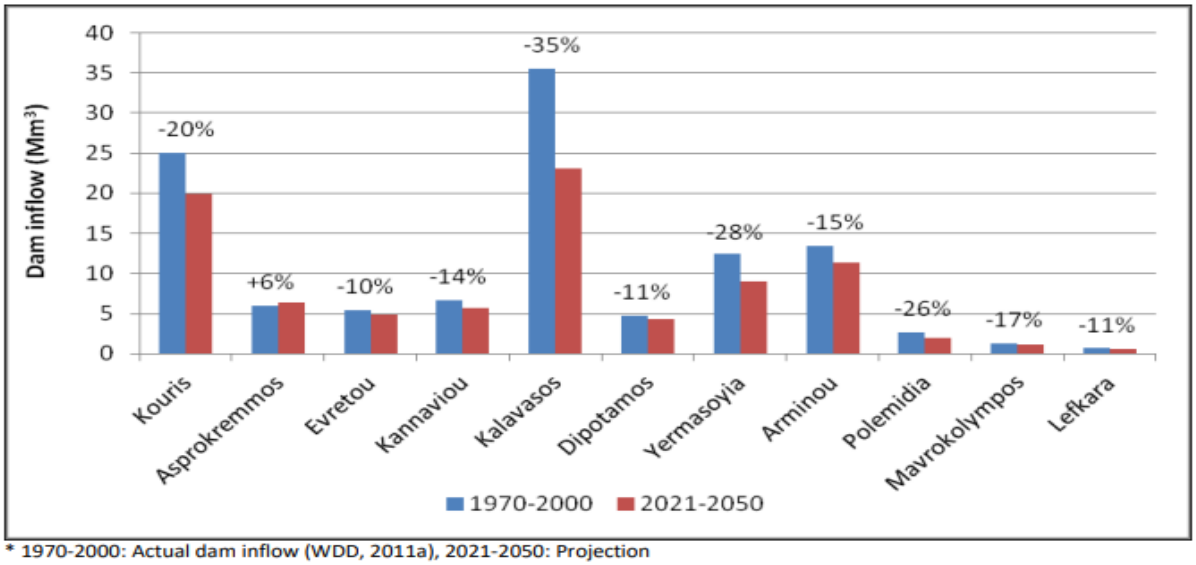
Changes in evapotranspiration and the occurrence of intense rainfall events are expected to affect river flows, subsequently impacting the quantity and quality of surface water entering dams and reservoirs.

According to the results of Deliverable 4.3 from the 3PRO-TROODOS research project, conducted in April 2023[33], the projected impacts of climate change on water resources in 37 catchments in the Troodos region for the period 2030–2060, compared to 1980–2010, were assessed using simulations from three climate models under a high-emission scenario. The findings indicated that a predicted reduction in rainfall of 6% to 15% would lead to an overall reduction in river runoff of 14% to 30%, respectively. Interestingly, for the model predicting the smallest rainfall reduction (5%), results were unexpected, showing a 5% increase in river runoff.

Furthermore, according to the UNFCCC Report, the average annual inflow to dams during the period 1971–2000 was approximately 130 mm^3. Simulations using the PRECIS model predict that total future inflow to dams during 2021–2050 will decrease by 23%, despite an estimated 5% reduction in annual average rainfall. It is noted that this method does not account for potential future changes in runoff that could increase runoff losses and reduce water inflows to dams.

The expected changes in inflow to Cyprus' main dams for the period 1970–2050 are illustrated below.

Diagram 12: Change in inflow to Cyprus' main dams for the period 1970–2050.



* 1970-2000: Actual dam inflow (WDD, 2011a), 2021-2050: Projection

Figure 6.42. Change in inflow to the main dams of Cyprus for the period 1970-2050

Source: Cyprus Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

[33] «Proactive Producer and Processor Networks for Troodos Mountains Agriculture», 3PRO-TROODOS, Prot No. INTEGRATED/0609/061, The Cyprus Institute, 2023..

c. Deterioration due to non-climate factors.

The increased demand driven by population growth, rising living standards, tourism flows, and overexploitation of water resources is expected to further strain Cyprus' already limited water resources, particularly during the summer months.

d. Water supply and irrigation needs.

(i) Potable water supply needs. As stated in the UNFCCC Report, existing and planned investments in water provision through unconventional water resources are expected to minimize future marginal differences between water supply and demand.

The total estimated average conventional and unconventional water resources for the period 2021–2050 (341 mm^3) are anticipated to fully meet future water demands across all sectors. However, desalinated water is mainly distributed to Cyprus' urban centers through water supply systems, while other areas, such as mountain Communities, rely almost exclusively on groundwater resources to meet their potable water needs.
According to the Revised DMP (2016), mountain areas of Cyprus depend, in many cases, on the exploitation of base river flows to meet their needs. This reliance will be particularly sensitive to the impacts of climate change due to the expected reduction in base flows in favor of flood runoff and the subsequent increase in the number of streams and days without flow. Small dams with only short-term, seasonal storage will face similar impacts. Additional impacts on small dams include increased sedimentation due to heightened soil erosion, resulting in a reduction of their effective volume and consequently increased maintenance costs.

As noted, for mountain Communities, the risk from the reduction or elimination of source flows must be evaluated.

(ii) Irrigation needs. According to the Cyprus Climate Change Risk Assessment Evidence Report (2016)[34], irrigation water demand may increase due to two climate factors: higher evapotranspiration and/or reduced effective rainfall caused by the overall decrease in precipitation depth.

As highlighted in the UNFCCC Report, projected climate changes are expected to exacerbate the already limited water resources (drought and water scarcity issues) in the agricultural sector, leading to crop destruction. The combination of reduced rainfall and prolonged drought periods is expected to decrease water availability for irrigation, increase crop water stress, and consequently further reduce crop yields. Specifically, traditional irrigated agriculture is the first

[34] Climate Change Risk Assessment Contract No. 22/2014, "The Cyprus Climate Change Risk Assessment Evidence Report", Ministry of Agriculture, Rural Development and Environment, 2016

to face water cuts during drought years, resulting in significant reductions in areas cultivated with annual crops, such as vegetables and potatoes.

We asked the Ministry of ARDE and the WDD to confirm whether future water needs for both supply and irrigation have been assessed to design effective and efficient adaptation measures for the impacts of climate change on water resources.

The WDD informed us that, as part of the contract for the Study of the Revision of the Water Policy, which has been underway since December 2024, the future water balance up to 2050 will be determined among other things.

3.2.2.3 Deterioration of water quality.

Climate changes expected to exacerbate the degradation of water quality include reduced rainfall, prolonged drought periods, increased heavy rainfall events, rising water temperatures (linked to air temperature increases), rising sea levels, and low runoff levels predicted for future periods. The relationship of the aforementioned phenomena to the deterioration of water quality is described in chapter 3.1.2.3 of this Report.

We note that the GB of Cyprus, which are already in poor condition (Six out of a total of 22) are considered more vulnerable to the impacts of climate change.

According to the UNFCCC Report, surface water quality is expected to be moderately to significantly impacted by climate change, while groundwater quality is anticipated to be highly to critically highly affected.

3.2.2.4 Increase in frequency and severity of droughts.

According to the Revised DMP (2016), the agricultural sector is the first to be affected by drought due to its strong dependence on soil moisture. If reduced rainfall persists, other sectors reliant on various water resources, such as surface and groundwater, will also be impacted. Conversely, agriculture is the first sector to recover after the end of a drought, as soil moisture replenishes quickly, while other sectors may take months or even years to recover, depending on the intensity of the phenomenon.

According to the climate change projections, as presented above, the frequency and duration of drought periods are expected to increase.

Climate change and extreme temperatures are expected to significantly impact crops, such as tomatoes, vines, and olives, which have growth cycles during the summer. On the other hand, crops grown during autumn-winter, such as potatoes, barley, and wheat, will partially avoid harsh summer conditions, but will still be significantly affected by rainfall deficits.

3.2.2.5 Infrastructure.

Most of Cyprus' critical water management infrastructure is located near coastal areas, including desalination plants, wastewater treatment plants, and tertiary water treatment plants.

According to the UNFCCC Report, climate factors likely to impact infrastructure (including water management systems) in the future include extreme weather events, particularly heavy rainfall, rising sea levels, floods, and wind speed. Heavy rainfall affects all types of infrastructure due to flood risks, land subsidence, and structural collapse. The impacts on infrastructure are expected to primarily result in physical damage and operational disruption.

As noted in the UNFCCC Report, there is insufficient scientific data to assess or correlate all impacts and indicators related to future climate change. Further research is needed to provide more detailed and descriptive vulnerability assessments of the infrastructure sector to climate change.

As stated in the Revised DMP (2016), the direct risks to desalination plants from climate change arise from the rise in sea level and the increase in wave action. Additionally, the risks that may result from the need for increased production of desalinated water in Cyprus' energy balance should also be examined.

As mentioned in the UNFCCC Report, the rise in sea level will affect the operational and maintenance costs of critical infrastructure, and new investments will be required to maintain their functionality. For example, an average sea level rise of 58 cm, which is projected by the end of the century (RCP8.5), would result in an additional annual cost of over €4.3 million.

Nevertheless, a future vulnerability assessment of infrastructure to climate change highlighted risks of damage from floods (urban and coastal) and damage due to landslides, as summarized in the table below.

Table 3: Comprehensive assessment of infrastructure vulnerability to climate change

Impact	Sensitivity	Exposure	Adaptive Capacity	Vulnerability
Damage from urban floods	Moderate to high	High	Moderate	Limited to moderate
Damage from coastal floods	Limited	Very high	Limited to moderate	Limited
Damage from landslides	Limited	Limited	Limited	Not assessable due to limited data

Source: Cyprus Eighth National Communication and Fifth Biennial Report under the United Nations Framework Convention on Climate Change, Department of Environment, 2023.

As noted in the UNFCCC Report, in order to reduce the impacts of flooding, the government has undertaken a series of protective measures, including but not limited to the following:

a. Coastal protection works (to safeguard against coastal flooding).

b. Fishing shelters and artificial reefs (to protect against coastal flooding).

c. Dams (to protect against urban flooding).

d. Sustainable urban drainage systems (to protect against urban flooding).

However, as noted, due to a lack of sufficient data on future climate change impacts on Cyprus' infrastructure, an analysis of the effectiveness of the currently implemented measures, as well as the need for additional measures to protect infrastructure, could not be conducted. Therefore, UNFCCC Report recommends further research on this matter.

We asked the Ministry of ARDE to inform us if it has conducted an assessment of the effectiveness of the already implemented measures and whether it has identified the need for additional measures to protect infrastructure from the expected impacts of climate change, particularly critical infrastructure, in order to ensure the maintenance of their functionality. However, we did not receive any update.

3.2.3 General Conclusions.

The expected impacts of climate change in Cyprus include rising temperatures, an increase in the frequency and duration of droughts and flooding. These phenomena are anticipated to reduce further the availability and quality of natural water resources (both groundwater and surface water), which, being already scarce, are more vulnerable. Particularly vulnerable to the impacts of climate change are the Communities and farmers in the mountainous areas, who are not served by the GWWs and use private boreholes to meet their needs. Additionally, farmers in coastal areas are also highly vulnerable due to the increased risks of seawater intrusion into coastal aquifers. Finally, rising sea levels and flooding (both urban and coastal) pose increased risks of physical damage to infrastructure, leading to the need of additional financial resources for maintaining their functionality.

3.3 To what extent has the RoC identified and assessed climate change risks on water resources?

To answer the above question, we conducted a review of various reports, policies, and strategies that serve as tools for the management and monitoring of water resources in Cyprus, and we assessed the extent to which the government, through the aforementioned, has identified and evaluated the risks of climate change to water resources.

3.3.1 Introduction

Identifying and assessing climate change risks to Cyprus's water resources is of utmost importance, as it provides a critical tool for designing the appropriate adaptation measures. This offers key information to stakeholders for strategic planning and prioritization of adaptation measures in line with available resources, ensuring water sufficiency (quantity) and safety (quality). Additionally, it facilitates the development of strategies to counter extreme weather events, such as floods and droughts, reducing

their impacts on people and infrastructure. Accurate risk assessment also supports policy development for economic stability, given that climate change effects on water resources may impact many sectors of the economy, including agriculture and tourism.

We set below an overview of the potential risks that climate change poses to water resources, as mentioned in the Climate Change Risk Assessment Report, issued in August 2016. This report identifies and assesses the risks that climate change poses to Cyprus's water resources, evaluating both their impact and likelihood of occurrence.

Additionally, we refer to reports that serve as tools for strategy development and water resource management in Cyprus, which include general references to risk assessment and the impacts of climate change on water resources, however they do not include an evaluation of the likelihood of occurrence and potential impact of these risks. In addition, some of them are outdated and need to be updated to reflect current developments arising from climate change.

3.3.2 Climate Change Risk Assessment Report for Cyprus (2016)

The Cyprus Climate Change Risk Assessment (2016), assessed specific risks posed by climate change on the water resources of Cyprus and determined the impact and probability of their occurrence. This report presents the potential risks posed by climate change up to the end of the 21st century. The findings, particularly those related to risks that require timely action, aim to inform and support the development of adaptation plans by the Government and relevant Authorities, ensuring the effective implementation of the Decision No. 1313/2013/EU of the European Parliament and of the Council on a Union Civil Protection Mechanism.

Due to the long period of time that has elapsed since its preparation, the aforementioned report is now considered outdated and needs to be updated.

The report focuses, among other areas, on the following sectors, related to Cyprus's water resources.

3.3.2.1 Agricultural Economy - Irrigation Water Supply:

This section indicates that, increased evapotranspiration and reduced rainfall contribute to higher demand for irrigation water. Additionally, it states that irrigation water shortages may increase due to climate change, directly impacting agricultural production and income.

The report identifies the following risks related to the agricultural economy due to climate change:

- Deficit in irrigation water supply.
- Increased risk of damage from drought/loss of productivity.

To address water scarcity in Cyprus's irrigation sector, the use of non-conventional water resources, such as recycling, is promoted. Recycled water is increasingly used for irrigation puposes and the replenishment of aquifers. Additionally, the use of smart irrigation systems area is promoted to curb excessive water waste.

According to the report, the potential increase in irrigation water demand was estimated based on various scenarios. Projections took into account an ongoing action plan for predicting the overall irrigation demand aimed at reducing water use in irrigation through changes in cultivation practices and improvements in irrigation management plans. The anticipated water savings from these actions can offset projected increases across different scenarios. Thus, in water balance calculations, the total effect is estimated to be neutral, with future average irrigation demand expected to remain stable at approximately 143 million m^3 annually.

3.3.2.2 Natural Environment – Significant Drought Periods and Productivity Loss:

Cyprus faces significant drought and water scarcity periods, which are expected to worsen with climate change, resulting in desertification in many areas. Climate change is anticipated to increase the pressure on Cyprus's natural resources, which are already under strain due to the country's semi-arid climate conditions. Consequently, adverse impacts on water availability are expected, with subsequent effects on water dependent ecosystems, flora and fauna species.

Increased water demand has led to the construction of dams since 1900 and severe over-extraction of groundwater resources. The desertification of various regions, resulting from severe droughts and water scarcity, has led to extensive tree loss, as recorded after the 2005-2008 drought.

The report acknowledges that understanding the direct and indirect impacts of climate change on the natural environment is challenging due to a high degree of uncertainty. Regarding the impacts on water resources, it identifies the following risks:

- Increased soil moisture deficits and drought.
- Prolonged drought periods, impact on water quantity and increased societal water demand.
- Higher risk of drought damage/loss of productivity.

3.3.2.3 Built Environment and Infrastructure – Drinking Water Supply:

The built environment encompasses constructions, mainly buildings and their surroundings, including infrastructure, which impact water resources. Despite national water policy projections indicating no expected shortages in drinking water supply, even under the worst-case scenario, this entails a high water supply cost for the public, businesses, and industry due to increased reliance on desalination, which in turn, negatively impacts the carbon footprint. Additionally, those involved in agriculture or

tourism are likely to be more affected by climate change's impact on water resources, as their activities are constrained by water scacity and the higher costs associated with water supply. This is because increased drinking water needs reduce available water for irrigation purposes.

The risks identified in this sector are as follows:

- Higher water supply cost due to increased reliance on desalinated water.
- Reduction in available quantities, and consequently, in water supply for irrigation purposes.

3.3.2.4 Businesses and Industry

a. Businesses, Industry, and Services (excluding the tourism industry)

- **Water Supply:** According to the Water Sector Report, industry accounts for only 1% of total water demand. Therefore, any increase in demand due to climate change would insignificantly affect the water balance. However, the business and industry sector may face higher water cost due to increased reliance on desalinated water. Thus, climate change could lead to higher water costs and indirectly affect the food and beverage industry.

b. Tourism

- **Water Supply:** Tourism accounts for 18% of annual drinking water demand. The report suggests that, water demand per tourist is not expected to show greater sensitivity compared to domestic demand, as tourists demand appears consistently high and is not influenced by temperature, which affect water demand in tourist resorts, mainly due to the increased irrigation of green spaces. However, a significant factor in annual water demand increase, due to climate change, would be the extension of the tourist season due to longer periods of favorable temperatures for coastal tourism. The reports notes that the risk of drinking water demand (for industry and tourism) is mitigated by Cyprus's capacity to adapt drinking water supply primarily through the use of desalination plants. Nevertheless, the increased operation of desalinisation plants raises energy demand and consequently greenhouse gases emissions, unless renewable energy sources are used.

The risks identified in relation to this sector include:

- Deficit in irrigation water supply.
- Higher water supply cost due to increased reliance on desalinated water.
- Increased risk of drought damage /loss of productivity.

We summarize below the risks identified in the Climate Change Risk Assessment Report for Cyprus for the periods up to 2050 and 2080, taking into account the medium (RCP4.5) and high (RCP8.5)

greenhouse gas emission scenarios. These risks are associated with climate change impacts on water resources in the aforementioned areas, for which the impact (positive/negative) and the likehood (confidence) of occurrence are specified.

Table 4: Risks of climate change impacts on water resources for the time periods up to 2050 and 2080.

Metric Code	Metric Name	Confidence	2050		2080	
			RCP 4.5	RCP.8.5	RCP 4.5	RCP.8.5
W3	Irrigation supply deficit	L	1	2	2	3
FO3	Increased risk of drought damage / loss of productivity	M	2	3	3	3
BD8	Increased soil moisture deficits and drought	M	1	1	2	3
BD9	Major drought periods, impact on water quantity and increased societal water demand	M	2	2	3	3
W2	Higher cost of water supply due to increased desalination	L	2	2	3	3

Consequence:
1. Negative – Low consequence
2. Negative – Medium consequence
3. Negative – High consequence

Confidence:
L – Low
M – Medium
H - High

Source: The Cyprus Climate Change Risk Assessment Evidence-*Report*.

Finally, the fact that the above report, which thoroughly addresses the risks that climate change poses to water resources, has not been updated since 2016 may increase the risk of inadequate design and implementation of more effective measures and policies. These policies are necessary to address potential changes in the impacts of already recognized risks, as well as new risks that may emerge, and their likelihood of occurring. These changes stem from current conditions and the ongoing impacts of climate change on water resources.

Moreover, continuous monitoring and reassessment of the risks that climate change poses to water resources is becoming increasingly critical, especially as detailed in Question 1 of our Report, which notes that, in Cyprus, all indicators related to extreme temperatures have shown an upward trend in recent decades. At the same time, according to Cyprus's water balance for 2009–2022, it appears that natural water resources in Cyprus are insufficient to meet water demands in most years. Additionally, there has been an increase in water demand of 10.7% between 2019 and 2023.

Audit Office Recommendation: The DE needs to update the Climate Change Risk Assessment Report in order to identify potential new risks associated with the impacts of climate change and/or to revise the measurements and impacts of previously identified risks. Moreover, as a good practice, the risk assessment should be reviewed periodically to enhance its effectiveness, and, if necessary, re-

evaluated when new data become available. Also, monitoring should be adjusted according to the level of exposure of each risk. For instance, a risk with high negative impact and likelihood of occurrence requires active management and should be continuously monitored and reviewed.

3.3.3 Eighth National Communication and Fifth Biennial Report of Cyprus under the United Nations Framework Convention on Climate Change (2023)

This Report was prepared in the context of the UNFCCC, as reaffirmed by UNFCCC decision 2/CP.17 and constitutes the Eighth National Communication (NC8) providing a comprehensive overview of Cyprus's climate change-related activities. Chapter 6 of the Report addresses, among other areas, the vulnerability assessment of Cyprus' water resources to climate change.

Future Vulnerability Assessment: According to the Report, the future vulnerability of water resources due to climate change impacts is assessed based on their sensitivity, exposure and adaptive capacity, and covers the following categories of impacts:

a. Water Availability: The sensitivity and exposure related to water availability under climate change impacts are assessed based on the runoff/inflow sensitivity to rainfall variations in dams. High sensitivity of surface water and high exposure of groundwater resources to climate change are noted in Cyprus.

As noted, the challenges Cyprus faces meeting water demand, whether for drinking or other uses such as agriculture, tourism, and industry, highlight the sensitivity of water resources to climate change. Already stressed water resources are considered more vulnerable to climate change. The projected decrease in precipitation and increase in evapotranspiration due to future temperature rises will negatively impact the water availability, while demand growth driven by population increase and the rising living standards adds an additional pressure on the already limited water resources. Taking into consideration the above, water availability is considered to have very high sensitivity and very high exposure to both current and future climate changes.

- **Adaptive Capacity Assessment:**

To address the challenges in water availability arising climate change impacts various adaptation measures, plans, and water projects have been implemented or are planned for implementation. According to the Report, many of the adopted measures have already contributed to mitigate the water scarcity issues, and thus the future adaptive capacity in terms of water availability for domestic use is considered high to very high in lowland and coastal areas, while in mountainous areas it is considered limited to moderate. On the other hand, Cyprus' future adaptive capacity in terms of irrigation water availability in lowland coastal areas is characterized as moderate, and in mountainous areas, limited to moderate, as the measures implemented in this sector have not yet yielded the desired results in meeting irrigation water demand.

b. Quality of water resource: Taking into account factors such as reduced water flows that make water resources more vulnerable to eutrophication and stratification, the Report assessed that surface water resources have moderate to high sensitivity to pollution resulting from the impact of climate change, while GB show high to very high sensitivity.

♦ **Assessment of Adaptive Capacity:**

Considering the implementation of the WFD, the program of measures, and other legislation that contribute to the protection and reduction of water pollution, it has been estimated that the future adaptive capacity of water quality to climate change is moderate for surface water and limited to moderate for groundwater.

c. Droughts: Cyprus, with very limited water resources, is vulnerable to droughts having exploited the majority of its natural water resources, with most of its aquifers depleted and lacking rivers with continuous flow. According to the Report, the maximum period of consecutive drought days per year is expected to increase by 10-12 days annually compared to the reference period 1961-1990, indicating that Cyprus' future exposure to droughts is anticipated to be very high.

♦ **Assessment of Adaptive Capacity:**

Cyprus has significantly enhanced its adaptive capacity to address droughts by adopting the EU's guidelines on water and drought management through the preparation of DMPs. However, it is noted that, these plans and policies developed need to be implemented and tested over time to demonstrate their effectiveness under drought conditions. Therefore, Cyprus' future adaptive capacity to droughts is considered moderate.

Below is a summary table that illustrates the future vulnerability of Cyprus' water resources to climate change concerning sensitivity, exposure, and adaptive capacity:

Table 5: Overall future vulnerability assessment Cyprus's water resources to climate change.

Impact		Sensitivity	Exposure	Adaptive Capacity	Vulnerability
Water availability for domestic use	in urban areas	Very high	Very high	High to Very high	Limited
	in mountain areas	Very high	Very high	Limited to Moderate	High
Water availability for irrigation	in plain & coastal areas	Very high	Very high	Moderate	Moderate to High
	in mountain areas	Very high	Very high	Limited to Moderate	High
Water quality	of surface water bodies	Moderate to High	Limited to Moderate	Moderate	None
	of groundwater bodies	High to Very high	High to Very high	Limited to Moderate	Moderate to High
Droughts		Very high	Very high	Moderate	Moderate to High

Source: Cyprus Eighth National Communication & Fifth Biennial Report - under the United Nations Framework Convention on Climate Change (p.216) – Department of Environment.

3.3.4 National Strategy for Climate Change Adaptation (2017)

To start with, the National Strategy for Climate Change Adaption, identifies the impacts of climate change on water resources, particularly on water availability. However, it does not specifically address the risks or quantify the likelihood and impact of their occurrence. Instead, it generally indicates risks that affect both the quantity and quality of water resources.

To fulfill Cyprus' international and European obligations, the Ministry of ARDE, through the DE, assumed the coordination of efforts to develop and implement the National Strategy for Climate Change Adaptation. This Strategy, prepared by the DE in April 2017, highlights the seriousness of climate change impacts on the most vulnerable regions in Europe, particularly Southern Europe and the Mediterranean basin. Additionally, it indicates that mountainous areas, islands, coastal and urban regions, and densely populated floodplains face particular challenges. Given its location to Mediterranean Sea, Cyprus's has a mild Mediterranean climate characterized by hot, dry summers and rainy but mild winters. During the 20th and early 21st centuries, Cyprus' climate, especially regarding rainfall and temperature, has shown considerable fluctuations and trends. Similar fluctuations and trends have also been observed in countries of the EMME, indicating a broader climate shift in the region.

The aforesaid report dedicates a separate chapter to the assessment of the impacts of climate change on Cyprus' water resources, highlighting their adaptive capacity and vulnerability. It notes that water resources are directly linked to the climate, since the hydrological cycle depends significantly on climatic factors. Therefore, Cyprus' water resources are considered vulnerable to climate change, due to the semi-arid climate that characterizes the country.

According to the Strategy, changes in temperature, rainfall distribution, and evaporation affect water availability. Additionally, fluctuations in rainfall volume influence river flow and groundwater recharge rates. The climate also impacts soil moisture and, subsequently the infiltration of water into GB, while extreme weather events, such as heavy rainfall and floods, hinder water storage, resulting in substantial losses. Furthermore, rising water temperatures and prolonged drought periods worsen water pollution, and sea level rise threatens coastal water bodies with salinization.

We note that the DE, through the European Commission's technical support instrument, is in the process of revising and updating the National Strategy for Climate Change Adaptation. This project, which began in November 2023, is being carried out by international and local experts with the aim of strengthening national adaptive capacity to climate change.

3.3.5 Strategic Study for Water Management and Drought Response (2019)

At the outset, it is important to note that the strategy outlined here aims to identify the impacts of climate change on water resources, considering both the availability and quality of water bodies. However, it does not specifically address the associated risks, nor does it define the potential impact or the likelihood of their occurrence

In its Decision No. 85.018 dated 10.5.2018, the Council of Ministers authorized the Minister of Agriculture, Rural Development, and Environment to take all necessary actions to prepare a Strategic Study for Water Management and Drought Response. Accordingly, the WDD proceeded with the preparation of this study, which was approved by the Council of Ministers on 5.6.2019. Based on the proposal to the Council, the WDD updated the strategy to address additional challenges posed by climate change and increasing water demand through the optimal management of water resources.
The Strategy set forth m of extreme weather events, such as droughts and floods.

Audit Office Recommendation: The Ministry of ARDE should promptly inform the Council of Ministers regarding the failure to submit the Strategic Study for Water Management and Drought Response for environmental assessment and ensure compliance with the obligations set forth by the relevant legislation requiring the preparation of SEIA.

3.3.6 Third Cyprus River Basin Management Plan or Water Management Plan (2023)

This Plan acknowledges the need to promote sustainable water use and take appropriate measures, considering the impacts of climate change, not only to protect but also to improve the surface and GB in light of continuous pressures, though without specific reference to risks, impact assessment or likelihood of those risks occurring.

The WFD, fully transposed into Cyprus' national legislation by the Protection and Management of Water Law (L.13(I)/2004), establishes the framework for water management at the European level. According to L.13(I)/2004, Ministry of ARDE is the competent Authority responsible for implementing the WFD provisions and assumes all related obligations, except for developing the measures program and the RBMP, which are coordinated by the competent Authority and approved by the Council of Ministers. The Directive mandates appropriate measures to promote sustainable water use and protect or improve the condition of surface and GB.

A river basin is typically defined as a geographic area where all runoff is collected through a series of streams, rivers, and potentially lakes, ultimately discharging into the sea through a single river mouth, estuary, or delta. Smaller basins may be grouped to form a river basin area. Cyprus represents such a case, and the Management Plan is implemented for the river basin area of Cyprus.

The third RBMP was approved by the Council of Ministers on 8.11.2023 and serves as a revision of the second RBMP (2016-2021), which was approved by the Council on 7.10.2016. The Water Management Plan is a strategic document outlining the objectives for the status of water bodies at the river basin area level, and the necessary measures and actions planned to achieve these objectives. According to Directive 2000/60/EC, water management and plan development are on-going, with six-year cycles.

The Program of Measures, a distinct chapter of the third RBMP, includes the essential measures specified in Article 11(3) of the WFD and, where necessary, supplementary measures. These additional measures are to be adopted when the basic measures are insufficient to achieve the objectives. The program was developed based, among other considerations, on the general policy for climate change adaptation, incorporating actions for this purpose.

Additionally, the aforesaid Plan includes actions and targets for each water body, with summary tables covering 238 water bodies (170 rivers, 15 reservoirs, eight lakes, 22 coastal water bodies, and 22 groundwater aquifers). These tables provide information on the status of the water bodies (ecological status/potential and chemical status for surface waters, and quantitative and chemical status for groundwater), their classification, and the targets set according their condition, as well as recommended management measures. Regarding lakes (natural lakes that are brackish, saline, or hypersaline, and reservoirs), their classification according to ecological status/potential has not yet been achieved, while in terms of their chemical status most are classified below good. Moreover, in line with the WFD provisions, the overall status of GB is deemed good only when both their quantitative and qualitative (chemical) status is classified as such. According to an evaluation study results, the status of 14 out of 22 GB in Cyprus is classified as poor status.

3.3.7 National Energy and Climate Plan (NECP) (2020)

The European Green Deal sets out EU wide targets for achieving climate neutrality by 2050 and reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. Cyprus' NECP outlines a detailed roadmap for energy and climate issues to meet specific energy and climate targets by 2030. It was approved by the Council of Ministers on 15.1.2020 and also submitted to the European Commission on 21.1.2020, while a draft update was submitted on 27.7.2023. This plan does not include extensive references to the impacts of climate change on Cyprus' water resources, nor does it identify risks for which the impact and probability of occurrence are determined, but only refers to the impacts of water scarcity and reduced rainfall.

We note that the European Commission has decided to initiate an infringement procedure by sending a Letter of formal notice to Cyprus (INFR2024/2254) due to the failure to submit the final updated NECP by 30 June 2024.

3.3.8 Water Policy Report (2011)

The Report - aimed at the optimal water resource management, particularly regarding water demand, the performance of major water projects and linking of water development with sustainability principles - was approved by the Council of Ministers on 9.6.2011. The proposals in the Report aimed to balance supply and demand, including environmental needs, and to ensure that drinking water is provided to all areas under the effective control of the Republic of Cyprus. The Water Policy Report includes a quantitative and qualitative analysis of available water resources and management proposals for each related sector (water demand management, groundwater aquifers, dams, desalination plants, recycled water), considering the need to adapt to climate change.

Although the report references certain risks affecting water resources, such as the potential climate change impact on dams' evaporation, it does not extensively discuss climate change effects. It is noted that climate change considerations in evaporation estimates, takes into account the following climate factors: (a) temperature increase, (b) corresponding increase in relative humidity, and (c) wind speed increase. Based on these factors, scenarios were developed to calculate average annual evaporation rates. It is also mentioned that climate change impacts in the Eastern Mediterranean lead to reduced rainfall. In the chapter "Climate Change Control," specifically concerning the Southern Pipeline project, it is noted that the climate change impacts on dam inflows are almost certain to increase variability of inflows and possibly reduction in the average inflow, while the increase in evaporation due to temperature rise is estimated to be too small have practical significance.

In conclusion, the Water Policy Report requires updating with recent information or data, to clearly outline the risks and impacts of climate change on water resources, not only due to the worsening climate effects observed in recent years but also because over 13 years have passed since its approval. It should be noted that the WDD has initiated the process of updating the report.

Audit Office Recommendation: The WDD should proceed as soon as possible with the revision/update of the Water Policy Report to align it to current conditions, data, and developments, including those arising from climate change. This will facilitate both the identification and appropriate assessment of all climate change risks to water resources, related to increasing needs and the decreasing water resources, and will support the timely planning and implementation of appropriate measures.

3.3.9 Revised Drought Management Plan (2016)

The 2nd Revised DMP was published in September 2024. Considering that our audit for this specific chapter of the Report had already been completed prior to the above date, we refer to the 1st Revised DMP for the response to the third audit question. We also note that during the audit, we requested a draft of the 2nd Revised DMP, which was not provided.

The RDMP outlines the expected climate changes in Cyprus and the impacts on country' s water resources, without specifying the likelihood or the precise impact of these changes.

According to the above Plan, drought is a recurring climate phenomenon characterized by temporary water shortages relative to normal supply over an extended period (seasonal, yearly or spanning several years). It differs from other natural disasters in three main aspects:

- It affects far more people than any other natural disaster,
- it is a phenomenon that evolves silently, making it challenging to determine its beginning and end, while its effects accumulate gradually over time and may persist for many years after it ends, and
- its social impacts are less visible (it does not result in infrastructure destruction) and extend over much larger geographic areas compared to other natural disasters (such as floods or earthquakes).

RDMP are crucial to the effective, efficient, and sustainable management of water resources and are an integral part of Water Policy. They also aim to quantify drought through an indicator system that allows for early detection and supports effective management to mitigate the adverse effects of the phenomenon. Among other considerations, they define the percentage of total dam capacity at the end of the inflow period, which signals the need for irrigation restrictions, adjustments to desalinated water production, and management of the replenishment of downstream aquifers. The 1st RDMP, developed in 2016 and the 2nd RDMP eight years later.

The possible climate changes and their main effects, noted in the Plan, are summarized below:

a. Increase in air temperature results in increased evaporation and transpiration.

b. Increase in evapotranspiration reduces runoff in the hydrological network, results in a quantitative reduction, and leads to salinization of groundwater due to reduced infiltration.

c. Droughts and decrease in rainfall lead to increased water scarcity, higher water pollution due to reduced dilution of pollutants, and thus greater concentrations of contaminants.

d. Intense rainfall events result in flooding and increased runoff.

e. Rising sea levels cause salinization of coastal aquifers.

Audit Office Recommendation: The WDD should complete promptly the update of the DMP as soon as possible to reflect the new data emerging from climate change, enabling more effective management of the Cyprus' s limited water resources.

3.3.10 General Conclusions.

Climate change leads to increased temperatures, changes in rainfall patterns, drought, water scarcity, and evaporation, all of which negatively impact the availability of water resources.

In the Climate Change Risk Assessment Report for Cyprus, specific risks to the country's water resources posed by climate change are evaluated, detailing the impact and probability of their occurrence across different scenarios. Cyprus's Eighth National Communication and Fifth Biennial Report under the UNFCCC, assesses the vulnerability of Cyprus's water resources to climate change and their adaptive capacity to its impacts.

The other reports examined in this chapter, which include national plans, strategies, and policies, make general or specific references to risks, without identifying their precise impact or likelihood of occurrence.

Below is a summary of the risks identified from the above reports related to the impacts of climate change on Cyprus's water resources:

a. Risk to the quantitative status of surface and GB.

b. Risk to the qualitative (chemical) status of water, including salinization.

c. Risk of insufficient water storage in dams, one of the main water sources, leading to inadequate water availability.

3.4 To what extent has the RoC taken measures to manage climate risks to water resources through climate change adaptation actions?

To answer the above question, we recorded and evaluated the actions that have been promoted over time for the development of water infrastructure such as dams, desalination plants, wastewater treatment plants and boreholes. Additionally, we evaluated the government's pricing policy as a tool for encouraging sustainable management of water resources, as well as the degree of implementation of the plans and strategies that were developed.

3.4.1 To what extent have the actions taken by the RoC contributed to climate change adaptation with regard to water resources?

3.4.1.1 General.

Cyprus has historically faced a serious problem of water scarcity and has implemented measures to address it. The problem has been exacerbated by climate change, but it is very difficult, if not impossible, to distinguish the government's actions aimed at addressing general water scarcity from those specifically targeting to address the impacts of climate change.

As stated in the Strategic Plan of the Ministry of ARDE for 2024–2026, to address the water issue, significant water development infrastructure projects have been implemented over recent decades for domestic water supply, irrigation, and other uses, such as dams and wastewater treatment facilities. Additionally, since 1997, five desalination plants[35] have been constructed to reduce dependency on rainfall for providing drinking water to major urban and tourist centers. These plants play a significant role in meeting domestic water supply needs and operate under long-term contracts. Furthermore, significant projects for utilising recycled water produced by urban sewerage board's wastewater treatment facilities are being implemented and operated.

According to the World Bank Report for 2018, titled "Securing Potable Water Supply under Extreme Scarcity: Lessons and Perspectives from the Republic of Cyprus", a revised pricing policy, including, among others, higher consumption fees, would send a stronger signal to consumers about the true value of water - which is essential in a country suffering from extreme water scarcity. A similar observation was included in a Special Report issued by our Office in 2016 regarding the management of Cyprus's water resources.

A country's water balance, defined as the difference (positive, negative, or neutral) between water demand (water needs) and the available water supply, is significantly affected by climate change, which causes changes in climatic conditions and hydrological cycle as mentioned in greater detail in Chapters

[35] The Paphos Desalination Plant, which began operations in 2021, has been completely destroyed following a fire in December 2024.

4.1 and 4.2 of this Report. An imbalance in the water balance can impact agricultural production, domestic water supply, and industrial activity. To address these challenges, it is necessary to design sustainable water management strategies, such as increasing water use efficiency, utilising alternative sources and implementing climate change adaptation policies.

For calculating the water balance, the WDD considers the available water resources in Cyprus, which include: (a) the surface water bodies/dams (with a total capacity of 332 million m^3), (b) the production of desalination plants (with a total nominal capacity of 86 million m^3 per year), (c) the recycled tertiary-treated water from wastewater treatment facilities (in areas with irrigation networks for utilising recycled water), and (d) groundwater resources.

For the evaluation of the government's actions regarding the management of risks to water resources from climate change and adaptatiing to it, we considered, in relation the to supply side, actions concerning the above-mentioned available water sources, and, in relation to the demand side, the pricing policy.

3.4.1.2 Government Dams.

a. Introduction.

According to data from the WDD, Cyprus currently has 108 reservoirs and dams with a total capacity of 332 million m^3 of water, 56 of which are registered in the International Commission on Large Dams (ICOLD) list, of which Cyprus has been a member since 1969. In Cyprus there are no hydroelectric dams, because the economically exploitable hydroelectric potential is minimal, however, due to the altitude water is transferred by gravity over long distances, such as the water from Kouris Dam, which is transferred to the Kokkinochoria area.

The dams serve the needs of irrigation and domestic water supply; however, due to reduced rainfall, a decline in water levels and the degradation of the quality of most groundwater resources, domestic water supply needs are also supplemented by desalination plants.

The large dams in Cyprus are included in four GWWs, the Southern Conveyor System, the Paphos GWW, the Polis Chrysochous GWW and the Nicosia GWW. The dams within each GWW are interconnected. However, we found that there is no possibility of connecting the above GWWs, except for the connection of the Arminou Dam, with the Southern Conveyor System, via the Diarizos Diversion Tunnel, which limits the plans for utilising the available water reserves.

The map below shows the main dams and their connection to the GWWs.

Figure 3: Map of Cyprus with the major dams and their connection to the GWWs.

Source: [Water Development Department, 2021.]

As outlined below, dams in Cyprus play a crucial role in storing water used to meet domestic and irrigation needs, particularly through the Southern Conveyor System. However, reduced rainfall, prolonged droughts and the degradation of underground aquifers, because of climate change, make it imperative to enhance water reserves through desalination plants and optimise the management of all available water resources. Furthermore, the fragmented management of reservoirs and irrigation storage tanks hampers efforts to achieve optimal efficiency and cost-effectiveness. Finally, although evaporation is a significant cause of water loss and despite the successful application of pilot solutions to limit it, such as the placement of floating membranes and photovoltaics, the implementation of these measures has not been adequately expanded.

b. Management of Reservoirs and Irrigation storage tanks.

The management of water resources is fragmented, as 14 reservoirs and 25 irrigation storage tanks, with a total capacity of 3,540 million m^3 and 2,466 million m^3, respectively, are still managed by the Ministry of Interior. We noted that the integrated management of water resources can contribute to the equitable distribution of water to irrigators, the reduction of management costs, and the provision of comprehensive information to the WDD, which enhances rational decision-making.

Audit Office Recommendation: For the purposes of unified management of water resources, the WDD, in collaboration with the Ministries of ARDE and Interior, should consider, within the framework of economy, efficiency and effectiveness, the possibility of undertaking the management of all reservoirs/water reserves to it.

c. Southern Conveyor System

The Southern Conveyor System is the largest water project in Cyprus, designed to transport water from eight large dams with a total capacity of 189.45 million m^3 to meet the domestic water and irrigation needs of Nicosia, Limassol, Larnaca, and Famagusta district. The 110-kilometer-long pipeline connects the Kouris, Kalavasos, Lefkara, and Arminou dams.

d. Water Storage in Dams

(i) **Capacity.** The total capacity of Cyprus's major dams included in the water balance amounts to 291 million m^3.

(ii) **Average Water Storage.** The average volume of water stored in all dams on October 1[36] each year, from 1988 to 2021, was 106,8 million m^3, while the respective average volume for dams connected to the Southern Conveyor System, was 62,9 million m^3.

(iii) **Average Water Inflow into Dams.** The average annual water inflow into all dams during the hydrological years 1988 to 2021[37] was 83,8 million m^3. Over the past five years (2019–2023), the average inflow increased to 127,9 million m^3 per year. However, water inflows present significant and unpredictable fluctuations from year to year, with the highest recorded inflow (265 million m^3) occurring during the hydrological year 2018–2019, a fact that complicates long-term water resource management planning.

(iv) **Average Annual Water Allocation.** The average annual volume of water allocated from the dams between 1991 - 2022 was 35 million m^3 for irrigation purposes and 27,2 million m^3 for domestic water supply purposes.

According to WDD, the preparation and implementation of annual water allocation scenarios is a critical tool for demand management, that evaluates the water balance and allocates the available GWWs' water resources across all uses. The key principles guiding water allocation, are, on one hand ensuring the full satisfaction of domestic water needs without any cuts, utilising existing desalination plants and dam reserves and on the other hand, meeting irrigation needs to the extent allowed by dam reserves, while maintaining the minimum necessary safety reserves.

[36] The hydrological year refers to the period from October 1 to September 30.

[37] Latest available data.

For 2024, the WDD has proposed reduced irrigation allocations from GWWs, compared to 2023, due to low water reserves in the dams.

(v) **Evaporation/Loss Rate.** Water losses due to evaporation depend on various factors, including the surface area of the reservoir, the altitude of the dam, temperature, wind speed, and rainfall. The daily evaporation of water at 11 dams is measured using specialised instruments, whilst at other dams, where such instruments, are not available, this is measured based on data from the Department of Meteorology. According to the WDD's data, the water evaporated in 2023, from the 18 dams for which there is available data, amounted to 14,2 million m^3, compared to 18 million m^3 in 2022.

Evaporation from dams and reservoirs is one of the primary causes of water loss. According to the Strategic Study for Water Management and Drought Mitigation (WDD, 2019), Cyprus' long periods of sunshine result in significant water losses from dams and reservoirs, estimated at 8% of their storage capacity. The study also notes that past attempts to reduce evaporation using various methods were unsuccessful. However, the pilot project implemented at the recycled water reservoir "Moni 2" involving the placement of a special floating elastic membrane, demonstrated positive effects in reducing evaporation (although without precise measurements) and controlling algae, as reduced sunlight hindered their growth.

It is worth noting that photovoltaic systems have also been installed on the membrane at the same reservoir, although they have not yet been connected to generate electricity.

We asked the WDD to inform us whether they intend to apply these new technological methods on a larger scale to limit evaporation and why the photovoltaic systems installed at the "Moni 2" reservoir have not been connected to produce electricity. However, the WDD did not inform us in this respect.

Audit Office Recommendation: The application of new technologies should be considered, such as the installation of floating photovoltaic systems on dams and reservoirs, which can reduce evaporation, conserve water, and generate electricity to reduce operating costs. Additionally, a unified approach to managing water reserves in dams would positively contribute to the sustainable management of water resources in Cyprus.

3.4.1.3 Desalination plants

a. General.

The prolonged droughts in Cyprus have rendered water reserves in dams insufficient for long-term planning to meet domestic water needs. Consequently, five desalination plants have been constructed to Dhekelia, Larnaca, Limassol–Episkopi, Vasilikos–Electricity Authority of Cyprus and Paphos. The

Paphos plant was destroyed by a fire on December 6, 2024. The total production capacity of these plants was 235.000 m^3 of water per day, with a minimum contractual daily supply of 211.500 m^3 or 77,2 million m^3 annually.

The desalination plants at Dhekelia and Larnaca contribute significantly to meeting a large portion of the domestic water needs in the districts of Nicosia, Larnaca, and Famagusta, with a total annual minimum contractual production of 39,4 million m^3. The Limassol desalination plant (Episkopi) covers a significant part of Limassol district's water needs, while the Vasilikos–Electricity Authority of Cyprus contribute for covering the needs of a smaller area of Limassol and a larger area of Larnaca and the Famagusta districts. The total annual minimum contractual production of the two desalination plants amount to 32,9 million m^3. The Paphos plant contributed significantly to Paphos district's water needs, with an annual minimum contractual production of 4,9 million m^3.

As our review was completed before the destruction of the Paphos plant the data presented in this Report are based on the situation prior to the fire. According to recent announcements by the RoC, the free provision of mobile desalination pants has been secured, which are expected to be operational soon, covering the gap in needs that arose from the aforementioned disaster.

Annex IX summarizes key information on the costs and production capacities of the five desalination plants.

Four out of the five desalination plants (Dhekelia, Larnaca, Episkopi, and Paphos) were built using the self-financing method following procurement by WDD, with the most recent desalination plant being that of Paphos, which began operation in 2021. Investors cover construction and operational costs for 20–25 years and the government guarantees the purchase of a minimum annual quantity of water.

All plants, powered by conventional fuels, supply water to the government at a fixed price that includes capital costs, operational and maintenance expenses and energy costs. This price is adjusted for fluctuations in fuel and electricity prices and increases in labor costs.

Contracts for all desalination plants, except that of Vasilikos for which there is only a provision for operational cessation, include provisions for reduced production or temporary suspension, with the plants maintained in standby mode following WDD instructions. This provision can be applied during periods of heavy rainfall, when domestic water needs can be met entirely or partially with stored dam water, which is much cheaper to treat than desalinated water.

According to the detailed data listed in Annex IX, actual water production increased by 23% in 2023 (61,8 million m^3 compared to 50,3 million m^3 in 2021), while production costs rose by 64% due to increased energy prices. Meanwhile, standby costs decreased by 18%.

It is important to note the fact that all desalination plants are highly energy-intensive, resulting in significant pollutant emissions, which conflict with measures to mitigate climate change.

As evident, desalination plants are a crucial solution for meeting Cyprus's domestic water needs, especially during drought conditions, considering that the storage capacity of dams and the significant annual variation in rainfall levels hinder long-term planning. However, incidents such as the recent destruction of the Paphos plant highlight that exclusive reliance on these plants should be avoided and that the government should be able to cover domestic water needs promptly through alternative means, as well as the importance of appropriate water management planning. Furthermore, the high energy consumption of desalination plants increases costs while also contributing negatively to higher emissions.

Additionally, there are significant discrepancies in production costs between desalination plants and, due to the large number of units and their capacities, some operate with reduced production or are placed on standby mode. Nevertheless, the DMP determines the amount of water that can be extracted from all the dams in a given year and, consequently, the time period and quantities of water that must be produced by desalination units, without specifying which units should operate and which should remain on a standby mode.

Weaknesses are also identified regarding the implementation of the DMP, as decisions by the Council of Ministers regarding water distribution are still often made with delays. For example, in 2017, the relevant decision was taken in November, and in 2021, the consumption of an additional 1.908 million cubic meters of irrigation water, due to prolonged drought and high temperatures, was approved retroactively in September 2022. Furthermore, in April 2021, water reserves in the dams were 159 million cubic meters, with a projected extraction of 55 million cubic meters; however, the total consumption reached 62,6 million cubic meters (7,6 million cubic meters more). Additionally, excesses are still observed for the two major water projects, namely the Southern Conveyor and Paphos projects, both in terms of the quantity approved by the Council of Ministers for extraction and the quantity ultimately consumed.

(b) Coverage of domestic water needs by desalination plants

The production capacity of desalination plants is sufficient to cover over 100% of the daily domestic water needs of areas served by the Southern Conveyor System, which has a daily maximum demand of 160.000 m^3 of water, excluding Limassol district needs, that are not fully covered by the Episkopi plant, since the plant's daily water capacity is 40.000 m^3, while the respective water demand during summer period can reach up to 45.000 m^3.

The WDD informed us that it plans to increase the capacity of the Episkopi plant and to establish a new desalination plant which will be built at the eastern part of the city, with capacity of 60.000 m^3 per day,

with an option to increase it by an additional 20.000 m^3 per day. Similar to the other desalination plants, the new plant will be a joint project between public and private sector.

The WDD also informed us that, for technical reasons, it is neither feasible nor cost-effective to meet all of Cyprus's domestic water needs through desalination, especially for remote Communities far from urban centers and at high altitudes, thus efforts have focused on meeting the needs of urban and peri-urban areas. This underscores the critical importance of managing groundwater resources in communities that cannot rely on recycled water to meet their needs.

(c) Contribution of desalination plants during drought periods

The table below illustrates the contribution of desalination plants during drought periods.

Table 6: Contribution of desalination plants by climatic conditions (2016–2022)

Period with:	Year	Consumption from SCPS (MCM/year)	Water Production from Desalination Plants (MCM/year)	Contribution to Consumption (%)
Years with Severe Drought	2016	77,4	62,9	81
	2017	81,5	65,3	80
	2018	82,7	66,1	80
	2019	80,7	54,8	68
Year with Rainfall	2020	77,1	29,6	38
	2021	81,0	48,8	60
	2022	85,9	50,5	59

Source: Water Development Department data.

As shown above, during periods of severe drought (2016–2018), the contribution of desalination plants to cover domestic water needs rose up to 81% of the total consumption, while, conversely, during periods of adequate rainfall (e.g. 2020), this contribution decreased to 38%.

Although the contribution of desalination plants plays a critical role during drought periods and diminishes during rainfall periods, we observed that the inadequate implementation of the DMP and its delayed revision, resulted in an increased reliance on these plants, leading to higher costs and reduced efficiency. It is worth noting that DMP's target was to quantify drought conditions through an indicator system that would enable early detection of droughts and support effective management to mitigate the adverse effects of the phenomenon. Among other things, the Plan defined the percentage of the total quantity of water stored in dams at the end of the inflow period, that would trigger the need for irrigation restrictions, the cessation or resumption of desalinated water production and the opportunity of recharging downstream aquifers.

Regarding the distribution of water reserves, we have observed the following:

(i) **Large dams' reserves indicators.** Maintaining adequate water reserves period in Cyprus' two major water projects (Southern Conveyor and Paphos), before the start of the drought, is crucial to minimize the cuts in water extractions that will inevitably be imposed during drought conditions.

Based on the inflows to the dams and the water reserves on April 1st (when the inflows for the hydrological year are complete in the dams of the Integrated System of the Southern Conveyor (ISSC) and Paphos), relevant tables are prepared that characterize the drought and forecast corresponding actions, such as the extent of reductions and extraction capacities from the dams. These tables, which are separate for each water project (ISSC and Paphos), have been consolidated into one, presented below:

Table 7: Categorization of the ISSC and Paphos Project Reservoir Indicators

Integrated Southern Conveyor System		Paphos Project		Category Characterization	Action Characterization
Storage April 1st	**Extraction for the year (million m^3)**	**Storage April 1st**	**Extraction for the year (million m^3)**		
>120 εκ.	55	>40 εκ.	17	Adequate	No reductions
100 - 120 εκ.	44	25 - 40 εκ.	14	Mildly deficient	Small reductions
80 - 100 εκ.	35	15 - 25 εκ.	10	Moderately deficient	Moderate reductions
50 - 80 εκ.	25	10 - 15 εκ.	7	Severely deficient	Significant reductions
<50 εκ	15	<10 εκ	4	Extremely deficient	Very significant reductions

Source: Final Report - Review (October 2016) of the Drought Management Plan.

In relation to the above, we examined whether the aforementioned indicators are considered in the General Water Policy, which includes the policy for the distribution of water reserves by usage and region, based on Council of Ministers' Decisions.

The following tables present the water reserves in the dams of the two major water projects (ISSC and Paphos) in April of each year, Council of Minsters' approvals for extraction, and the quantity that was ultimately consumed, in relation to the reserve indicators defined based on the drought conditions.

Table 8: Water Reserves in the ISSC Dams and Council of Minsters' Decisions

Year	Dam reserves (April 30)	Projected extraction based on DMP reserve indicators*	Council of Ministers' Approval	Difference between Approval and projected extraction	Actual extracted	Difference between actual and projected axtraction
	million m^3	million m^3	million m^3	million m^3	million m^3	million m^3
2023	142	55	52	-3.00	57.8	2.80
2022	176.3	55	59.5	4.50	58.3	3.30
2021	159	55	50.5	-4.50	62.6	7.60
2020	210	55	77.5	22.50	71.5	16.50
2019	176.5	55	49.9	-5.10	44.1	-10.90
2018	37	15	20.6	5.60	25.6	10.60
2017	51.7	25	25	0.00	26.4	1.40

*Revised DMP, October 2016.

Source: Water Development Department, 2024.

Regarding the ISSC, we found that during the period from 2017 to 2023, there was an excess both in the quantity approved and ultimately consumed, compared to the quantity determined based on the reserve indicators outlined above. Specifically, in 2020, the proposal for the projected extraction exceeded the forecasted quantity by 22,5 million m^3, and that same year, the consumption exceeded the projected extraction by 16,5 million m^3, based on the relevant indicators. Although 2020 was considered a year of rainfall, we believe that both the proposal for extraction of that quantity and the respective approval should have remained within the limits set by the established indicators, as the following years could potentially have been characterized by a drought period.

Table 9: Reservoirs in the Paphos Project dam and Council of Ministers' Decisions.

PAPHOS PROJECT						
Year	**Dam reserves (April 30)**	**Projected extraction based on DMP reserve indicators***	**Council of Ministers' Approval**	**Difference between Approval and projected extraction**	**Actual extracted**	**Difference between actual and projected axtraction**
	million m^3	million m^3	million m^3	million m^3	million m^3	million m^3
2023	59,9	17	**18,4**	**1,40**	**18,9**	**1,90**
2022	73,9	17	**17,3**	**0,30**	**18,8**	**1,80**
2021	61	17	**16,8**	-0,20	**16,9**	-0,10
2020	76,3	17	**18,7**	**1,70**	**16**	-1,00
2019	74,9	17	**18,6**	**1,60**	**16,8**	-0,20
2018	24,2	10	**12,7**	**2,70**	**13,9**	**3,90**
2017	32,5	14	**16,3**	**2,30**	**15,8**	**1,80**

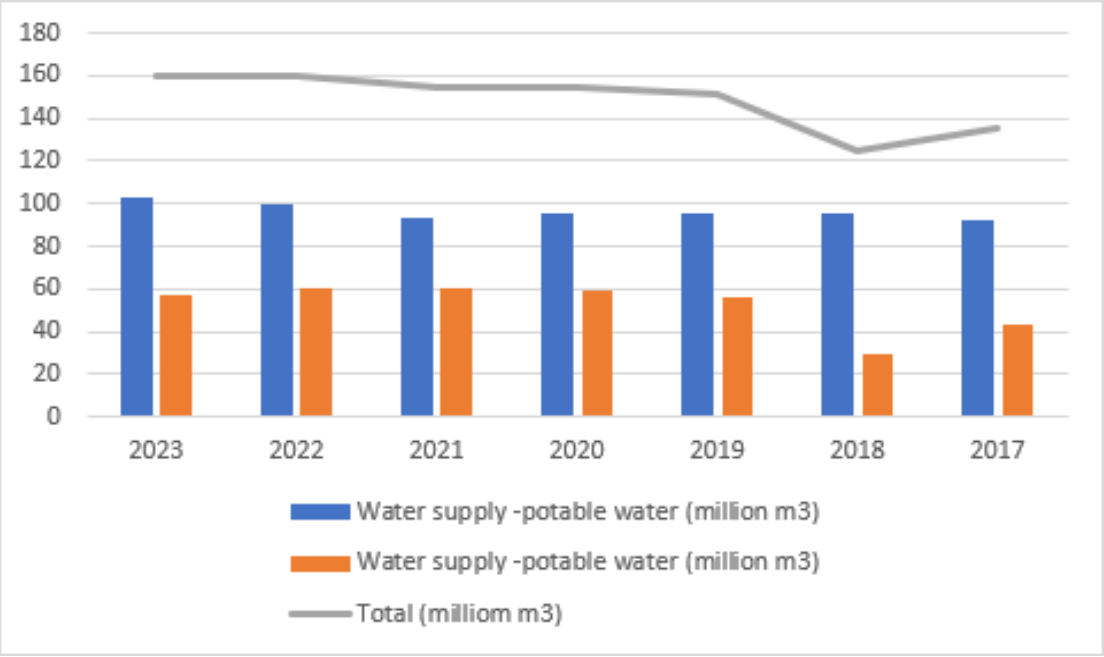
*Revised DMP, October 2016.

Source: Water Development Department, 2024.

Similarly, though to a lesser extent, deviations were observed both in the proposed and approved quantities for withdrawal from the Paphos Project dams by the Council of Ministers, as well as in the quantities that were eventually consumed, compared to the quantities set based on the aforementioned reservoir indicators. Specifically, in 2017 and 2018, the proposed withdrawal exceeded the expected quantity by 2,3 million m^3 and 2,7 million m^3, respectively, while the consumption in those same years surpassed the proposed withdrawal by 1,8 million m^3 and 3,9 million m^3, respectively.

(ii) Council of Ministers' Decisions on the allocation of water reserves by use and region. The planning for the allocation of water reserves for the year is prepared by the WDD and approved by the Council of Ministers, after considering the opinions of the AWMC. Below are the decisions made by the Council of Ministers from 2017 to 2023 regarding the allocation of water reserves by use and region. Additionally, a chart is presented showing the course of water reserves allocation during this period for drinking water and irrigation.

Diagram 13: Allocation of water reserves – Council of Ministers' Decisions 2017-2023



Source: Data from the Water Development Department.

d. Operating model of desalination plants.

As mentioned above, the DMP defines the time period and the quantities of water that must be produced by the desalination plants, but it does not specify which units should operate and which should remain on a standby mode. We believe that a comprehensive plan, which would take into account both the needs and production costs, could reduce expenses while ensuring water sufficiency.

However, to make this feasible, it is essential that the WDD's plants for interconnecting all desalination plants with water supply systems are completed.

Specifically, the WDD entered into an agreement for the purchase of water from the desalination plant of the Electricity Authority of Cyprus in Vasilikos before the construction of the necessary infrastructure to transport potable water to the water supply networks. As a result, the majority of the desalinated water is directed to the Southern Conveyor System, where it either ends up at the Tersefanou refinery plant for processing, or is used for irrigation, or is stored in dams. We emphasized the importance of ensuring the implementation of all the necessary infrastructures required for the smooth operation of the waterworks, so that when the desalination plants operate, the produced water, which is already significantly more expensive than that from the dams, is directed, whenever possible, directly to the domestic water supply systen, to avoid the cost of further refinery.

We found that despite the fact that approximately eight years have passed, the necessary infrastructure to transport potable water produced by the desalination plants to the domestic water supply networks has still not been constructed, resulting in the majority of the desalinated water continuing to be directed to the Southern Conveyor System, thus creating the need for re-refinery.

In our Special Report in 2016, we highlighted the importance of connecting the desalination plants to the domestic water supply systems for optimal management and mentioned, among other things, that the operation of the then planned pipeline from Vasilikos (Choirokitia section) to Nicosia, along with the full operation of the Larnaca desalination plant, would reduce the need for production from the Dhekelia plant and would cover a large portion of the needs of the Larnaca, Nicosia, and free Famagusta regions. However, we found that the aforementioned project has been under construction since 2016, while it has been included in co-financed projects, initially for the 2014–2020 programming period and then as a bridging project for the 2021–2027 Thaleia Operational Program. Moreover, Phase A of the project consists of ten sub-projects, some of which have been completed or are ongoing, while others are pending due to expropriations. Phase B has been designed and is scheduled to be completed by 2029.

Regarding the overall management of potable water production sources, the WDD has promoted the construction of a new refinery plant in Choirokitia and the replacement of the Choirokitia – Famagusta pipeline.

e. Risk Management.

The greatest risk threatening the operation of a desalination plant is the pollution of the marine area from which water is drawn and the absorption of this water into the plant's membranes, as this would render the unit inoperative for an extended period. All plants are equipped with monitoring systems and in the event of pollution, they halt its intake into the plant until the issue of marine pollution is resolved.

Due to the aforementioned measure, it is considered unlikely that a desalination plant will experience prolonged inactivity due to marine pollution. However, short-term production interruptions cannot be ruled out. According to the Department, in the past three years, no pollution has been observed in the marine area from which the desalination plants draw water. Furthermore, the WDD addresses short-term production interruptions by diverting water for potable use to the affected areas from other sources, such as other desalination and treatment plants, or boreholes. For this reason, even during periods when desalination plants are fully operational, the Department ensures that refinery plants operate simultaneously or are at least maintained in a functional state. If their operation is interrupted, it would take several hours, potentially even days, for them to resume, posing a risk of large areas facing a shortage of potable water. For the same reason, during periods when production from desalination plants decreases, the Department prefers to operate as many plants as possible with reduced production, as it takes several weeks to bring a unit back into full operation if it is placed on a standby mode.

Therefore, alternative water production sources for addressing emergency situations, such as the recent destruction of the desalination plant in Paphos, are of critical importance, especially during the summer months when water demand is elevated. In this context, it is essential to maintain sufficient strategic reserves in the dams, which can cover any deficits in production from desalination plants, while treatment plants must remain in a continuously operational state.

Audit Office Recommendation:

(i) The WDD should promote the implementation of technologies that improve efficiency and reduce operational costs of desalination plants and to invest in renewable energy sources (e.g., solar energy) to power these plants, so as to decrease both energy and environmental costs.

(ii) To address temporary urgent needs in cases such as the destruction of the Paphos desalination plant, a strategic plan for handling emergency situations should be developed. For this purpose, the recently acquired mobile desalination plants, through a donation, could be utilized.

(iii) To regularly revise the DMP, to ensure a balanced approach to meeting domestic water supply needs from available water resources and to optimise water management policies.

(iv) WDD should ensure the timely implementation of the projects/actions timelines for connecting the plants to the domestic water supply systems, so that the operational model of the desalination plants can be optimized.

3.4.1.4 Tertiary wastewater treatment

a. General

Recycled water from the tertiary treatment of urban wastewater has been a key irrigation resource in Cyprus since 1998, contributing to the sustainable management of water scarcity and climate change adaptation.

Directive 91/271/EEC on urban wastewater treatment and the National Implementation Program requires the creation of sewer networks and wastewater treatment plants in communities and municipalities (settlements) with an equivalent population (permanent, seasonal, and tourist populations) exceeding 2.000. According to the latest report Cyprus submitted to the European Commission (13th report) regarding the Implementation Program with the reference year 2022, implementation of the above requirement stands at 84.35%. As we elaborate further in Chapter 3.4.2.1(d)(i) of this Report, a letter of formal notice was sent by the European Commission regarding this issue.

In conclusion of the analysis below, the reuse of recycled water is an effective and sustainable manner for meeting irrigation needs and addressing water scarcity, contributing to climate change adaptation. However, as we further analyze below, despite the increase in recycled water production, a substantial portion remains unused or is discharged, while quality deviations of the water produced from many plants hinder optimal utilization.

b. Production and supply of recycled water

The production capacity of recycled water from urban tertiary wastewater treatment plants is 147.820 m^3 per day or 53,9 million m^3 annually. The Limassol district has the highest production capacity, followed by Nicosia. As detailed in Annex X, during 2023 28,2 million m^3 were produced, which corresponds to 52.3% of their total capacity. The fact that the plants do not operate at their full capacity is partly due to the fact that they were designed to meet the peak demand, which, in certain areas, presents significant seasonal fluctuations, mainly due to tourist flows during the summer period. It is also due to the fact that a number of Communities that were scheduled to be connected to the plants have not done so yet, an issue for which a letter of formal notice has been sent to the RoC by the European Commission (special reference is made in Section 3.4.2.1 (d) of this Report), as well as the fact that, even in Communities that have been connected to the plants, a number of consumers have not complied with the obligation to connect to the sewage system.

Of the total recycled water produced in 2023 by the plants, only 62.43% was used for irrigation (of which 14.21% represents unbilled water), due to the lack of necessary infrastructure for storage, transfer, and distribution, resulting in the remainder being discharged either into groundwater for replenishment, or into rivers, or into the sea.

Paphos district shows historically the lowest rate of utilisation of recycled water. Additionally, a significant portion (10%) of the recycled water produced in Limassol and Larnaca districts, ends up into the sea unused.

c. Strategy for utilising recycled water

To maximise the use of recycled water for irrigation, WDD plans to expand and construct new plants. Specifically, it schedules the expansion of the tertiary treatment at the Paralimni–Ayia Napa wastewater treatment plant. Also, it schedules to initiate the studies for the Aradippou–Livadia–Pyla–Oroklini and Episkopi–Trachoni–Ypsonas–Erimi–Kolossi plants, as well the completion of studies for the construction of the Polis Chrysochous plant. Regarding the plants requiring preparation of studies, WDD informed us that, the relevant provisions have been included in the government budget, with timelines set for completion by the end of 2027 and 2029. With regards to the expansion of the tertiary treatment at the Paralimni–Ayia Napa wastewater treatment plant, the WDD informed us that no provisions have been included in the government budget yet, since the completion of the detailed technical evaluation of the project is required first, followed by the preparation of a project concept note to be submitted for approval and evaluation to the Directorate General Growth of the Ministry of Finance. Nevertheless, the current timeline set for the above project involves preparing and submitting the project concept note in 2025, with inclusion in the budget and the start of construction in 2026.

d. Quality of recycled water

As detailed in Annex X, the quality of recycled water is monitored through laboratory analyses, which have shown deviations from acceptable levels at most plants, with those of Larnaca and Vathia Gonia having the most significant issues.

Audit Office Recommendation: WDD should improve the utilization of recycled water, reduce discharges into the sea and strengthen quality control.

3.4.1.5 Groundwater

Climate change impacts groundwater primarily through changes in rainfall, evaporation, and human activities that adapt to new climatic conditions. As a result, monitoring and management of groundwater resources are critical.

The analysis set below indicates that, although relevant legislation and policies have been adopted concerning the management and protection of groundwater, significant gaps remain in monitoring, data collection, and the implementation of measures.

Specifically, issues have been identified in water allocation, borehole monitoring, licensing and installation of water meters. Additionally, excessive use of boreholes by Local Authorities and the lack of data on water consumption further underline the need for comprehensive interventions.

In summary, the lack of complete data and control measures threatens the adequacy and quality of aquifers, undermining efforts to adapt to climate change.

a. Drilling and use of boreholes

(i) Responsible Authority

- **Allocation of available water - Advisory Water Management Committee (AWMC) and integrated water management:**

  According to the Integrated Water Management Law (79(I)/2010), WDD is responsible for managing all water resources. The AWMC advises the Minister of ARDE on water allocation policies.
  From reviewing the AWMC 's minutes for 2020–2024, it was observed that the committee only studies water allocations from GWWs. Consequently, it does not examine the quantities of water extracted for domestic supply by communities (15% of total demand) and water extracted from private boreholes for irrigation, which accounts for 70% of the total irrigation water used, nor reservoirs managed by Irrigation Divisions/Associations under the respective District Officer.

Audit Office Recommendation: The AWMC should comprehensively analyse water allocation, including water sourced from private boreholes or managed by Irrigation Departments.

The WDD informed us, among other things, that the annual water allocation scenario, which is prepared and then approved by the Council of Ministers, applies exclusively to the GWWs. The focus on GWWs is justified partly because these works fall under the responsibility and jurisdiction of WDD, and partly because they allow for immediate, flexible, and efficient control of water withdrawal, distribution, and consumption. In contrast, the supervision of Irrigation Departments falls under the responsibility of the respective District Administration, according to the Irrigation Departments (Villages) Law. Regarding the amounts of water abstracted from private boreholes of the Irrigation Departments, WDD expressed the view that, although these are not included in the annual water allocation scenario, their monitoring is possible through the water abstraction permits, as stipulated in Part VIII of the Unified Water Management Law.

It was also mentioned that the existing procedures for the GWWs provide the necessary flexibility and efficiency, while monitoring of the abstractions from private boreholes through licensing mechanisms is deemed sufficient. The proposal to incorporate all consumption into the annual water allocation scenario should be reconsidered based on a cost-benefit ratio and the practical feasibility of implementation.

Our Audit Office notes that, given that only 85% of total domestic water supply and 30% of total irrigation water supply are covered by the GWWs (as stated in section 3.1.2.2 d of our Report), the

exclusion of these quantities from the scenarios examined by the AWMC should raise concerns, both for the WDD and for the Ministry of ARDE, the AWMC, and the Council of Ministers, as it creates an obstacle to the holistic management of the Republic's water resources. Additionally, we note that the WDD has the responsibility to billing private boreholes, and as such, consumption data should have been readily available to be included in the scenario it submits to AWMC. Regarding the consumption of Irrigation Departments/Associations not connected to the GWWs (i.e., those withdrawing water from reservoirs and other sources managed beyond their private boreholes mentioned above), these could be sent directly by the Ministry of Interior to the WDD, for inclusion in the scenario being examined by AWMC.

- **Authority to issue water extraction licenses:**

  Since the enactment of Law 79(I)/2010 on November 15, 2010, water extraction licenses are issued exclusively by WDD[38].

(ii) Register of Wells/Boreholes

As detailed in Annex XI, the number of licensed boreholes stands at 137.548. Many older licensed boreholes included in this figure have not been recorded on the WDD database.

In addition, a large number of unlicensed and therefore illegal boreholes are in use. Regarding these illegal boreholes, we requested information from the WDD on the following:

- The number of illegal boreholes identified and verified by WDD to date.
- Whether procedures are continuously implemented to detect illegal boreholes.
- Measures and actions taken concerning identified illegal boreholes.
- How many of these cases were referred to the Law Office, and how many resulted in penalties or compliance.

The above remain unanswered.

Audit Office Recommendation: WDD should fully update the borehole register and conduct inspections to determine their operational status.

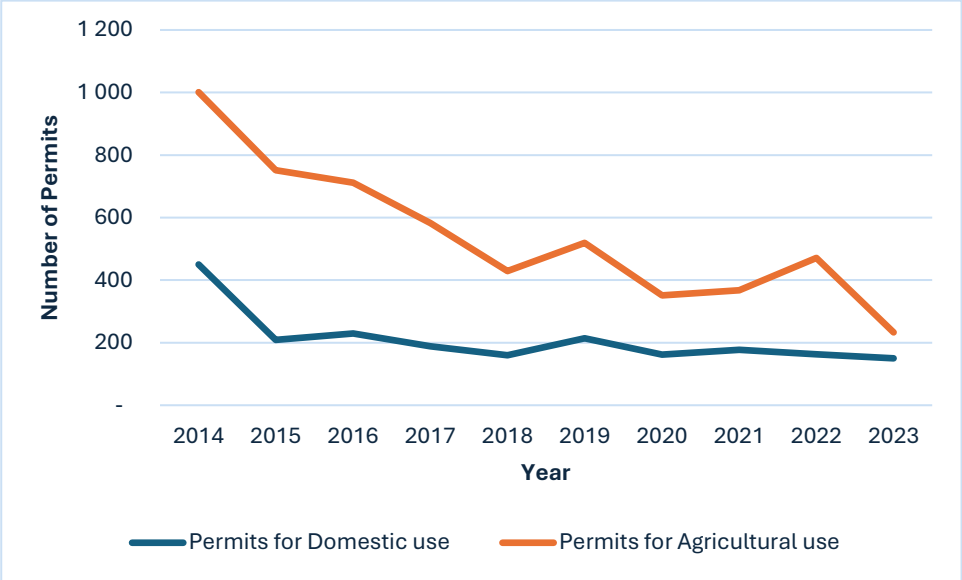
[38] Before the enactment of Law 79(I)/2010, the issuance of licenses for drilling boreholes was carried out by the respective District Officer in accordance with the Wells Law (Cap. 351), which has since been repealed.

(iii) Granting of groundwater work permit and groundwater abstraction permit

Between 2014 and 2023, a reduction in borehole licenses was observed, reaching 67% for domestic use and 77% for agricultural use.

The following chart illustrates the number of licenses for drilling wells/groundwater work permits issued between 2014 and 2023, categorized by type of use:

Diagram 14: Licenses for drilling wells/groundwater work permits



Source: Water Development Department, 2024.

At the same time, excessive water usage from boreholes by Local Authorities has been observed, even when water reserves in dams are available during periods of heavy rainfall, due to the lower cost, without the use of telemetry instruments to detect over-extraction beyond limits per permits.

We found that there is no available data on the total number of water meters installed in Cyprus, as a result, the WDD is unable to ensure compliance with legal provisions regarding the installation and maintenance of water measurement systems. We pointed out that the lack of complete records of all water meters and the absence of defined maximum extraction limits in the WDD's database have negative consequences for the protection of groundwater reservoirs from potential over-extraction, subsequent qualitative degradation, and, consequently, to the efforts for adaption to climate change.

Additionally, as we mention in more detail in chapter 3.4.2.1(d)(i) of this report, the European Commission sent a letter of formal notice to Cyprus on 14.11.2024 because it failed to conduct a periodic review of the various water permits issued, including water abstraction permits.

Audit Office Recommendation: WDD should proceed immediately with the installation of water meters equipped with telemetry instruments, particularly for boreholes operated by Local Authorities

and large consumers, for enabling real-time remote data collection on water consumption, better monitoring and identification of over-extraction beyond limits per permit and the timely adoption of corrective measures.

b. Boreholes used for domestic water supply

(i) General Information: According to data from the WDD, as of 2023, 485 boreholes were operational for domestic water supply purposes, including boreholes drilled by the Geological Survey Department and managed by Local Authorities that provide domestic water. These boreholes are detailed in the table below by district.

Table 10: Boreholes Across Cyprus

District	Number of Boreholes	Relative Percentage
Nicosia	141	29%
Larnaca	36	7%
Limassol	187	39%
Paphos	121	25%
Total	**485**	**100%**

Source: Water Development Department, 2023.

(ii) Adequacy of domestic water in Communities.

We observed that several Communities, particularly in the districts of Nicosia, Limassol, and Paphos, rely exclusively on boreholes and wells to meet their domestic water supply needs. In the district of Larnaca, the mountainous Communities of Agioi Vavatsinias, Vavatsinia, Melini, Ora, and Odou depend solely on boreholes, meanwhile in the free district of Famagusta, all Communities are exclusively supplied by GWWs. The table below presents data on districts rely that on boreholes and/or wells.

Table 11: Districts rely on boreholes and wells

	Community Councils Dependent on:			
District	**Boreholes**	**Wells**	**Boreholes & Wells**	**Total**
Nicosia	55	---	9	**64**
Limassol	63	3	18	**84**
Paphos	14	3	9	**26**
Larnaca	5	---	---	**5**
Total				**179**

Source: Water Development Department, 2024.

Audit Office Recommendation:

(i) WDD should ensure the integrated management of water resources, including private boreholes and irrigation projects,

(ii) update the borehole registry and implement telemetric systems for monitoring water consumption and

(iii) ensure sufficient domestic water for communities which rely on boreholes and wells.

3.4.1.6 Pricing of water services.

a. The role of pricing policies in water resources management.

Water pricing policy plays a significant role in the sustainable management of water resources, the promotion of sustainable consumption and the strengthening of both economic and environmental incentives. Therefore, it can serve as a powerful tool for the government to adapt to the impacts of climate change.

Specifically, an appropriate pricing policy, through which full cost recovery is achieved, communicates the value of water to consumers, promoting its efficient use[39].

Moreover, research supports that a suitable water pricing policy, which takes into account not only full cost recovery for each water service but also local environmental and socio-economic conditions, provides a clear incentive for water users to adopt more efficient water use practices and reduce pollution, thus contributing to the achievement of environmental goals[40]. The European Environment Agency highlights the direct connection between incorrect pricing policies and unsustainable development[41].

Additionally, effective and efficient water pricing systems can be used to generate funds for the construction of necessary infrastructure and provide a solid foundation to ensure that water services are available to all citizens at affordable prices[42]. Research has also linked high levels of unmetered water with low water supply charges, due to the correlation with low investment in the maintenance of local water supply networks[43].

The European Environment Agency noted in 2013[27] that despite the generally prevailing perception of the lack of price elasticity of water demand, consumption appears to respond to changes in pricing policies. Special mention is made of two factors that significantly affect the price elasticity of demand: the quantity of water consumed (large consumers react more to price changes) and the income level of consumers. Specifically, in Cyprus, the price elasticity coefficient of urban water demand ranges from

[39] Full-Cost Water Pricing Guidebook for Sustainable Community Water Systems, CMAP, Sea Grant Illinois-Alabama, University of Illinois, December 2012.

[40] European Environment Agency 2003: Indicator Fact Sheet, (WQ05) Water prices.

[41] European Environment Agency 2013: Technical Report no. 16/2013: Assessment of cost recovery through water pricing.

[42] http://www.oecdobserver.org/news/fullstory.php/aid/939/Pricing_water.html, 13.12.2015.

[43] The Connection between Water Prices and Water Network Efficiency, Research Paper, TaKaDu, 2012.

-0.79 (for the lowest 10% of income) to -0.39 (for the highest 10%). Demand is inelastic for specific urban uses (household consumption) and elastic for others (e.g., garden irrigation and swimming pools).

Furthermore, in a later report by the European Environment Agency[44], it is noted that although water pricing remains the primary tool for ensuring the recovery of the cost of water services, pricing mechanisms in place appear not to be fully effective in managing water demand and reducing consumption. Therefore, increasing water prices remains a key objective in countries with suboptimal cost recovery levels, regardless of goals to reduce water consumption.

b. Legal framework.

According to Article 9 of the WFD, member states shall ensure the recovery of the costs of water services, including environmental and resource costs, while integrating social, environmental, economic, and geographical criteria.

To facilitate the implementation of the provisions of the WFD, the European Commission issued a related guidance document that analyses the available methodologies for estimating the full cost of water services, which is distinguished into financial cost, environmental cost, and resource cost. Financial cost includes capital costs, maintenance costs, operational costs, administrative costs, and other costs. Environmental cost is defined as the cost of environmental damage in terms of opportunity cost (loss of welfare) and resource cost is defined as the opportunity cost of alternative uses of water, due to the reduction of water resources at a rate beyond their natural replenishment rate.

In Cyprus, the current legal framework includes the Pricing and Mechanisms for the Recovery of the Cost of Water Service Regulations (RAA 128/2014), which establish fees to include financial cost, environmental cost, and resource cost, as well as the Uniform Water Management (Rights, Fees, or Other Financial Compensation) Regulations (RAA 48/2017), which define the fees and any financial compensation for the provision of water or for benefiting from water provided or taken, or for any other benefit derived from water in general or from any GWW.

c. Recovery of the cost of water services.

As part of the purchase of service for the development of the third RBMP and the monitoring of the implementation of the program of measures for the implementation of the WFD, a study[45] (hereinafter referred to as the 'study') was conducted, which calculated, among other things, the cost and the cost

[44] Pricing and non-pricing measures for managing water demand in Europe, European Environment Agency 2017.

[45] Economic analysis of water uses – degree of recovery of the cost of water services, Deliverable 4 "Pricing and recovery of the cost of water services", consortium "ECOS Meletitiki A.E., ENM A.E., Lever A.E.", 2023.

recovery rate for water services by the WDD, water service providers and across the entire island. It is noted that the previous relevant study was conducted in 2009.

Detailed information is provided in Annex XII.

(i) Water pricing for domestic water supply.

As mentioned in section 3.1.2.2 (e) of this Report, 85% of the demand for drinking water is covered by the GWWs, and the remaining 15% comes from alternative water supply sources outside the GWWs.

WDD is responsible for supplying drinking water from specific GWWs, which include GWW of the Southern Conveyor System, the Paphos GWW and the GWW of "Chamila Krasochoria". Water is provided to the Local Water Supply Authorities (Municipal Water Supply Councils, Municipalities and Communities) that are connected to these GWWs, which are invoiced by the WDD based on its approved fees. Subsequently, the Local Water Supply Authorities distribute the water to the final consumers through water supply networks under their jurisdiction and charge them based on their own rates.

The supply of drinking water (ie domestic use) to areas outside the GWWs is carried out by Municipalities and Communities that have their own domestic water supply sources (mainly boreholes), which are not connected to the GWWs (see chapter 3.4.1.5(b)).

- **Water pricing from the WDD to water service providers.**

From the review of the data mentioned in the study "Pricing and recovery of the cost of water services", we identified the following:

- The pricing policy of the WDD fails to recover fully the cost of water services for domestic use. The lowest cost recovery rate concerns the Paphos GWW (75,7%), which is the second-largest GWW in Cyprus. The recovery rates for each GWW separately, as well as the average recovery rate for all GWWs in total, are shown in the table below:

Table 12: Domestic Water Supply – Recovery of the cost of water services by the WDD for the years 2016 – 2021.

Service	GWW of Southern Conveyor System	GWW of Paphos	GWW of Chrysochous	Other GWWs	Outside GWWs	Average
Domestic water supply	91,0%[2]	75,7%[2]	N/A	[1]	94,3%	87,1%

[1] It refers to the GWW of "Chamila Krasochoria" (water supply boreholes of the WDD for which no analysis for the recovery of the cost of water service was conducted by the WDD). Water pricing is the same as the Southern Conveyor System and Paphos GWWs.

[2] The analysis covers the period 2017-2021 because data for the year 2016 were not available.

- After a comparison between the water supply cost, provided from each GWW, with the current water fees (see Table 13), based on the RAA 48/2017, we also found that in the case of water supply for domestic use from the Southern Conveyor System, which is the largest GWW in Cyprus, the current pricing policy recovers only 50% of the environmental and resource costs.

Table 13: Domestic Water Supply – Cases where the pricing policy does not cover the environmental and resource costs.

Service		Environmental and resource cost €/m^3	Environmental and resource fees[1] €/m^3
Domestic water supply	Southern Conveyor System GWW	0,10	0,05

[1] Based on RAA 48/2017, RAA 10/2020, RAA 270/2021, RAA 302/2023.

- Water abstraction outside the GWWs for domestic water supply of households and other uses are billed at €0,05/m^3, compared to €0,82/m^3 for water supplied from the GWWs of Southern Conveyor System and Paphos. This fact acts as a disincentive for Communities that use their own boreholes to connect to GWWs. This results in the continued stress on groundwater bodies and creates unequal treatment for their consumers, as compared to those in Communities that are connected to GWWs. Data is provided in Annex XII.

♦ **Water pricing by the water service providers to consumers.**

According to the study[46], the unit cost of providing water supply services for domestic use for water service providers to end consumers, on average based on the years 2016-2021, ranged, per provider within the GWWs, from €0,67/m^3 (Municipalities and communities in the Nicosia district) to €1,94/m^3 (Limassol Water Board). The recovery rate ranged from 93,8% (Municipalities and communities in the Larnaca district) to 233,1% (Municipalities and communities in the Nicosia district). As for the Local Water Supply Authorities outside the GWWs, the corresponding unit cost ranged from €0,85/m^3 (Municipalities and communities in the Nicosia district) to €0,98/m^3 (Municipalities and communities in the Limassol district), while the recovery rate ranged from 74,6% (Municipalities and communities in the Paphos district) to 112,2% (Municipalities and communities in the Nicosia district). On country level, the unit cost of providing water for domestic use by the providers within and outside the GWWs to consumers amounted to €1,513/m^3 (recovery rate of 107,7%). The table below presents the unit cost of providing water for domestic use by the providers within and outside the GWWs, as well as the average across the entire island for the years 2016-2021, according to the study.

Table 14: Unit cost of water services for domestic use and recovery rates by providers within GWWs.

[46] Economic analysis of water uses – degree of recovery of the cost of water services, Deliverable 4 "Pricing and recovery of the cost of water services", consortium "ECOS Meletitiki A.E., ENM A.E., Lever A.E.", 2023.

	Average 2016-2021	
WITHIN GWWs		
SOUTHERN CONVEYOR SYSTEM GWW		
	Total Unit Cost €/ m^3	**Cost Recovery rate**
Limassol Water Board	1,94	107,0%
Limassol Municipalities and Communities	0,89	168,0%
Larnaca Water Board	1,85	108,1%
Larnaca Municipalities and Communities	1,77	93,8%
Nicosia Water Board	1,50	94,1%
Nicosia Municipalities and Communities	0,67	233,1%
Totals for providers within Southern Conveyor System GWW	**1,57**	**106,9%**
PAPHOS GWW		
Paphos Water Board	1,17	170,6%
Paphos Municipalities and Communities	1,11	141,5%
Totals for providers within Paphos GWW	**1,13**	**152,6%**
Totals for providers within GWWs	**1,54**	**109,6%**

Table 15: Unit cost of water services for domestic use and recovery rates by providers outside GWWs.

	Average 2016-2021	
OUTSIDE GWWs		
Municipalities and Communities outside GWWs	**Total Unit Cost €/ m^3**	**Cost Recovery rate**
Limassol	0,98	87,2%
Larnaca	0,91	90,8%
Nicosia	0,85	112,2%
Paphos	0,91	74,6%
Totals for providers outside GWWs	**0,92**	**94,3%**

Table 16: Unit cost of water services for domestic use and recovery rates by providers outside GWWs – Totals across the Country.

	Average 2016-2021	
WITHING AND OUTSIDE GWWs		
	Total Unit Cost €/ m^3	**Cost Recovery rate**
Total cost and cost recovery by providers within and outside GWWs	1,513	107,7%

We draw attention to the fact that the cost recovery rate by WDD for providing water to providers for domestic use on average for the period 2016-2021 was 87,1% (there were no available data for the year 2016), which is lower than the corresponding recovery rate of providers for providing water to the end consumers, which averaged to 107,7%.

Additionally, from the study of the 2022 annual Reports submitted by water service providers to WDD, in accordance with the provisions of RAA 128/2014, we found that there are still disparities in the fees and the frequency of billing, for the supply of water for domestic use across different regions/communities. This issue was also addressed in the 2013 European Environment Agency Report, which noted significant differences in water fees between regions/communities of the European countries examined. According to the referenced report, this is expected in countries where water resource management is delegated to local or regional authorities. The issue was also highlighted in our 2016 Special Report on water resource management.

Annex XII presents, as an example, the pricing of water by ten local water suppliers, as well as data related to the urban Water Boards.

(ii) Water pricing for irrigation water supply.

As mentioned in section 3.1.2.2 (e) of this report, 30% of the irrigation water demand is covered by GWWs and 70% it is provided outside GWWs.

Regarding the supply of irrigation water from GWWs, WDD supplies water from the GWWs of Southern Conveyor System, Paphos, Chrysochou, and other smaller GWWs, to both water service providers and directly to end consumers connected to these GWWs.

The demand for irrigation water in areas outside GWWs is primarily met through abstractions from private boreholes.

♦ **Water pricing from the WDD to consumers and water service providers.**

Regarding this, we observed the following:

- The study records a weakness in the pricing policy of WDD to recover the costs for providing water for irrigation purposes. As shown in the table below, the recovery rates are much lower than those of domestic water supply, and we believe that efforts should be made to improve them.

Table 17: Irrigation Water Supply – Recovery of the cost of water services by the WDD for the years 2016 – 2021.

Service	GWW of Southern Conveyor System	GWW of Paphos	GWW of Chrysochous	Other GWWs	Recycled water
Irrigation water supply	27,6%[1]	39,1%[1]	46,3%	18,1%	22,2%
Sewerage service (secondary treatment of wastewater)	162%				
Recycled water supply (tertiary treatment)	29,4%				

[1] The analysis covers the period 2017-2021 because data for the year 2016 were not available.

- After a comparison between water supply cost with the current water fees, based on the RAA 48/2017 (see Table 18), we also found, the environmental and resource costs are not recovered in the following cases:

  - Supply of irrigation water from the GWWs of the Southern Conveyor System, Paphos and Chrysochous,

  - Supply of recycled water (except in cases of irrigation with recycled water of golf courses) and,

  - Particularly the abstraction of irrigation water from sources outside the GWWs (boreholes, springs, or rivers and aquifers replenished with recycled water), including private green areas, hotel and household gardens, and golf courses.

Table 18: Irrigation Water Supply – Cases where the pricing policy does not cover the environmental and resource costs.

Service		Environmental and resource cost €/m³	Environmental and resource fees[1] €/m³
Irrigation water supply	Southern Conveyor System GWW	0,106	0,02
	GWW of Paphos	0,051	0,02
	GWW of Chrysochous	0,025	0,02
Recycled water supply (tertiary treatment)	To persons involved in agricultural production and irrigation water providers	0,041	0,01
	- To persons for industrial consumption - Irrigation of football and sports grass fields, islands, parks, and other green areas under the jurisdiction of Governmental/Local Authorities - Irrigation of private of football and sports grass fields and private green areas, hotel and residential gardens	0,041	0,02
Irrigation water supply from sources outside GWW (e.g. boreholes)	**i.** For agricultural/livestock use	0,259	0,01
	ii. For other uses:		
	- Football and sports grass fields - Islands, parks, and other green areas under the jurisdiction of Governmental/Local Authorities	0,259	0,02
	- Private green areas, hotel and residential gardens and industry	0,259	0,1
	iii. Golf courses:		
	- From surface sources – licensed private dams	0,259	0,11
	- From aquifers artificially recharged with recycled water	0,259	0,23

[1]Based on RAA 48/2017, RAA 10/2020, RAA 270/2021, RAA 302/2023.

According to the results of the aforementioned study, there is a weakness in the government's pricing policy to contribute to the recovery of the costs of irrigation water supply from the GWWs for agricultural, livestock, and industrial use, which, on average, during the years 2016-2021, amounted to 22.7%, as well as the production and distribution of recycled water, which for the corresponding period

amounted to 29.3%. As a result, this leads to non-compliance by the RoC with the provisions of Article 9 of the WFD.

Audit Office Recommendation: Water, as a basic good, should be available to all citizens of the Republic at a uniform price, to ensure equal treatment of citizens regardless of their place of residence. Therefore, it should be ensured that a fair and uniform distribution of the cost of domestic water supply among consumers across the island is achieved. Furthermore, without disregarding the social aspect of the issue, which is the provision of drinking water at affordable prices to all citizens, water pricing should reflect the true value of water, encouraging its conservation and sustainable management, while reducing pressure on water resources during periods of drought.

3.4.1.7 Conclusion.

In conclusion, the Republic of Cyprus has recognized the challenges imposed by climate change on water resources, given the country's limited water reserves and semi-arid climate. As a result, it has implemented various strategies and measures to address the impacts of climate change on water resources, such as the construction of dams and desalination plants, which ensure a steady supply of domestic water regardless of rainfall and the development of infrastructure for the recycling and reuse of treated wastewater, primarily for agricultural use, reducing pressure on natural water resources.

Dam management has improved water storage and utilisation, although climate change has affected the amount of rainfall flowing into the dams. The development of desalination plants has also significantly contributed towards reducing dependency on water stored in dams, especially during periods of drought. However, the energy requirements of the technology currently used for desalination are high, which raises sustainability concerns. Additionally, the reuse of treated wastewater for irrigation has enhanced the resilience of the agricultural sector to droughts, reducing pressure on natural water resources. However, despite the increase in recycled water produced, a large portion remains unused or is discarded, while there are discrepancies in the quality of water produced by many treatment plants, which prevents its optimal utilization. Additionally, the quantity of the recycled water produced could be further increased if Communities that have not yet done so were to connect to wastewater treatment plants, as well as were the consumers who have not connected to the sewage system, even though they live in Communities that are connected to wastewater treatment plants.

The management of groundwater also presents several weaknesses regarding monitoring and control of water abstraction permits and boreholes. In addition, pricing policy is not applied in a fair and uniform manner that optimally contributes to adapting to climate change.

Strengthening the implementation of sustainable practices and further emphasising on water savings measures and innovative solutions are crucial for addressing future challenges.

3.4.2 To what extent have the Plans and Strategies that were developed been implemented?

3.4.2.1 National Strategy for Climate Change Adaptation (2017) through the Action Plan.

In its Decision No. 82.555, dated 18.5.2017, the Council of Ministers approved the National Strategy for Climate Change Adaptation and the related Action Plan, asking all involved implementing bodies to promote the execution of the planned actions, integrating, where necessary, relevant provisions into their budgets and, where deemed necessary, to assess the related economic impacts as well as the cost-benefit of implementing the actions, in order to confirm the necessity of their implementation.

Additionally, through the same Decision, the Council of Ministers designated the DE as the body responsible for monitoring the implementation of the adaptation measures of the National Strategy and the related Action Plan and the DE was instructed to submit, through the Ministry of ARDE, an annual report including, among other things, the level of implementation of the actions, reasons for any deviations, and recommendations for corrective measures. Furthermore, through a new Decision No. 88.820, dated 15.1.2020, the Council of Ministers decided that the General Directors of Ministries/Deputy Ministries should monitor the implementation of the Climate Change Adaptation Action Plan.

The Action Plan included a total of 57 measures, seven of which were related to the water resources sector and six to the agricultural sector. According to the fourth annual report, these measures increased to ten and eight, respectively. The measures are listed in the table of Annex XIII.

After consultation with the involved bodies, the DE submitted, via the Ministry of ARDE, informative notes, with the relevant annual monitoring reports, to the Council of Ministers for the years 2018-2021 on 28.11.2018 (first), 13.1.2020 (second), 29.3.2021 (third) and 2.11.2022 (fourth), which were approved by the Council of Ministers through its Decisions dated 5.12.2018, 15.1.2020, 31.3.2021, and 15.11.2022, respectively.

We note that the Minister of ARDE classified the informative note dated 29.3.2021 as confidential. Similarly, the relevant Decision dated 31.3.2021 of the Council of Ministers was classified as confidential, and for this reason, its content is not referred to in this report.

Regarding this, we observed the following:

a. Submission of the annual monitoring reports to the Council of Ministers.

(i) The DE has not yet submitted the relevant annual monitoring report for the year 2022 to the Council of Ministers.

(ii) The DE submitted, on 3.10.2023, a draft of the fifth annual monitoring report for the year 2023 to the General Directorate of Environment of the Ministry of ARDE. However, by the date of our audit

completion on 4.12.2024, the Ministry of ARDE had not yet submitted it to the Council of Ministers.

(iii) The DE has not yet begun preparing the sixth annual monitoring report for the year 2024, which should have already been submitted.

b. Monitoring and implementation of the National Strategy for Climate Change Adaptation and the Action Plan.

(i) In the second and fourth informative notes of the DE, it is noted that the degree of implementation of the measures in the Plan was low, and several measures were not mature for implementation. We found that, despite the DE recording its intention to make relevant recommendations to the involved bodies, it did not do so, and neither did the Ministry of ARDE take any action in this regard.

(ii) The informative notes and annual monitoring reports (first, second, and fourth) submitted by the DE through the Ministry of ARDE and approved by the Council of Ministers, did not include the degree of implementation of the measures and the reasons for any deviations, as required by the Decision No. 82.555, dated 18.5.2017 of the Council of Ministers. In this regard, we mention that after the submission of the fifth annual monitoring report by the DE to the Ministry of ARDE on 3.10.2023, which, as noted earlier, has not yet been submitted to the Council of Ministers, the General Directorate of Environment of the Ministry of ARDE requested for the first time from the DE, on 24.11.2023, that the degree of implementation of the measures be presented in the informative note of the fifth annual report, in percentage estimates per Ministry or per issue. The DE, in an email dated 30.4.2024, sent a relevant table to the General Directorate of Environment of the Ministry of ARDE and informed it that, after recontacting all the involved implementing bodies in an attempt to quantify the implementation of the related measures in the strategy, it became clear that for many of them, this was not possible due to the nature of the project/measure or due to the inability of the relevant body to proceed with this assessment. In addition, the DE recommended that the degree of implementation of the measures be stated as 40-50%, although this is not substantiated. Upon reviewing the aforementioned table, we found that the Departments sent incomplete data to the DE, as in many cases they did not include the estimated cost and the percentage of implementation of the measure, nor whether there were small, large, or no deviations as compared to the planning.

Conclusions:

(i) Non-compliance by the DE, the Ministry of ARDE, the involved Ministries/Deputy Ministries, and the other implementing bodies with the relevant decisions of the Council of Ministers.

(ii) Not-adequate monitoring of the implementation of the Strategy and the Action Plan by the DE and the Ministries/Deputy Ministries.

(iii) Not adequate oversight by the Ministry of ARDE of the informative notes prepared by the DE and forwarded to the Council of Ministers.

(iv) Low degree of implementation of the National Strategy for Climate Change Adaptation by the involved bodies.

Audit Office Recommendation:

(i) Compliance of the DE and other competent Ministries/Deputy Ministries with the Council of Ministers' Decisions through the following actions:

- The DE and Ministry of ARDE should submit the monitoring reports to Council of Ministers in a timely manner on an annual basis.
- The competent Ministries/Deputy Ministries should forward to the Department the degree of implementation of the actions, the reasons for any deviations, as well as proposals for corrective measures.

(ii) Monitoring of the implementation of the Strategy and the Action Plan by the DE and the involved Ministries/Deputy Ministries.

(iii) Oversight of the informative notes prepared by the DE and forwarded to the Council of Ministers by the Ministry of ARDE, in relation to the relevant Decisions of the Council of Ministers.

(iv) Adoption of corrective measures to increase the degree of implementation of the Strategy and the Action Plan.

c. Implementation timeline, estimated cost, prioritisation and impact of each measure in the Action Plan.

From the review of the fourth annual monitoring report, the related informative note to the Council of Ministers and the Action Plan, we found the following:

(i) The measures included in the Action Plan are described in a general and vague way (e.g., maintenance and repair of water transport systems/networks and related infrastructure) and are not linked to specific actions for their implementation, which makes it difficult to monitor them. Furthermore, there are no performance indicators for achieving the set objectives.

(ii) In most cases, the field "estimated cost of the measure" included in the annual monitoring report (fourth report) is not filled in.

(iii) No specific timeline for implementation of each measure has been provided, as in the field "implementation time," in most cases, the Departments indicate "continuous", "continuous

(immediate)", "immediate", "immediate and short-term", "short-term", "short-term/medium-term", "medium-term", "medium-term/long-term", "long-term" etc.

(iv) The contribution/impact of each measure in addressing climate change has not been assessed, which would enable the appropriate prioritisation. The prioritisation of the measures was determined based on the significance of the potential risk, rather than the significance of their contribution to addressing the potential risk.

Regarding the implementation and effectiveness of the measures, we requested that the WDD informs us whether the following data are available, so that we can quantify their effectiveness. However we have not received the aforementioned information.

- Measure A1: Water savings achieved in the water transport systems/networks that were repaired, both in terms of quantity and percentage.
- Measure A2:
  - Water consumption by golf courses, tourist facilities, and water-intensive crops in all regions with inadequate water resources for the years 2020–2024, as compared to previous years.
  - Changes that have been effected in licensing criteria and in prohibiting water-intensive developments/facilities and the water savings resulting from these changes.
- Measure A3: Number of residential buildings with efficient household appliances, industrial facilities using water recycling and improved irrigation systems for the years 2020–2024, along with the water savings achieved.
- Measure A4: Quantities of recycled water produced and quantities of recycled water used by category of use for the years 2020–2024.
- Measure A6: The number of new water meters installed for existing users and providers for the years 2020–2024, and the total number of existing water users and providers without meters for the aforementioned years. The automatic systems for centralised collecting and evaluating the measurements of the meters installed during the aforementioned years, for effective monitoring.
- Measure A7: The measures taken to ensure that the provisions of the DMP are applied without deviation (see point 4.4.2.2 (b) below).
- Measure A8: The number of rainwater systems installed within the framework of the Plan, the total number of residences installed the aforementioned systems and the average water savings per system.

- Measure E6: Land areas on which less water-intensive or drought-resistant crops are used during the years 2020–2024, both in terms of quantity (hectares) and as a percentage of total crops.

In this regard, we note that in the draft of the fifth annual monitoring report, dated 3.10.2023, which was sent by the DE to the Ministry of ARDE, the measure 'National Investment Plan for Water Works' was added under the category of water resources.

The national investment plan, which was approved by the Council of Ministers on 3.4.2024, includes water works with a total budget of €1,167,330,000, which are expected to be implemented by 2030.

According to the plan, 60 projects, totaling €445,530,000, are classified as works of second priority. While they fall under the general water policy of the government, either they are not mature or have not secured all the necessary (urban planning, environmental, financial) approvals for their implementation. As we were informed by the WDD, due to the above, these projects were neither included in the 2025 Budget nor in the medium-term fiscal framework (2026-2027).

The implementation of certain works included in the aforementioned National Investment Plan for Water Works, is expected to lead to compliance with the issues raised in the letter of formal notice sent by the European Commission on 19.4.2023 to Cyprus, which we mention below.

Audit Office Recommendation:

(i) The measures included in the Action Plan should be linked to specific, measurable, achievable, relevant, and time-bound implementation actions, which should be monitored with appropriate indicators.

(ii) An estimation of the implementation cost should be carried out for each specific action.

(iii) A specific timeline for the implementation of each action should be determined.

(iv) Each action should be prioritised based on the impact it is expected to have on achieving the objective of the measure and addressing the related risk.

d. Letters of formal notice from the European Commission regarding water resources.

(i) **Letter of formal notice dated 19.04.2023.** On April 19, 2023, the European Commission sent a letter of formal notice to Cyprus for its failure to swiftly and effectively implement the ruling of the Court of Justice of the European Union (EU) of 5 March 2020, concerning the insufficient implementation of Directive 91/271/EEC on the treatment of urban wastewater. To protect the environment and human health, the Directive requires towns and cities to collect and properly treat urban waste water before being discharged into the environment. Specifically, in its judgment, the Court ruled that in 31 agglomerations, Cyprus had not ensure that all urban water was collected nor did it ensure that urban

waste water entering sewage systems was subject to appropriate treatment before being discharged. To comply with the ruling, Cyprus has committed to build collection networks or new treatment plants for all agglomerations. However, this was only implemented in two agglomerations, while the remaining 29 agglomerations still do not comply with EU regulations. Construction works have only started for 13 agglomerations (compliance was expected by the end of 2023), while compliance in the remaining 16 agglomerations is expected to be achieved by 2029. Based on the above, the Commission sent a letter of formal notice under Article 260 of the Treaty on the Functioning of the EU to Cyprus. We note that in the description of the measure "Providing incentives to farmers for the use of recycled water for the irrigation of selected crops" in the Action Plan, among other things, the implementation of strict preventive measures and monitoring of the quality of treated urban wastewater is mentioned, in order to avoid the burden on the environment, public health, and agriculture.

(ii) Letter of formal notice dated 14.11.2024. According to a press release from the European Commission, the latter sent a letter of formal notice to Cyprus on 14.11.2024 for failing to conduct periodic reviews of the various water permits issued in accordance with the WFD. As noted in the letter, in Cyprus, the national legislation does not impose any form of periodic review of the aforementioned permits, as required by the WFD.

In this regard, we note that Articles 11(3)(e) to (h) of the WFD require that each RBMP program of measures include essential actions to control various types of water abstraction, impoundment, point-source discharges, diffuse sources liable to cause pollution, and any other significant adverse impacts on water quality and that Member States are required to periodically review and update these controls in order to ascertain whether the existing measures continue to achieve their objectives.

3.4.2.2 Degree of implementation and monitoring of the 2nd RBMP and the 1st Revised DMP.

As WDD informed us, the above are the most significant plans being implemented concerning Cyprus' adaptation to climate change in relation to water resource management.

Regarding the implementation and monitoring of the 2nd RBMP and the application of the 1st Revised DMP, we note the following:

a. Monitoring and degree of implementation of the 2nd RBMP.

(i) Monitoring of the degree of implementation of the 2nd RBMP.

According to Article 15(3) of the WFD, Member States shall, within three years of the publication of each RBMP, submit an interim report, describing progress in the implementation of the planned program of measures.

Additionally, according to Article 13(4) and Annex VII of the WFD, revisions of the RBMP should include, among other things, an assessment of progress made towards achieving the environmental objectives, including the presentation of monitoring results for the period of the previous plan in in the form of a map, an explanation for any environmental objectives which have not been reached and a summary of any measures foreseen in the previous RBMP that were not implemented, with relevant explanations. The 3rd RBMP includes a summary of the progress made in implementing the measures of the 2nd RBMP.

From a review of the relevant archive documents from the WDD, we found that the Department did not monitor the implementation of the 2nd RBMP on a continuous basis, but only through the purchase of services for the preparation of the interim report in the third year and the revision fo the RBMP in the sixth year of its implementation.

Audit Office Recommendation: The Department should monitor the degree of implementation of the measures included in the RBMP on a more frequent basis, so that it can take appropriate actions in a timely manner to improve the implementation of the plan.

We also draw attention to the risks involved in monitoring the implementation of the Plan solely through the purchase of services, such as the lack of internal expertise and continuous oversight, limited control and dependency on third parties.

(ii) Degree of implementation of the 2nd RBMP.

The program of measures of the 2nd RBMP for the period 2016-2021, included a total of 55 measures, of which 31 were basic measures and 24 were supplementary measures. The table below presents the progress of the implementation of the aforementioned measures according to the 3rd RBMP.

Table 19: Degree of implementation of the Program of Measures of the 2nd RBMP.

	Basic measures		Supplementary measures		Total	
Stage of implementation	**Number**	**%**	**Number**	**%**	**Number**	**%**
Has not started yet	5	16%	1	4%	6	11%
In progress	17	55%	8	33%	25	45%
Completed	9	29%	15	63%	24	44%
Total	**31**	**100%**	**24**	**100%**	**55**	**100%**

Source: Third River Basin Management Plan 2023, p. 377-382.

We have found that the final monitoring of the measures carried out within the context of the preparation of the 3rd RBMP is presented in a summary way and does not include:

- The degree of implementation of each measure.
- References to the implementation of the measures according to their prioritisation, as included in the relevant Program of Measures and carried out based on the economic effectiveness of each measure, which took into account its efficiency rate and the cost of implementation and operation of the measure.
- Comparison with the implementation timeline of the measures.

Audit Office Recommendation: In the context of monitoring each RBMP in force, WDD should calculate the degree of implementation of each measure, and monitor the application of the prioritisation of measures and the related timelines set in the plan.

WDD informed us that the degree of implementation of each measure is already evaluated quantitatively based on the implemented budget.

We note that, although the degree of implementation of each measure was calculated quantitatively in the interim evaluation of the 2nd RBMP, this was not done during its final evaluation.

b. Implementation of the DMP.

The existing DMP, which was published on the WDD website in September 2024, represents the second revision of the first plan, which was developed in 2011 (the first revision was made in 2016). The existing DMP, among other things, evaluated the implementation of the proposals for the management of available water reserves, which were included in the 1st Revised DMP for the GWWs of Southern Conveyor System and Paphos.

According to the aforementioned evaluation, the 2nd DMP was not implemented for managing the available reserves of reservoirs during drought years (2016-2017) in the aforementioned GWWs, as, based on the available reserves, the annual abstractions from the reservoirs were significantly greater than the permissible annual abstraction. As noted in the evaluation, abstractions within the GWW the Southern Conveyor System were higher even in the following two years, when reserves remained at very low levels. A related finding also emerged from our audit, which is extensively discussed in section 3.4.1.3(c)(i) of this report.

The aforementioned evaluation mentions that this temporary and exceptional non-implementation of the Plan in the GWW of the Southern Conveyor System occurred due to reasons related to the broader economic situation of the national economy of the RoC.

As stated in the Plan, the system did not face significant pressure, as the drought event did not continue, both in intensity and duration. Otherwise, there would have been a serious issue in meeting water needs in the following years.

Audit Office Recommendation: The WDD should implement the proposals included in the DMP in force.

3.4.2.3 Conclusion.

Although the RoC proceeded with the development of the National Strategy for Climate Change Adaptation, the degree of implementation by the involved authorities is low, and its monitoring, both by the monitoring body (the DE) and the relevant Ministries/Deputy Ministries, is not sufficient. Furthermore, there was no prioritisation of measures based on impact, the estimated implementation cost was not calculated, no precise timelines were set and the measures were not linked to specific actions to achieve their objective.

In addition, significant plans that were developed based on the WFD and consider climate change in the management of water resources are either not being implemented or their implementation is not adequately monitored.

4. ANNEXES

Annex I - Responsibility of the Audit Office and safeguarding its independence & Institutional framework of the Auditor General's duties

Responsibility of the Audit Office and safeguarding its independence

The Special Reports of the Audit Office present the findings of the audits it conducts on the policies and programs of the Republic of Cyprus or other audited entities, or on issues related to their budgets or specific sectors thereof, as well as the results of audits conducted by private auditors to whom the Audit Office has assigned the audit of accounts of any entity under its oversight, pursuant to the Law on the Submission of Data and Information to the Auditor General of the Republic (Law 113(I)/2002). The Audit Office selects and designs these audit activities in a manner that maximizes impact, taking into account risks to performance or compliance, the level of relevant revenues or expenditures, upcoming developments, and public interest.

The Audit Office's presentation of audit findings is based on the evidence made available to it.

Unless explicitly stated, the absence of findings on certain aspects or issues related to the subject of the audit does not constitute assurance or imply that these aspects are free of weaknesses, errors, or deviations from the applicable regulatory framework, as an external auditor is not expected to identify every weakness, error, or deviation from the applicable regulatory framework.

The Audit Office's recommendations are suggestions on how to address the observations and findings of the audit. Under no circumstances should these recommendations be construed as affecting the independence of the Office as an external auditor or implying its participation in any related decision-making by the management of the audited entity, which remains solely responsible for the proper and lawful decision-making regarding how to address the audit findings and recommendations.

No provision in this Report implies, or should be perceived, that it accuses any individual of deliberate abuse of power or the commission of criminal or other offenses. If such matters exist, they must be investigated by the competent authorities, and only the relevant courts can determine an individual's guilt regarding any offense. It is also emphasized that the recommendations and findings of the Audit Office concern the audited entities, and any reference to other natural or legal persons in no way implies that they have necessarily engaged in any reprehensible, as such matters fall outside the scope of this Report.

Institutional framework of the Auditor General's duties

The audit was conducted within the framework of the constitutional powers of the Auditor General of the Republic and the provisions of the Fiscal Responsibility and Financial Framework Law (Law 20(I)/2014).

Article 116 of the Constitution of the Republic stipulates that the Auditor-General assisted by the Deputy Auditor-General shall, on behalf of the Republic, control all disbursements and receipts and audit and inspect all accounts of moneys and other assets administered, and of liabilities incurred, by or under the authority of the Republic and for this purpose he shall have the right of access to all books, records and returns relating to such accounts and to places where such assets are kept. Additionally, the Auditor-General assisted by the Deputy Auditor-General shall exercise all such other powers and shall perform all such other functions and duties as are conferred or imposed on him by law.

According to Article 81 of the Fiscal Responsibility and Financial Framework Law (Law 20(I)/2014), the Auditor General conducts the external audit of the accounts of the Republic.

In accordance with the Law on Accounting and Fiscal Management and Financial Control of the Republic (Law 38(I)/2014), the controlling officer of each account is required to ensure the correctness and legality of receipts and payments, as well as the effectiveness, efficiency, and economy in the implementation of the respective budget, based on the principles of sound financial management (Articles 7(1) and 8).

To this end, the Audit Office conducts financial and management audits, as well as compliance audits, of Ministries, Departments, and Services of the Public Service and the broader public sector.

The Law on the Provision of Evidence and Information to the Auditor General (Law 113(I)/2002) grants the Auditor General explicit powers to request data in any form, including electronic format, explanations, and information, whether written or oral, which, in his judgment, may assist him in carrying out his work.

Annex II - Methodology

Audit standards

According to Article 81(2) of the Fiscal Responsibility and Financial Framework Law (Law 20(I)/2014), the Auditor General conducts external audits based on internationally recognized auditing standards, as determined by the Auditor General.

As explicitly stated in the Audit Guidelines issued by the Auditor General, the audits conducted by the Audit Office are carried out in accordance with the International Standards of Supreme Audit Institutions (ISSAI) issued by the NTOSAI, which is an autonomous, independent, and non-political Organization with special consultative status with the Economic and Social Council (ECOSOC) of the United Nations.

The ISSAI standards categorize the audits performed by SAIs into three types: financial audits, compliance audits, and performance audits. For these audits, there are standards that apply universally across all types, as well as standards specific to each category of audit.

The conduct of this audit is primarily governed by the provisions of the following Standards:

The fundamental INTOSAI Standard P1 essentially reproduces the Declaration adopted in 1977 by the INTOSAI World Congress in Lima, Peru (the Lima Declaration). As stated within the Standard itself, this document is considered the "Magna Carta" of external government auditing, as it laid the foundation for public audit practices. The Declaration outlines the key aspects of auditing and the fundamental principles for SAIs necessary to achieve independent and objective results. The principles established in the Lima Declaration have been recognized by the UN General Assembly Resolutions No. 66/209 (dated 22 December 2011) and No. 69/228 (dated 19 December 2014). The INTOSAI-P1 Standard, along with INTOSAI-P10 (the Mexico Declaration), forms part of the acquis communautaire.

The ISSAI 100 Standard defines public sector auditing and provides the fundamental concepts, elements, and principles (including both general principles related to auditing and principles specific to the various phases of the audit process) that apply to all public sector audits.

According to ISSAI 200, financial auditing aims to collect sufficient and appropriate evidence to provide reasonable assurance to users of the financial statements, in the form of an audit opinion and/or other report, that the financial statements are presented fairly and/or in compliance with the applicable financial reporting framework and regulatory framework.

According to the provisions of ISSAI 300, the performance audits conducted by Supreme Audit Institutions include the examination of programs, actions, systems and management process, to assess whether the resources allocated are being used economically, efficiently, and effectively. The principle of economy focuses on minimizing the cost of resources, the principle of efficiency examines achieving the maximum possible output from available resources, and the principle of effectiveness evaluates the achievement of the intended objectives. These audits, which also examine the adherence to the principles of sound financial management, cover a wide range of topics and within their framework, various aspects of the process are evaluated, including inputs (the financial, human, material, organizational, or regulatory means necessary for implementation), outputs (the deliverables), outcomes (the effects on direct recipients or beneficiaries), and impact (long-term changes in society).

The ISSAI 400 Standard defines compliance auditing as an independent assessment of whether a specific subject matter conforms to the principles established as audit criteria. These audits aim to evaluate whether the actions of the audited entity align with the principles or rules governing them. Such principles and rules may relate to compliance with the provisions of relevant Laws, Regulations, or agreements, or adherence to the general principles of sound financial management and the conduct expected of public officials. According to the Standard, if compliance audit is conducted as part of a performance audit, then compliance with the established principles and rules is considered one of the parameters of economy, efficiency, and effectiveness, as non-compliance may result in (or justify) the failure to achieve the intended objectives.

The Audit Office conducts environmental audits based on relevant standards and guidelines governing SAI audits issued by INTOSAI. Specifically, these audits are designed and executed based on the provisions of «GUID 5200 - Activities with an Environmental Perspective» and «GUID 5201 - Environmental Auditing in The Context of Financial and Compliance Audits» by INTOSAI.

GUID 5200 provides guidance on the application of INTOSAI Auditing Standards to environmental audits, offers practical assistance in developing methodologies for conducting environmental audits, and suggests approaches for setting audit criteria. As explained in GUID 5200, «Environmental audit is usually defined as a performance audit, or compliance audit, or financial audit that examines the approach taken by competent authorities (e.g., governments) to a specific environmental problem, or environmental policies or programs, as well as their performance in managing environmental issues». It is also clarified that «a Supreme Audit Institution does not need specific

mandates to conduct environmental audits and can perform them under its general authority to conduct performance or compliance audits». In the case of a performance audit (GUID 5200), it is provided that «depending on the subject matter, the economy, efficiency, or effectiveness, i.e., the 3Es (economy, efficiency, effectiveness) of governance and public expenditures can be examined in any of the relevant policy areas», while for a compliance audit (GUID 5201), it is provided that «compliance audit in relation to environmental issues may relate to providing assurance that government activities are conducted in accordance with relevant environmental laws, standards, and policies, both at the national and international (where required) levels». Specifically, GUID 5201 highlights the possibilities of conducting audits with an environmental focus, within the context of financial or compliance audits. Particularly regarding compliance audits, it focuses on examining whether government activities are conducted in accordance with applicable environmental legislation and policies.

Based on the above, the referenced audit is considered as a performance audit with a specialization in environmental issues, which also examined compliance with the applicable regulatory framework.

Audit approach

This audit was based on information provided by the Departments of Water Development, Environment and Meteorology, as well as the Cyprus Institute, the review of documents, registers, correspondence files and reports and conducting meeting with the management and staff of the aforementioned entities.

In selecting the subject of the audit, various evaluation criteria were considered, including the growing societal interest for climate change and the fact that Cyprus has been facing ongoing drought issues for years, the lack of natural surface water systems such as lakes and rivers, had led in the past to excessive exploitation/over-pumping of groundwater, resulting in its deterioration.

After identifying risks that could potentially impact the evaluation of actions promoted by the Republic of Cyprus for water resource management to adapt to climate change, we designed the audit questions and outlined the audit criteria, sources of information and data collection procedures.

The audit covers the period from 2016 to 2023.

The audit findings were forwarded for comments and feedback to the Departments of Water Development and Environment are incorporated as Annex XIV in this Special Report.

We clarify that for the purposes of publishing this Special Report, all references to personal data have been removed. This ensures compliance with the EU 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, without significantly restricting the communication of the findings and conclusions of our Office as required by applicable international standards.

Audit criteria

For the purposes of this performance audit, specific provisions of the following were used as audit criteria, as explicitly referenced in Annex III.

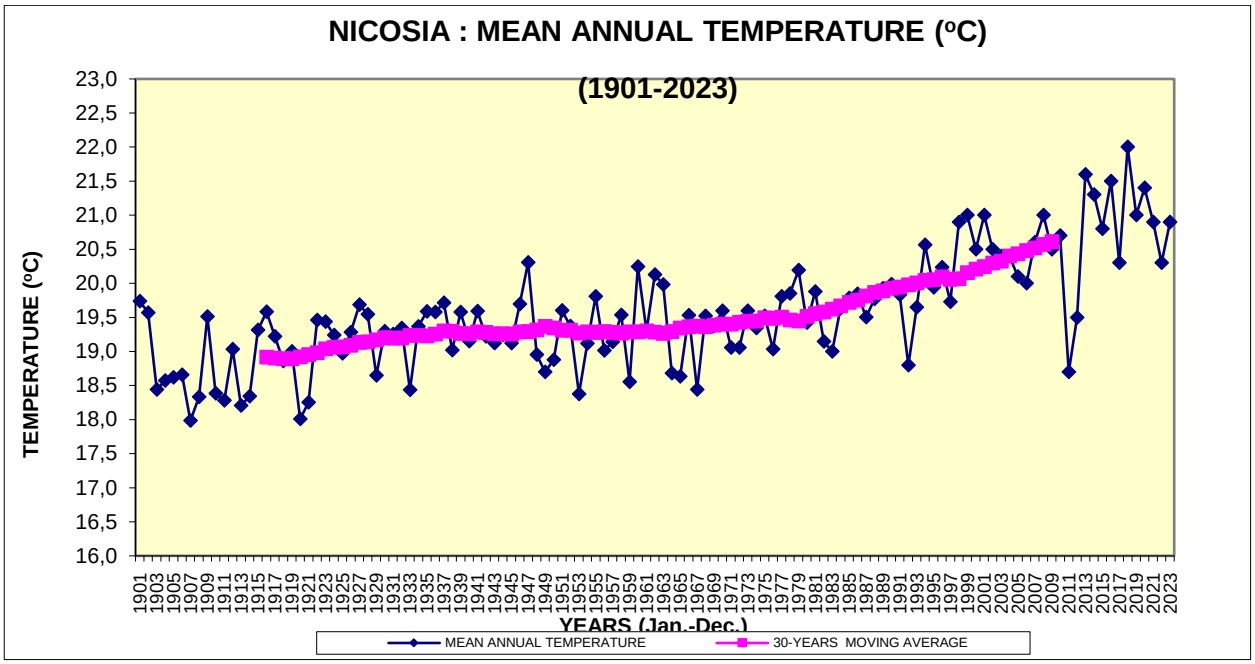
Annex III - Audit criteria

No.	Audit criteria	Audit questions			
		What have been the overall impacts of climate change on the water resources of Cyprus?	What are the expected impacts of climate change on the water resources of Cyprus?	To what extent has the RoC identified and assessed climate change risks on water resources?	To what extent has the RoC taken measures to manage climate risks on water resources through climate change adaption actions
1	Council Directive 91/271/EEC concerning urban waste-water treatment.				√
2	Directive 2000/60/EC establishing a framework for Community action in the field of water policy.				√
3	Directive 2001/42/EC relating to assessment of the certain effects of plans and programmes on the environment.			√	√
4	The Environmental Impact Assessment of Certain Plans and/or Programs Law of 2005 (102(I)/2005).			√	
6	The Integrated Water Management Law (79(I)/2010).	√			√
7	The Wells Law (Cap. 351) – superseded by Law (79(I)/2010).				√
8	Water Policy Report, Water Development Department (2011).	√		√	
9	The Pricing and Mechanisms for the Recovery of the Cost of Water Service Regulations (RAA 128/2014).				√
10	1st Revised Drought Management Plan, Water Development Department, 2016.	√		√	√
	2nd River Basin Management Plan of Cyprus, Water Development Department, 2016.				√
11	Climate Change Risk Assessment Contract No. 22/2014, "The Cyprus Climate Change Risk Assessment Evidence Report", Ministry of Agriculture, Rural Development and Environment, 2016.		√		
12	The Cyprus Climate Change Risk Assessment (2016).			√	

No.	Audit criteria	Audit questions			
		What have been the overall impacts of climate change on the water resources of Cyprus?	What are the expected impacts of climate change on the water resources of Cyprus?	To what extent has the RoC identified and assessed climate change risks on water resources?	To what extent has the RoC taken measures to manage climate risks on water resources through climate change adaption actions
13	National Strategy for the Adaption to Climate Change (2017) and implementation Plan.			√	√
14	The Uniform Water Management (Rights, Fees, or Other Financial Compensation) Regulations (RAA 48/2017).				√
15	World Bank Report, titled «Securing Potable Water Supply under Extreme Scarcity, Lessons and Perspectives from the Republic of Cyprus» (2018).	√			√
16	Strategic Study for Water Management and Response to Drought, Water Development Department, 2019.	√			√
17	National Energy and Climate Plan (2020).			√	
18	Assessment of Climate Change Effects on Pollution Transport in Cyprus (ACCEPT), Climatic Vulnerable areas in Cyprus, The Cyprus Institute, 2022.		√		
19	«Proactive Producer and Processor Networks for Troodos Mountains Agriculture», 3PRO-TROODOS, Prot No. INTEGRATED/0609/061, The Cyprus Institute, 2023.		√		
20	3rd River Basin Management Plan of Cyprus, Water Development Department, 2023.	√		√	√
21	8th National Communication and 5th Biennial Report under the UNFCCC of Cyprus, Department of Environment, 2023.	√	√	√	
22	2nd Revised Drought Management Plan, 2024.				√
23	Assessment of Climate Change Effects on Pollution Transport, in Cyprus (ACCEPT), Future Extreme Events in Cyprus, The Cyprus Institute, 2024.		√		
24	Strategic Plan of Ministry of Agriculture, Rural Development and Environment for the period 2024 – 2026.				√

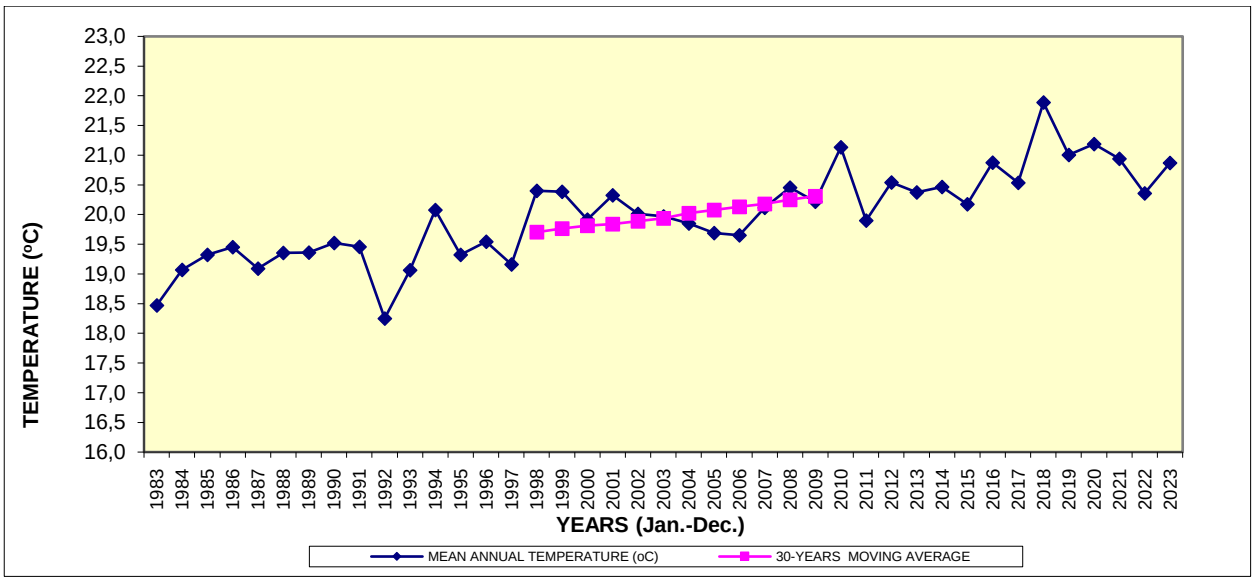
Annex IV - Diagrams of mean annual temperature from various stations in Cyprus

Diagram 1: Mean Annual Temperature (°C) in Nicosia (1901–2023).



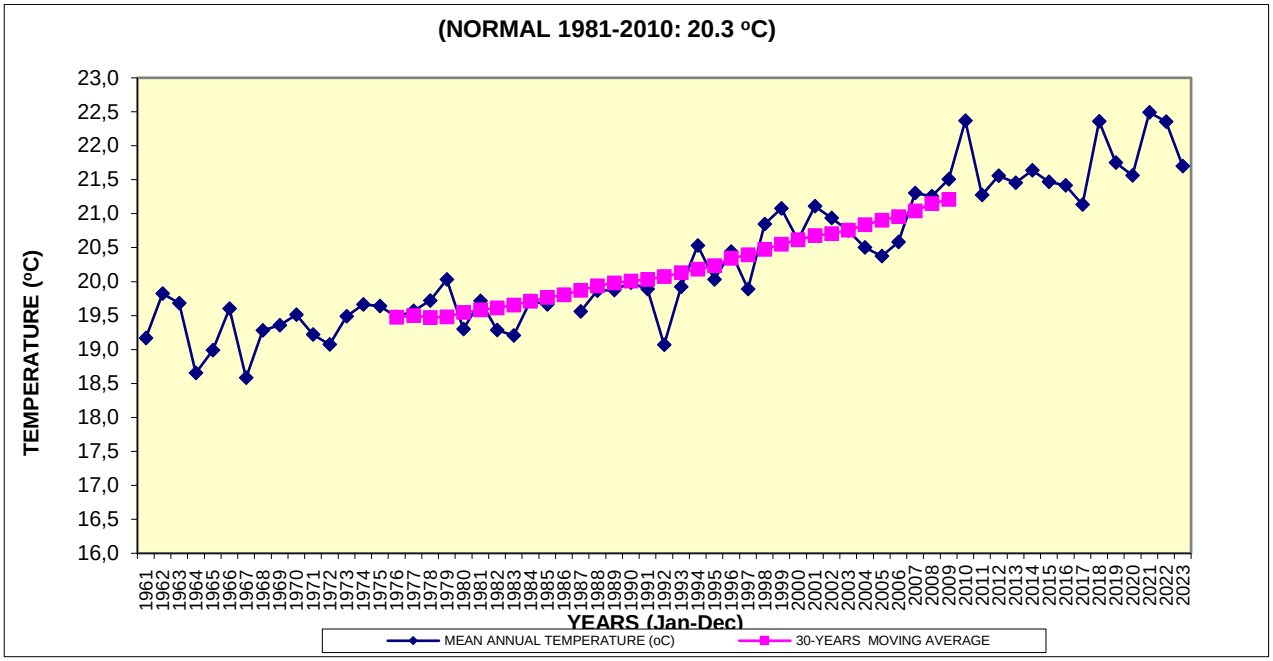
Source: Department of Meteorology, 2024.

Diagram 2: Mean Annual Temperature (°C) in Athalassa (1983–2023).



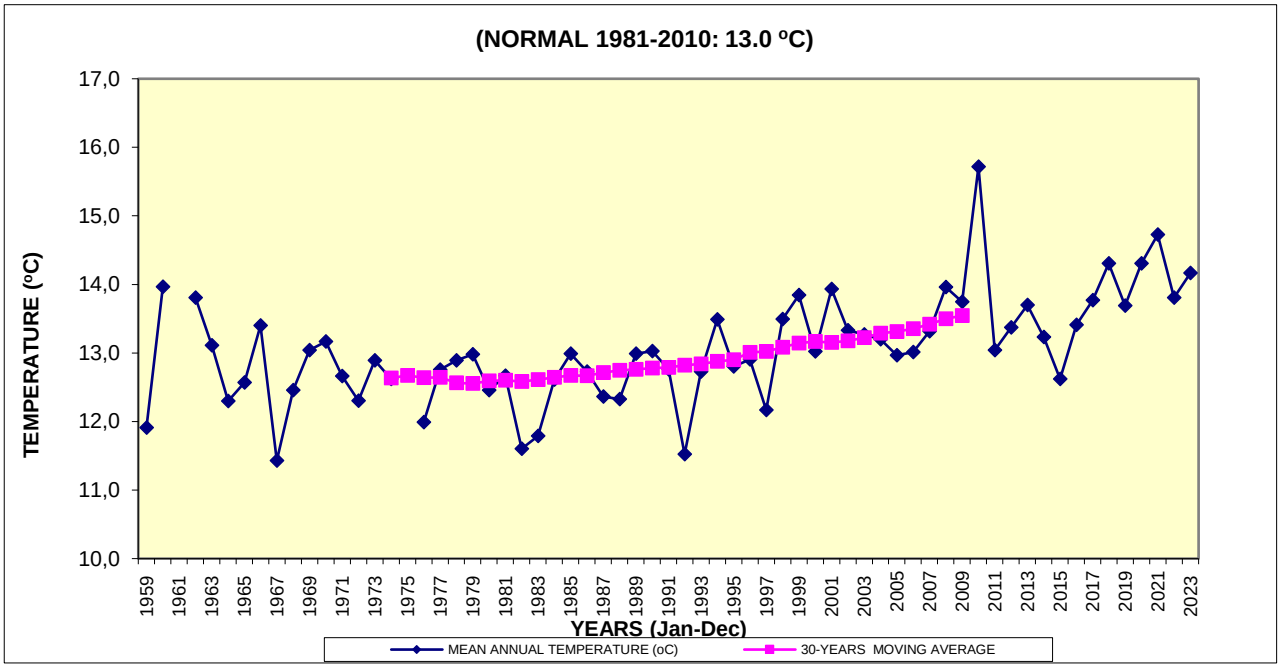
Source: Department of Meteorology, 2024.

Diagram 3: Mean Annual Temperature (°C) in Limassol (1961–2023).



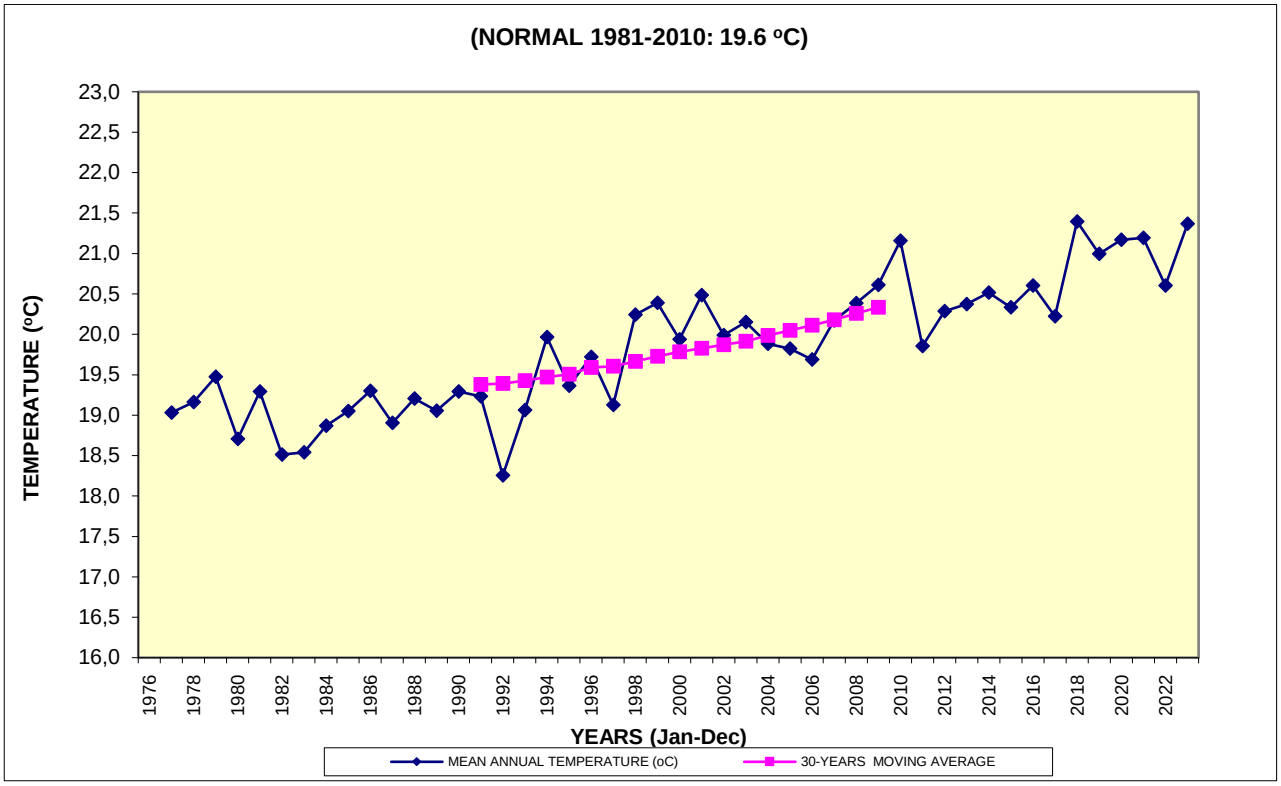
Source: Department of Meteorology, 2024.

Diagram 4: Mean Annual Temperature (°C) in Prodromos (1959–2023).



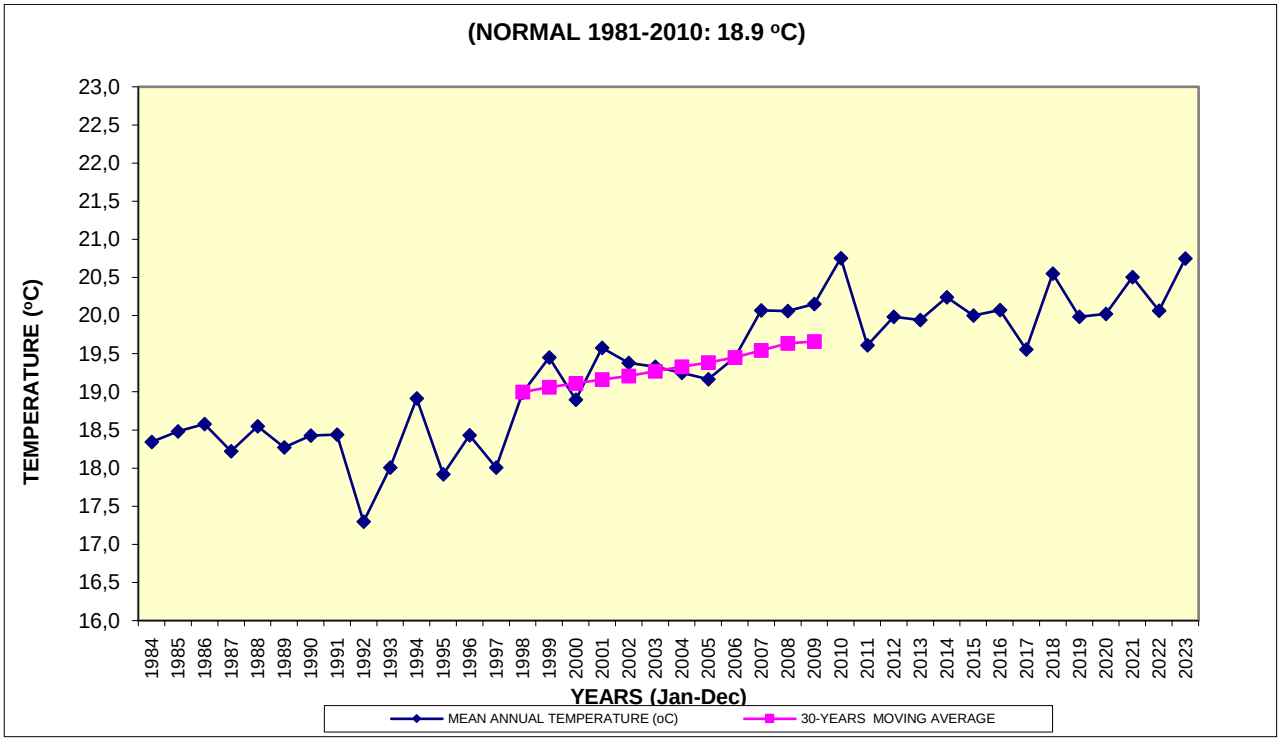
Source: Department of Meteorology, 2024.

Diagram 5: Mean Annual Temperature (°C) at Larnaca Airport Station (1976–2023).



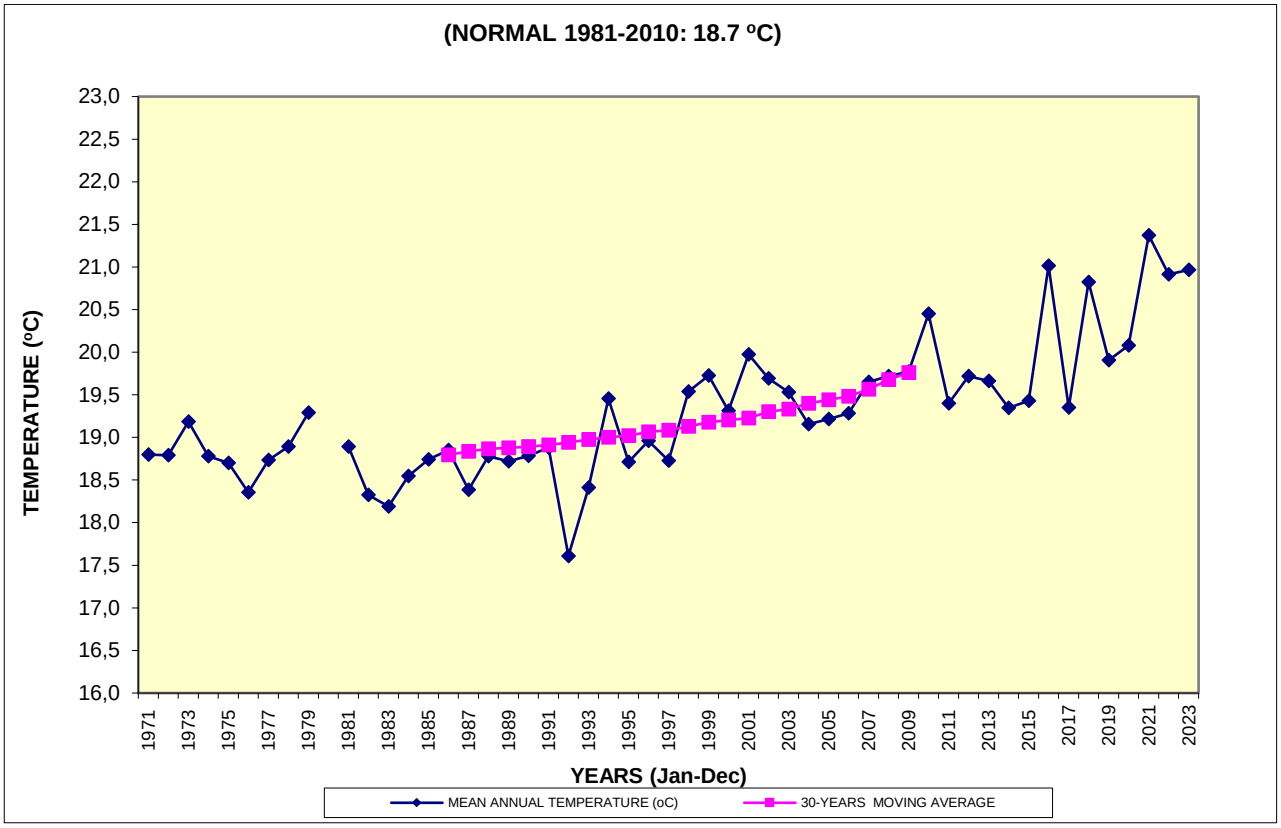
Source: Department of Meteorology, 2024.

Diagram 6: Mean Annual Temperature (°C) at Paphos Airport Station (1984–2023).



Source: Department of Meteorology, 2024.

Diagram 7: Mean Annual Temperature (°C) in Polis Chrysochous (1971–2023).



Source: Department of Meteorology, 2024.

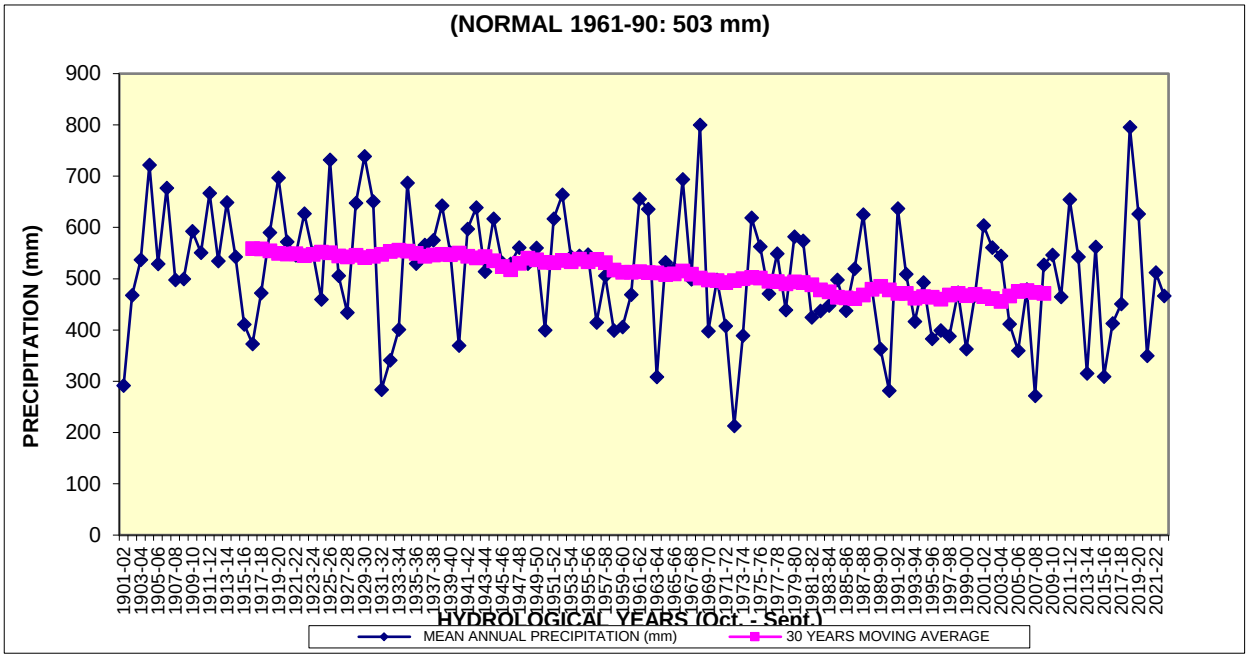
Table 1: Increase in mean annual temperature of various areas in Cyprus for the corresponding specific periods.

Measurement Station – Department of Meteorology	Period of Meteorological Data	30-Year Period for Moving Average	Increase in Mean Temperature (30-Year Moving Average)
Nicosia	1901 – 2023	1916 – 2009	1.69°C
Nicosia (Athalassa)	1983 – 2023	1998 – 2009	0.61°C
Limassol	1961 – 2023	1976 – 2009	1.74°C
Limassol (Akrotiri)	1975 – 2023	1987 – 2009	0.70°C
Prodromos	1959 – 2023	1974 – 2009	0.91°C
Larnaca (Airport)	1976 – 2023	1991 – 2009	0.95°C
Paphos (Airport)	1984 – 2023	1998 – 2009	0.66°C
Polis Chrysochous	1971 – 2023	1986 – 2009	0.97°C

Source: Audit Office of the Republic, based on data obtained from the Department of Meteorology, 2024.

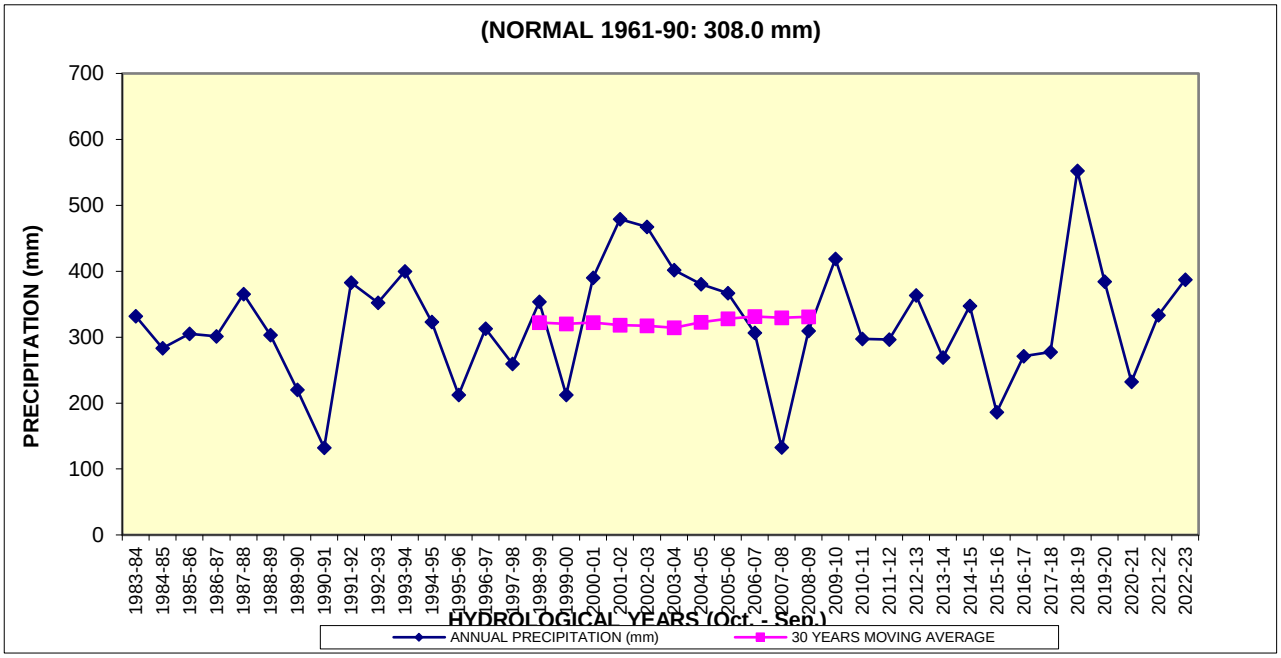
Annex V – Diagrams of mean annual precipitation from various stations in Cyprus.

Diagram 1: Mean Annual Precipitation (mm) (1901–02 to 2022–23) in Cyprus.



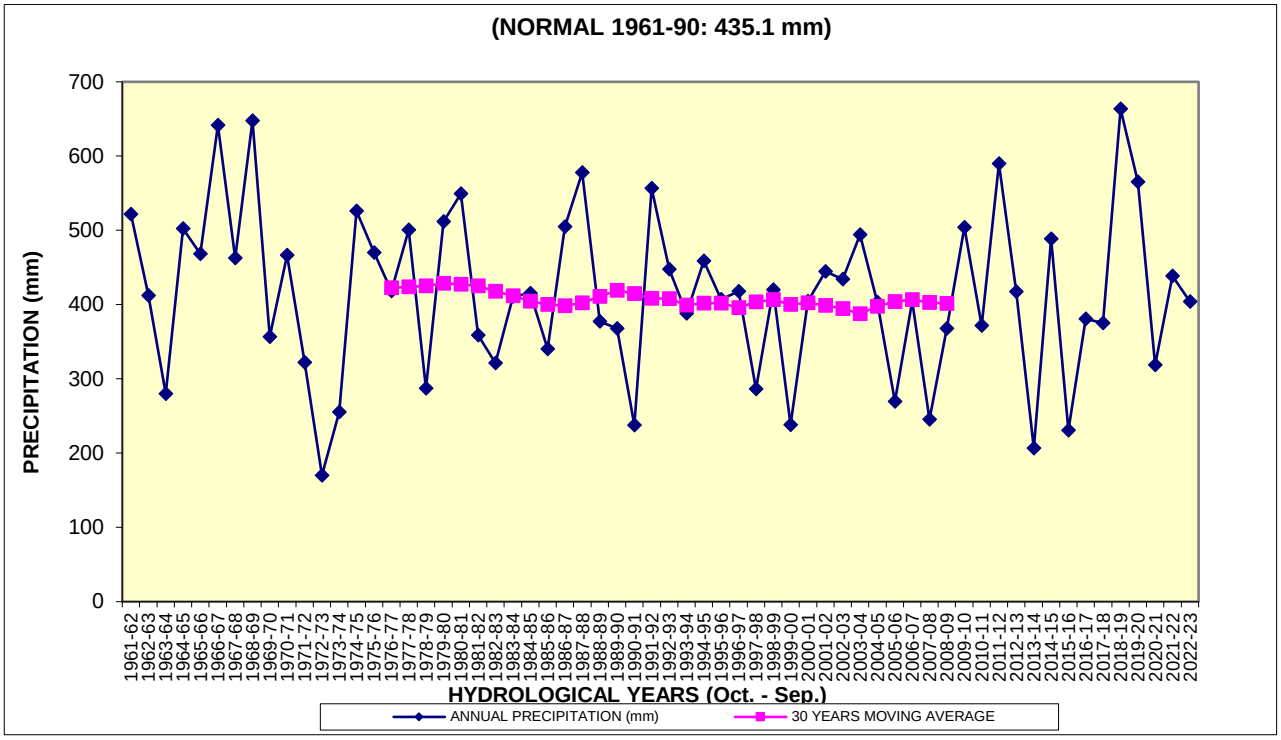
Source: Department of Meteorology, 2024.

Diagram 2: Mean Annual Precipitation (mm) (1983–84 to 2022–23) at the Athalassa Radiosonde Station.



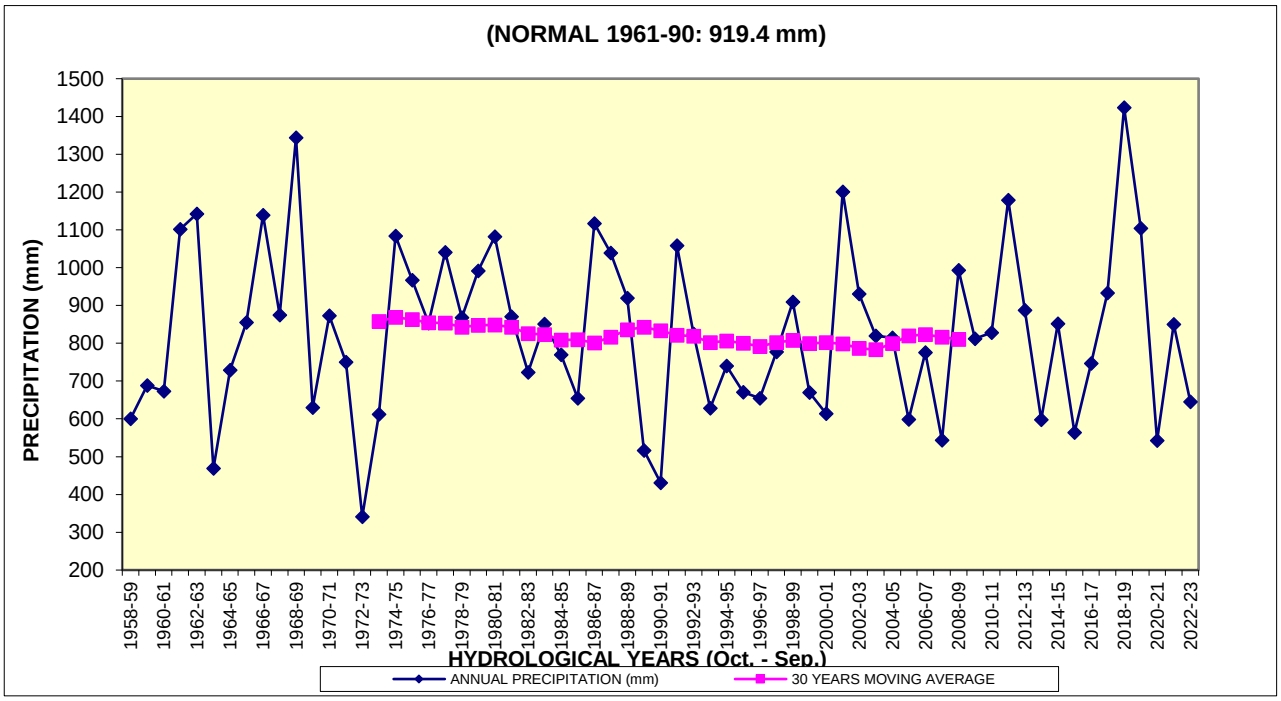
Source: Department of Meteorology, 2024.

Diagram 3: Mean Annual Precipitation (mm) (1961–62 to 2022–23) in Limassol.



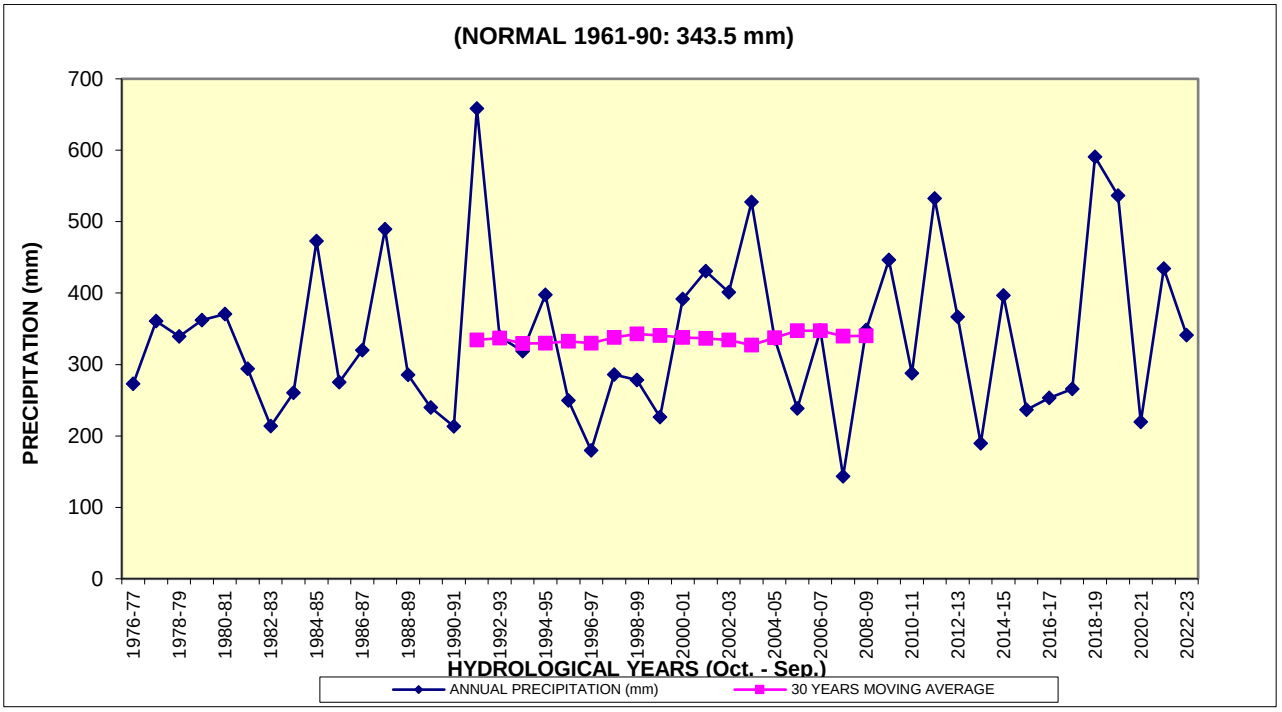
Source: Department of Meteorology, 2024.

Diagram 4: Mean Annual Precipitation (mm) (1958–59 to 2022–23) in Prodromos.



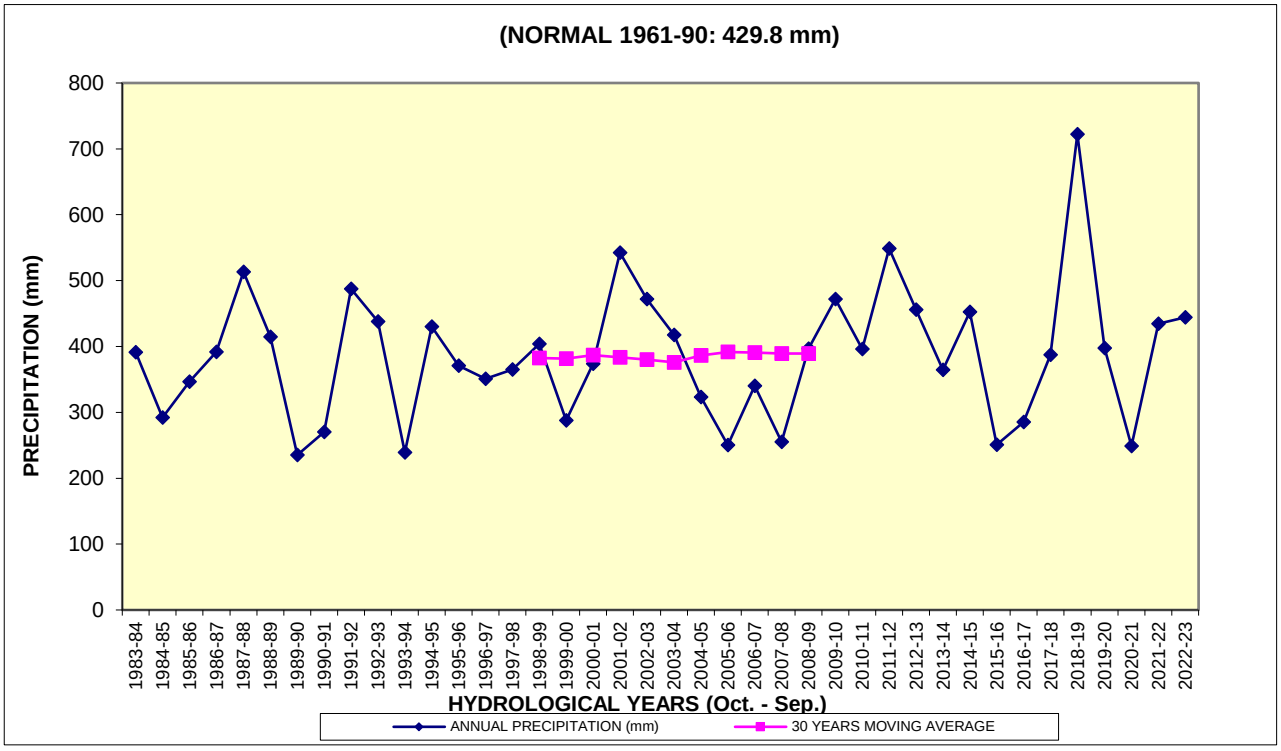
Source: Department of Meteorology, 2024.

Diagram 5: Mean Annual Precipitation (mm) (1976–77 to 2022–23) at Larnaca Airport Station.



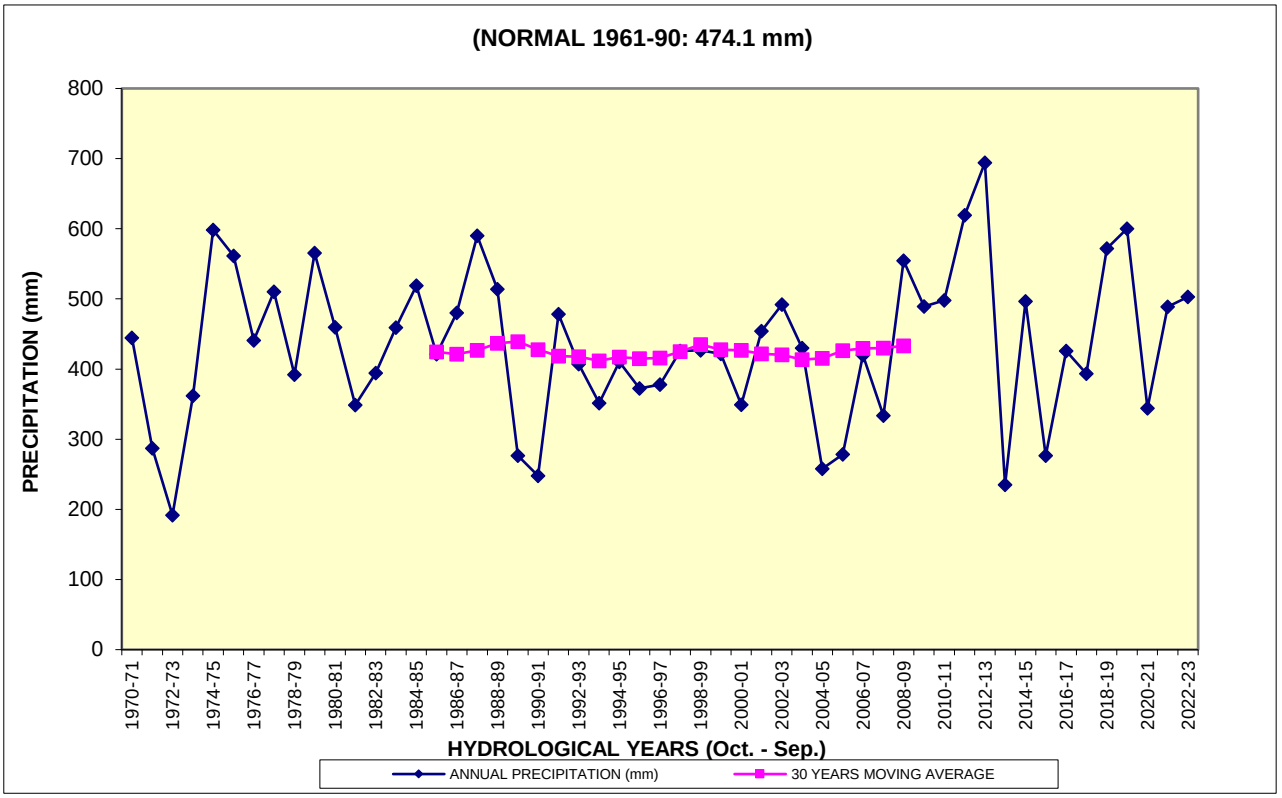
Source: Department of Meteorology, 2024.

Diagram 6: Mean Annual Precipitation (mm) (1983–84 to 2022–23) at Paphos Airport Station.



Source: Department of Meteorology, 2024.

Diagram 7: Mean Annual Precipitation (mm) (1970–71 to 2022–23) in Polis Chrysochous.



Source: Department of Meteorology, 2024.

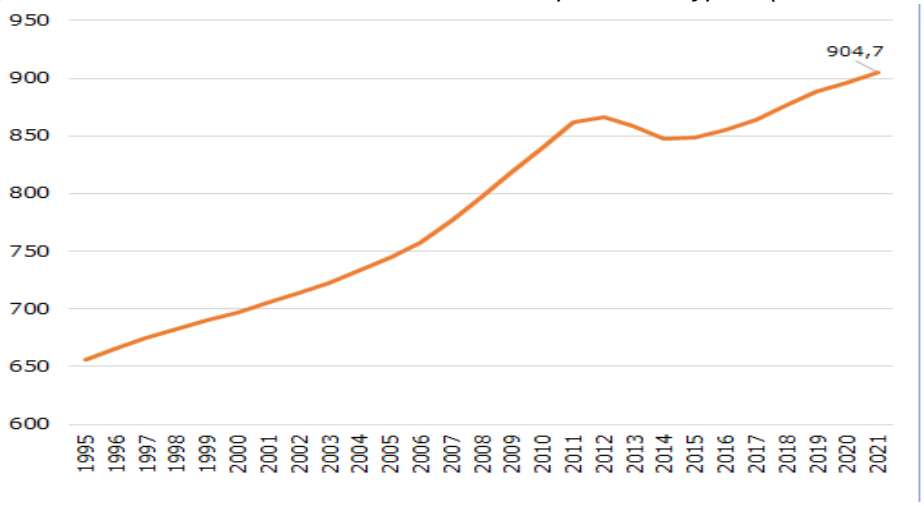
Annex VI – Water Balance Data from the Water Development Department, 2009 – 2022

Year	Volume of Annual Precipitation (million m^3)	Evapotranspiration (million m^3)	Net Beneficial Inflow (million m^3)	Inflow to Surface Sources (million m^3)	Inflow to Groundwater Bodies (million m^3)	Outflow of Groundwater to the Sea (million m^3)	Net Beneficial Groundwater Inflow to the System (million m^3)	Total Water Inflow to the System (million m^3)	Total Water Withdrawals (million m^3)	Water Demand/Needs (million m^3) (estimate)	Allocation of Desalinated Water for Irrigation (million m^3)	Supply-Demand Difference (million m^3)	Allocation of Recycled Water (million m^3)	Final Water Balance
2009	3745	3371	375	121	254	65	189	310	178	256	49	54	12	115
2010	2570	2313	257	119	138	60	78	197	199	257	53	-60	12	5
2011	3348	3013	335	66	269	70	199	265	221	258	49	7	14	70
2012	4737	4263	474	239	235	70	165	404	255	259	18	145	17	179
2013	1770	1593	177	42	135	60	75	117	254	260	11	-143	17	-115
2014	2358	2122	236	13	223	63	160	173	217	261	33	-88	17	-39
2015	2904	2614	290	116	174	62	112	228	232	262	38	-34	18	23
2016	2580	2322	258	23	235	60	175	198	218	263	69	-65	19	22
2017	1956	1760	196	45	151	60	91	136	216	264	69	-128	20	-40
2018	3642	3278	364	68	296	64	232	300	207	265	70	35	21	126
2019	4782	4304	478	284	194	73	121	405	202	266	55	139	24	218
2020	2832	2549	283	106	177	62	115	221	231	266	30	-45	22	7
2021	2724	2452	272	51	221	62	159	210	235	266	49	-56	22	15
2022	2760	2484	276	156	120	62	58	214	223	266	53	-52	24	25

Source: Water Development Department, 2024

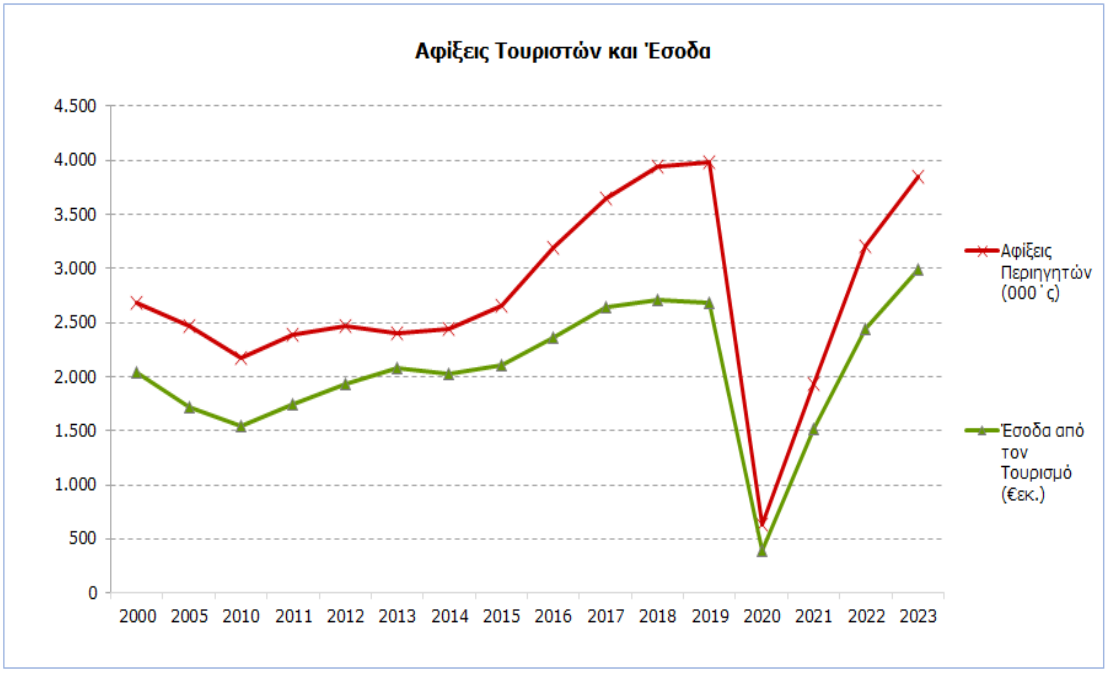
Annex VII – Data from Cyprus Statistical Service for population and tourist flows.

Diagram 1: *Population in Areas Under the Control of the Republic of Cyprus (in thousands) by Year.*



Source: Statistical Service, 2024 (https://www.cystat.gov.cy/el/SubthemeStatistics?id=46).

Diagram 2: Tourist Arrivals in Cyprus and Tourism Revenue by Year.



Note: The COVID period in Cyprus began in early 2020.

Source: Statistical Service, 2024 (https://www.cystat.gov.cy/el/SubthemeStatistics?id=SI

Annex VIII –Pressures and impacts on groundwater bodies.

Table 1: Significant Pressures and Impacts on All Groundwater Bodies.

No.	Groundwater Body Code	Groundwater Body Name	Annual Withdrawals in million m^3 (2022)	Significant Pressure	Main Factors	Impact	General Status 2014 – 2018 (3rd RBMP)	Change from General Status 2008 – 2013 (2nd RBMP)
1	CY_1	Kokkinochoria	16.7	– Abstraction or flow diversion – Diffuse – Agriculture – Diffuse – Discharges not connected to a sewage network	– Agriculture – Urban development	– Abstraction exceeds allowable groundwater resources (decline in water table) – Pollution/seawater intrusion – Nutrient pollution	Poor	Poor
2	CY_3A	Tremithos River Basin	1.9*	– Abstraction or flow diversion – Agriculture	Agriculture	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
3	CY_3B	Kiti-Perivolia	1.2	– Abstraction or flow diversion – Agriculture – Diffuse – Agriculture – Diffuse – Discharges not connected to a sewage network	– Agriculture, – Urban development	– Abstraction exceeds allowable groundwater resources (decline in water table – Pollution/seawater intrusion – Nutrient pollution	Poor	Same
4	CY_4	Softades-Vasilikos	3	– Abstraction or flow diversion – Agriculture – Diffuse – Agriculture	Agriculture	– Abstraction exceeds allowable groundwater resources (decline in water table) – Pollution/seawater intrusion – Nutrient pollution	Poor	Same
5	CY_5	Maroni	1.1	No significant pressure	N/A	– No significant impact	Good	Improvement
6	CY_6	Mari-Kalo Chorio	0.6	– Abstraction or flow diversion – Public domestic water supply	N/A	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
7	CY_7	Germasogeia	6.2	No significant pressure	N/A	– No significant impact	Good	Same

8	CY_8	Limassol	1.4	– Abstraction or flow diversion – Agriculture – Diffuse – Discharges not connected to a sewage network	– Agriculture, – Urban development	– Abstraction exceeds allowable groundwater resources (decline in water table) – Pollution/seawater intrusion – Nutrient pollution	Poor	Same
9	CY_9A	Akrotiri-Kolossi	1*	– Abstraction or flow diversion – Public water supply	Urban development	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
10	CY_9B	Akrotiri	3.4	– Abstraction or flow diversion – Agriculture– Diffuse – Agriculture– Diffuse – Discharges not connected to a sewage network	– Agriculture, – Urban development	– Abstraction exceeds allowable groundwater resources (decline in water table) – Pollution/seawater intrusion – Nutrient pollution	Poor	Same
11	CY_10	Paramali-Avdimos	1	– Abstraction or flow diversion	Agriculture	– Pollution/seawater intrusion – Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
12	CY_11A	Paphos	4.4*	No significant pressure	N/A	– No significant impact	Good	Same
13	CY_11B	Ezousa River Basin	3.5	No significant pressure	N/A	– No significant impact	Good	Same
14	CY_12	Letymbou-Yialou	2.9	No significant pressure	N/A	– No significant impact	Good	Improvement
15	CY_13	Pegeia	1.6	– Abstraction or flow diversion – Agriculture	Agriculture	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
16	CY_14	Androlikou	0.5*	– Abstraction or flow diversion – Agriculture	Agriculture	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Worsening
17	CY_15A	Chrysochou-Yialia	0.7	No significant pressure	N/A	– No significant impact	Good	Improvement
18	CY_15B	Chrysochou River Basin	1.3	No significant pressure	N/A	– No significant impact	Good	Improvement

19	CY_16	Pyrgos	0.2*	– Abstraction or flow diversion – Agriculture	Agriculture	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
20	CY_17	Central and Western Mesaoria	50	– Abstraction or flow diversion – Agriculture – Abstraction or flow diversion – Public water supply	–Agriculture –Urban development	– Abstraction exceeds allowable groundwater resources (decline in water table)	Poor	Same
21	CY_18	Lefkara-Pachna	20.9	– Anthropogenic pressure – Unknown		– Chemical pollution – Abstraction exceeds allowable groundwater resources (decline in water table) – Nutrient pollution	Poor	Same
22	CY_19	Troodos	50.8*	No significant pressure	N/A	– No significant impact	Good	Same
23	CY_20	Unknown						
			174,3					

*The withdrawal quantities are as recorded in the most recent records of the WDD's boreholes (2022). Other values are estimates based on theoretical needs for irrigation in previous studies.

Source: Audit Office (2024), based on tables and data included in the 2nd and 3rd RBMP.

Annex IX – Desalination plants

Contracts and production capacity

Table 1: Desalination plants in Cyprus.

Desalination plant	Year of commencement of operation	Contract expiry year	Period of operation	Contracted with:	Nominal Daily Capacity (m3 water/day)	Contractual Minimum Annual Quantity (m3 of water/year)	Contractual price	*Adjusted price (fuel prices and labour cost index - Q1_2023*
Dhekelia *	2007	2027	20	Joint Venture «A»	60.000	19.710.000	0,82 €/m^3	1,78 €/m^3
Larnaca	2015	2040	25	Joint Venture «B»	60.000	19.710.000	0,59 €/m^3	1,04 /m^3
Limassol (Episkopi)	2012	2032	20	Joint Venture «Γ»	40.000	13.140.000	0,87 €/m^3	1,66 €/m^3
Vasilikos (EAC)	2013	2033	20	EAC	60.000	19.710.000	0,81 €/m^3	1,59 €/m^3
Paphos	2021	2046	25	Joint Venture «A»	15.000	4.927.500	0,51 €/m^3	1,30 €/m^3
Total					**235.000**	**77.197.500**		

* The data presented for the Dhekelia desalination plant refers to the second and current contract signed with the Joint Venture – «Extension of the renovated Dhekelia Desalination plant including operation and maintenance and sale of desalinated water for the period of the agreement».

Source: WDD (Presentation of the Deputy Director of WDD to Moody's "Dealing with water scarcity in Cyprus").

Water production from desalination plants

Below are detailed data for the production from desalination plants for the years 2021 - 2023.

Table 2: Water production from desalination plants.

Desalination plant	Nominal Daily Capacity (m3 /day)	Contractual Minimum Daily Quantity (m3 of /year)	Contractual Minimum Annual Quantity (m3 /year	Actual Annual Production quantity (m3 /year)			Actual Annual Quantity of Reserve (m3 /year)		
				2021	2022	2023	2021	2022	2023
Dhekelia	60.000	54.000	19.710.000	17.200.570	13.969.215	16.240.090	2.766.445	5.229.759	3.639.690
Larnaca	60.000	54.000	19.710.000	15.508.860	17.259.150	19.293.430	4.201.140	2.735.400	187.327
Limassol (Episkopi)	40.000	36.000	13.140.000	4.414.622	7.458.850	9.540.570	8.725.378	5.681.150	3.966.000
Vasilikos (EAC)	60.000	54.000	19.710.000	10.070.025	10.459.105	13.396.170	9.085.135	6.831.735	6.009.090
Paphos	15.000	13.500	4.927.500	3.035.619	2.408.868	3.367.619	0	2.651.809	1.398.114
Total	**235.000**	**211.500**	**77.197.500**	**50.229.696**	**51.555.188**	**61.837.879**	**24.778.098**	**23.129.853**	**15.200.221**

Source: WDD (Division of Domestic Water Works), 2024.

As can be seen from the data above, the total actual annual production quantity for 2023 amounted to 61,8 million m3 compared to 2021 that amounted to 50,3 million m3, i.e. there was an increase of 23%. The total annual reserve quantity decreased significantly in 2023 to 15,2 million m3 from 24,8 million m3 in 2021 (a decrease of 38.7%).

Cost of desalinated water.

As shown in the table below, total annual production costs including VAT increased significantly in 2023 to €91,5 million from €55,7 million in 2021 (an increase of 64.2%). Total annual standby costs, however, decreased from €6,6 million in 2021 to €5,4 million in 2023 (a decrease of 18.2%).

Table 3: Production costs from desalination plants

Desalination plants	Production Unit Price - Annual Average (€/ m3)			Unit Price of Reserve - Yearly Average (€/ m3)			Total Annual Production Cost including 5% VAT			Total Annual Cost of the Reserve including 19% VAT (€)		
	2021	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
Dhekelia	1,17	1,78	1,75	0,17	0,18	0,18	21.624.126	26.718.507	29.653.772	546.829	1.139.802	766.170
Limassol (Episkopi)	1,2	1,66	1,2	0,39	0,4	0,39	5.951.908	12.609.431	15.694.618	4.020.860	2.688.664	1.873.351
Vasilikos (EAC)	1,11	1,58	1,52	0,35	0,36	0,35	13.935.524	16.814.191	21.166.877	1.738.302	2.923.457	2.505.700
Larnaca	0,66	1,03	1,02	0,06	0,06	0,07	11.137.998	19.030.718	20.555.901	265.497	205.535	14.580
Paphos	0,95	1,36	1,3	0,12	0,13	0,13	3.073.769	3.509.742	4.470.006	0	406.888	218.248
Total	**5,09**	**7,41**	**6,79**	**1,09**	**1,13**	**1,12**	**55.723.325**	**78.682.589**	**91.541.174**	**6.571.488**	**7.364.346**	**5.378.049**

Source: Water Development Department (Division of Domestic Water Works), 2024.

The increase in production costs is mainly due to the increase in energy costs, which constitutes the largest part of the unit price of water.

Annex X – Tertiary water treatment in Cyprus

Production and supply of recycled water.

Table 1: Urban tertiary wastewater treatment plants in Cyprus.

S/N	WASTEWATER TREATMENT PLANTS.	PLANT CAPACITY	THEORITICAL ANNUAL VOLUME OF RECYCLED WATER OUTFLOW (CAPACITY)	ACTUAL ANNUAL VOLUME OF RECYCLED WATER OUTFLOW 2023	ANNUAL VOLUME OF RECYCLED WATER OUTFLOW 2022
		(m^3/DAY)	m^3/YEAR	m^3/YEAR	m^3/YEAR
1	LIMASSOL – AMATHUS (SBLA)	40.000	14.600.000	9.604.990	9.824.690
2	WESTERN LIMASSOL	13.000	4.745.000	1.142.664	248.527
	LIMASSOL DISTRICT	53.000	19.345.000	10.747.654	10.073.217
3	PAPHOS (SABBA)	19.500	7.117.500	4.748.863	5.408.342
	PAPHOS DISTRICT	19.500	7.117.500	4.748.863	5.408.342
4	AYIAS NAPA - PARALIMNIOU	21.000	7.665.000	3.628.318	3.118.415
	FAMAGUSTA DISTRICT	21.000	7.665.000	3.628.318	3.118.415
5	LARNACA	18.000	6.570.000	3.742.614	3.299.988
	LARNACA DISTRICT	18.000	6.570.000	3.742.614	3.299.988
6	ANTHOUPOLI	13.000	4.745.000	1.993.991	1.965.056
7	VATHIA GONIA SBN	22.000	8.030.000	3.222.622	3.331.766
8	VATHIA GONIA WDD	1.320	413.004	123.177	132.983
	NICOSIA DISTRICT	36.320	13.188.004	5.339.790	5.429.805
	TOTAL	147.820	53.885.504	28.207.239	27.329.767

Source: Water Development Department, 2024.

Based on the above data, the Limassol district appears to have the highest capacity for recycled water production, as the Amathus and Western Limassol plants produce up to 53.000 m^3/day, with a total capacity of 19,3 million m^3. This is followed by the Nicosia district with the Anthoupolis, Vathia Gonia WDD, and Vathia Gonia SBN plants, which have a total daily and annual capacity of 36.320 m^3 and 13,2 million m^3, respectively. The Larnaca district has the lowest capacity, with a total amount of recycled water amounting to 18.000 m^3/day and 6,5 million m^3 annually.

Additionally, according to WDD data, in 2023, out of the 28,2 million m^3 of water produced by the biological stations of the Urban Sewerage Boards, 13,6 million m^3 was distributed for irrigation and billed, meaning 48,22% of the produced recycled water was utilised.

Table 2: Use of recycled water.

	Nicosia	Limassol	Larnaca	Ayia Napa - Paralimni	Paphos	Total
	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Production						
2020	5.528.407	9.866.280	3.559.169	2.370.047	4.219.330	**25.543.233**
2021	4.995.027	9.925.860	2.994.130	2.826.338	4.347.600	**25.088.955**
2022	5.429.805	10.073.217	3.299.988	3.118.415	5.408.342	**27.329.767**
2023	5.351.239	10.747.654	3.742.614	3.628.318	4.748.863	**28.218.688**
Supply						
2020	2.767.889	2.961.607	1.991.030	1.489.940	55.218	**9.265.684**
2021	3.358.551	7.070.900	2.126.810	1.812.698	39.932	**14.408.891**
2022	2.643.107	5.108.148	2.178.980	1.633.059	45.022	**11.608.316**
2023	3.011.784	6.202.809	2.361.960	1.975.477	54.071	**13.606.101**
Unused						
2020	2.760.518	6.904.673	1.568.139	880.107	4.164.112	**16.277.549**
2021	1.636.476	2.854.960	867.320	1.013.640	4.307.668	**10.680.064**
2022	2.786.698	4.965.069	1.121.008	1.485.356	5.363.320	**15.721.451**
2023	2.339.455	4.544.845	1.380.654	1.652.841	4.694.792	**14.612.587**
Used						
2020	50,07%	30,02%	55,94%	62,87%	1,31%	**36,27%**
2021	67,24%	71,24%	71,03%	64,14%	0,92%	**57,43%**
2022	48,68%	50,71%	66,03%	52,37%	0,83%	**42,47%**
2023	56,28%	57,71%	63,11%	54,45%	1,14%	**48,22%**

Source: Water Development Department, 2024.

The table below presents the quantity of water discharged into the sea from the districts of Limassol and Larnaca during the period 2020–2023.

Table 3: Quantity of recycled water discharged into the sea for the Districts of Limassol and Larnaca (2020–2023).

District	Quantity produced				Water discharged into the sea			
	2020	2021	2022	2023	2020	2021	2022	2023
	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Limassol	9.866.280	9.925.860	10.073.217	10.747.654	3.331.970	486.910	409.210	364.040
Larnaca	3.559.169	2.994.130	3.299.988	3.742.614	1.388.036	649.603	1.107.275	1.088.800
Total	**13.425.449**	**12.919.990**	**13.373.205**	**14.490.268**	**4.720.006**	**1.136.513**	**1.516.485**	**1.452.840**
					35,2%	***8,8%***	***11,3%***	***10,0%***

Source: Water Development Department, 2024.

As presented above, in 2020, the total amount of recycled water produced by the districts of Limassol and Larnaca that ended up in the sea amounted to 4,7 million m^3 (representing 35,2% of the total quantity produced from the two districts). This percentage decreased over time and reached 10% in 2023; however, it remains significant.

Quality of Recycled Water

The water produced by urban wastewater treatment plants is collected and managed accordingly by the WDD, which reimburses the Sewerage Boards for the cost of tertiary wastewater treatment. The water is then stored and distributed for irrigation purposes. During the winter months, a surplus of water may occur that cannot be stored, resulting to the discharging. For this purpose, the WDD obtains a water discharge permit for each wastewater treatment plant, which specifies the parameters related to the water's quality characteristics and the frequency of their monitoring. Depending on the location of each plant, the required parameters for water quality may vary. For example, in environmentally sensitive areas, stricter requirements apply to the quality of discharged water.

WDD conducts water quality control through analyses performed by private laboratories. The table below summarises the deviations in chemical and microbiological parameters at the Wastewater Treatment Plants during the period 2020–2022[47].

[47] Although we requested data for the analyses conducted during the period 2020–2023, the WDD did not provide the relevant data for 2023.

Table 4: Deviations in the parameters of chemical and microbiological analyses identified at Wastewater Treatment Plants during the period 2020–2022.

		NUMBER OF DEVIATIONS			
S/N	**WASTEWATER TREATMENT PLANT**	**2020**	**2021**	**2022**	**TOTAL**
1	PARALIMNI	3	0	3	6
2	AYIA NAPA	0	0	5	5
3	ANTHOUPOLI	6	3	1	10
4	VATHIA GONIA SBN	0	2	4	6
5	VATHIA GONIA WDD	59	27	24	110
6	LARNACA	35	32	42	109
7	LIMASSOL – AMATHUS	8	4	8	20
8	PAPHOS	0	0	0	0
TOTAL		**111**	**68**	**87**	**266**

Source: Water Development Department, 2024.

Based on the above, it appears that all plants exhibit deviations from the specified parameter values being examined, with the Larnaca and Vathia Gonia WDD stations recording the most deviations. Specifically, for the Vathia Gonia WDD treatment plant, a total of 110 deviations were identified across various parameters during the period 2020–2022, the majority of which concerned the conductivity index, which almost shown double values from the permissible limits. Notably, based on 12 samples collected in 2022, although the plant's discharge permit sets the maximum conductivity limit at 2.500 μS/cm, the annual average value calculated from the 12 samples, reached 4.128 μS/cm (nearly double). Similarly, for the Larnaca treatment plant, a total of 109 deviations across various parameters were identified for the period 2020–2022, with conductivity again being the most significant parameter exceeding the permissible limits. Specifically, based on 22 samples collected during 2022, the annual average value, calculated from the 22 samples, reached 3.563 μS/cm, while the plant discharge permit sets the maximum conductivity limit at 2.500 μS/cm.

Annex XI – Drilling and use of boreholes.

According to data from the WDD, the Department maintains a database gathered the main information regarding the licensing of groundwater abstraction, which however is not updated with boreholes licensed before 2010, except for those in the Nicosia district and those for which a request for examination/modification has been submitted. The table below presents, by district, the number of licensed boreholes and those that have been recorded in the aforementioned database.

Table 1: Licensed boreholes by district.

District	Total licensed boreholes	Licensed boreholes before 2010	Licensed boreholes after 2010 (recorded in the database)
Nicosia	36.700	27.000 (recorded in the database)	9.700
Larnaca	30.617	23.000 (Not recorded in the database)	7.617
Limassol	32.388	22.208 (Not recorded in the database)	10.180
Paphos	20.383	18.000 (Not recorded in the database)	2.383
Famagusta	17.460	8.512 (Not recorded in the database)	8.948
ΣΥΝΟΛΟ	**137.548**	**98.720**	**38.828**

Source: Water Development Department, 2024.

According to the table above, there are currently a total of 137.548 licensed boreholes, of which 38.828 were licensed by the WDD since 2010 with the enactment of Law 79(I)/2010, and 98.720 were previously licensed by the respective District Officers.

ANNEX XII – Pricing of water services.

Recovery of the cost of water services.

a. Water Pricing by the WDD to consumers and water service providers.

i. The table below provides detailed information on the recovery of the cost of water services provided by WDD, based on the study[48]:

Table 1: Recovery of the cost of water services by the WDD for the years 2016 – 2021.

Service	Category	GWW of Southern Conveyor System €/m³	GWW of Paphos €/m³	GWW of Chrysochous €/m³	Other GWWs €/m³	Outside GWWs €/m³
Domestic water supply	Financial cost	0,84[2]	0,87[2]	N/A	[1]	0,91
	Environmental cost	0,04[2]	0,01[2]	N/A	[1]	0,00
	Resource cost	0,06[2]	0,01[2]	N/A	[1]	0,01
	Total unit cost	**0,95[2]**	**0,89[2]**	N/A	[1]	**0,92**
	Unit Revenue	**0,86[2]**	**0,67[2]**	N/A	[1]	**0,87**
	Cost Recovery	**91,0%[2]**	**75,7%[2]**	N/A	[1]	**94,3%**
Irrigation water supply	Financial cost	0,435[2]	0,433[2]	0,34	0,802	[3]
	Environmental cost	0,072[2]	0,034[2]	0,017	0,005	0,187
	Resource cost	0,034[2]	0,017[2]	0,008	0,002	0,072
	Total unit cost	**0,541[2]**	**0,484[2]**	**0,365**	**0,809**	**0,259**
	Unit Revenue	**0,149[2]**	**0,190[2]**	**0,169**	**0,146**	-
	Cost Recovery	**27,6%[2]**	**39,1%[2]**	**46,3%**	**18,1%**	-
Sewerage service (secondary treatment of wastewater)	Total Revenue	€81.440.756				
	Total Cost	€50.182.338				
	Total	**162%**				
Recycled water supply (tertiary treatment)	Financial cost	0,330				
	Environmental cost	0,041				
	Resource cost	N/A				
	Total unit cost	**0,371**				
	Unit Revenue	0,109				
	Cost Recovery	**29,4%**				

[1] It refers to the GWW of "Chamila Krasochoria" (water supply boreholes of the WDD for which no cost analysis for the recovery of cost of water service was conducted by the WDD). Water pricing is the same as the Southern Conveyor System and Paphos GWWs.

2 The analysis covers the period 2017-2021 because data for the year 2016 were not available.

3 As stated in the study, since the ability to extract water outside of the GWWs requires a water permit from WDD, and since these are considered private boreholes, the analysis assumes that the financial cost of private boreholes is fully recovered (100%).

[48] Economic analysis of water uses – degree of recovery of the cost of water services, Deliverable 4 "Pricing and recovery of the cost of water services", consortium "ECOS Meletitiki A.E., ENM A.E., Lever A.E.", 2023.

According to the study, the unit cost of water services (domestic water, irrigation water, wastewater and recycled water), on average ranges from €0.365/m^3 to €0.95/m^3 within and outside the GWWs, with the recovery percentage ranging from 18.1% to 94.3%, depending on the region.

ii. The current pricing policy, as determined by the RAA 48/2017, is presented in the table below:

Table 2: Current pricing policy:

		Water Fees (RAA 48/2017, RAA 10/2020, RAA 270/2021, RAA 302/2023)		
	Water Work	Financial €/m^3	Environmental and Resource €/m^3	Total €/m^3
1.	**Domestic water supply**			
A	**Domestic water supply from GWWs/Government Water Supply Systems (GWS) to Local Water Supply Authorities**			
i.	GWS of the Southern Conveyor System	0,77	0,05	**0,82**
ii.	GWS greater Paphos region			
	- Up to 25.10.2021	0,59	0,05	**0,64**
	- From 26.10.2021	0,77	0,05	**0,82**
iii.	From Pissouri GWW to the communities of Pissouri, Avdimou, Alectora, Fasoula, and Archimandrita.	0,60	0,05	**0,65**
iv.	From Souni-Zanatzia GWW to the Community of Souni-Zanatzia	0,34	0,05	**0,39**
v.	GWS of the Southern Conveyor System to the community of Episkopi, Limassol*	0,25	0,05	**0,30**
vi.	From Limassol GWS to the Limassol Water Board's reservoir located in the community of Palodia - Limassol, for a water quantity that corresponds to 20% of the total sources of the Regional Water Supply Plan of Agia Paraskevi (Group of Semi-Mountainous Communities). Retroactively from 1.5.2023 to 1.7.2029	0,00	0,05	**0,05**
B	**Abstraction of domestic water outside GWW (from groundwater / surface sources)**			
i.	Abstraction of domestic water outside GWWs (from groundwater / surface sources)			
	- For the supply of water intended for domestic use of residences and other domestic water supply purposes.	-	0,05	**0,05**

	- For the supply of water to water resellers (tankers/bottlers)	-	0,12	**0,12**
ii.	Fees applied by WDD to potable water vendors by tankers, bottlers of potable water or for other uses of potable water	-	0,12	**0,12**
2.	**Irrigation water supply**			
A.	**Supply of fresh, unrefined irrigation water from GWWs/ Government Irrigation Systems**			
i.	Fixed annual fee/decare	2,40 €/dec.		**2,40 €/dec.**
ii.	- To persons for agricultural / livestock use or aquaculture	0,15	0,02	**0,17**
	- To persons for agricultural / livestock use, from the overflow of the dams: Argaka, Pomos, Agia Marina (Chrysochous), Kalopanayiotis, Xyliatos, Vyzakia, and Lympia	0,03	0,02	**0,05**
iii.	To irrigation water providers **	0,10	0,02	**0,12**
iv.	For industrial consumption/industrial use (with quantities returned to the system). The amount charged is the one not returned to the system	0,23	0,02	**0,25**
v.	For irrigation of other areas			
	- football and sports grass fields and islands, parks, and other green areas under the jurisdiction of Governmental/Local Authorities	0,21	0,02	**0,23**
	- private football and sports grass fields and private green areas and hotel gardens	0,34	0,02	**0,36**
B.	**Fees applied by the WDD to irrigation water consumers who receive water from sources outside GWWs (boreholes, springs or rivers and aquifers recharged with recycled water).**			
i.	For agricultural/livestock use or aquaculture	-	0,01	**0,01**
ii.	For other uses:			
	- Football and sports grass fields	-	0,02	**0,02**
	- Islands, parks, and other green areas under the jurisdiction of Governmental/Local Authorities	-	0,02	**0,02**
	- Private green areas and hotel and residential gardens	-	0,10	**0,10**
	- Industry	-	0,10	**0,10**
iii.	Golf courses:			
	- From surface sources – licensed private dams	-	0,11	**0,11**
	- From aquifers artificially recharged with recycled water	-	0,23	**0,23**
C	**Recycled water**			

i.	Fixed annual fee/decare	2,40 €/ dec.		**2,40 €/dec.**
ii.	To persons for agricultural productions	0,06	0,01	**0,07**
Iii.	To irrigation water providers **	0,01	0,01	**0,02**
iv.	Industrial consumption	0,15	0,02	**0,17**
v.	Irrigations for other uses			
	- football and sports grass fields and islands, parks and other green areas under the jurisdiction of Governments/Loval Authorities	0,10	0,02	**0,12**
	- private football and sports grass fields and private green areas, hotel and residential gardens	0,15	0,02	**0,17**
	- irrigation of golf courses	0,15	0,08	**0,23**

* The reduction of the fee for the community of Episkopi concerns the compensatory benefits granted to the community for the recharge of the Akrotiri aquifer with recycled water.

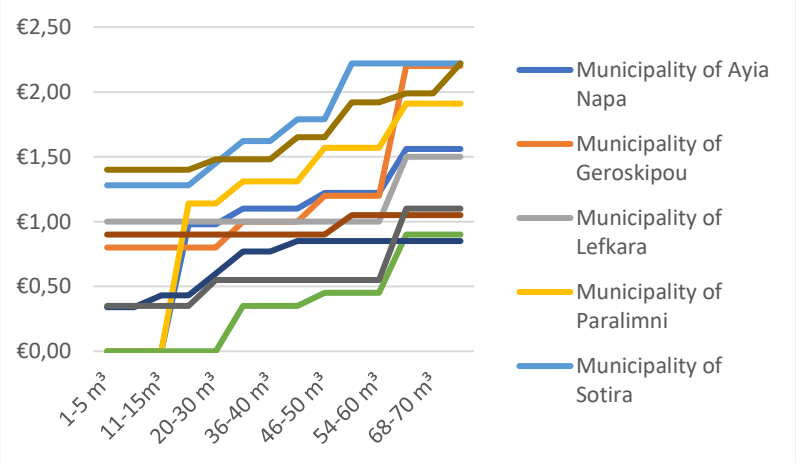
** Irrigation water providers are:

- Irrigation Departments that preceive irrigation water from GWWs.
- Local Authorities that receive irrigation water in bulk from the GWWs and distribute it to individual consumers for livestock farming.

b. Water pricing by the water service providers to consumers.

The following diagram presents, by way of example, the pricing of ten local water service providers, where pricing is applied on a quarterly basis:

Diagram 1: Indicative residential pricing by local water service providers.



Source: Analysis by the Audit Office of the Republic of Cyprus based on the Annual Reports submitted by the water service providers to WDD for the year 2022,2024.

Regarding the urban regions of Nicosia, Limassol, and Larnaca, where the water service providers are the urban Water Boards (as of 1.7.2024, the District Local Government Organisations), the charges showed in the past notable differences[49]. Specifically, for equivalent quantities of consumption, consumers served by the Larnaca and Limassol Water Boards were charged 75% and 39%, respectively, of the amount that consumers of the Nicosia Water Board were required to pay. As we mentioned in a Special Report of our Audit Office[50], following relevant recommendations of us to the Ministry of Interior, as the supervisory authority, measures were introduced to differentiate the water consumption fees across the urban Water Boards, resulting in a significant alignment of the charges, taking also into account the differences in the billing periods applied by the three Boards.

In relation to this, we found that for a consumption of 15 m^3 of water in one month, which is the estimated consumption for an average household, consumers supplied by the Nicosia and Limassol Water Boards are charged 86% of the amount paid by consumers of the Larnaca Water Boards. The charges per Board are currently estimated as follows:

Table 3: Comparison of pricing policies of urban Water Boards.

Water Board	Fixed charge and maintenance fee €	Consumption charge €	Total charge €
Nicosia	4,00	15,00	19,00
Limassol	5,50	13,50	19,00
Larnaca	5,25	16,75	22,00

[49] Annual Reports of the Auditor General of the Republic of Cyprus 2007 and 2008.

[50] Special Report of the Auditor General of the Republic of Cyprus Management of Water Resources in Cyprus 2016.

ANNEX XIII – Cyprus adaptation measures to climate change in the water resources and agricultural sectors according to the fourth annual monitoring report.

Measure No.	Adaptation Measure (from CYPADAPT)	Estimated Cost €	Main Implementing Body	Implementation Timeline
Water Resources Sector				
A1	Maintenance and repair of water transport systems/networks and related infrastructure.	4.000.000	Water Boards	Continuous
A2	Control and avoidance of water-intensive demands in all areas with insufficient water resources (e.g. golf courses, tourist infrastructures, water-intensive crops).	Not estimated	WDD	Medium-term/long-term
A3	Enhancement of efficient water use in buildings, industry, and agriculture.	Not estimated	Department of Agriculture (for crops), DE (for industry/discharge permits), District Administration (building permits).	Medium-term/long-term
A4	Reuse of treated wastewater of urban origin after strict suitability control.	Not estimated	WDD	Short-term/ medium-term
A5	Periodic reviews of progress and priorities, and corresponding adjustment to goals, means, and resources, considering climate change.	Not estimated	WDD	Continuous (immediate)
A6	Expansion of the usage of water meters.	Not estimated	WDD	Continuous (immediate)
A7	Implementation and regular reviews of the Drought Management Plan.	Administrative only	WDD	Continuous (immediate)
A8 *	Promotion of a rainwater collection grant scheme for households.	3.000.000	WDD	Medium-term
A9 *	Creation of a unified data platform for analysing and evaluating synergies between water and energy.	150.000 – 200.000	Nicosia Water Board and energy bodies	Continuous
A10 **	Creation of a platform to be used by water consumers.	Not estimated	Water Boards	Medium-term/long-term
Agricultural Sector				

E1	Provision of incentives to farmers for the use of recycled water for irrigating selected crops.	Not estimated	WDD	Continuous
E2	Identification and promotion of the use of native and other genetic material (plant and animal) adapted to the 50 soil-climatic conditions that climate change will bring.	350.000	Agricultural Research Institute/ Department of Agriculture	Immediate
E3	Improvement of water use efficiency for irrigation through the implementation of rational irrigation scheduling.	Not estimated	Department of Agriculture	Medium-term
E4	Improvement of water use efficiency for irrigation through the adoption of more advanced irrigation systems and maintenance of the existing irrigation systems.	Not estimated	WDD	Continuous/ medium-term
E5	Promotion of research for studying the impacts of climate change on agriculture and livestock.	100.000	Agricultural Research Institute	Medium-term
E6	Promotion of the use of less water-intensive or drought-resistant crops.	Not estimated	Department of Agriculture	Short-term
E7*	Development/improvement of early warning systems for extreme weather events.	250.000	Ministry of ARDE, Department of Meteorology	Immediate
E8*	Provision of advice and training regarding crop adaptation to climate change.	150.000	Department of Agriculture	Immediate

* They were not included in the original Action Plan. They were added in the 3rd annual monitoring report.
** They were not included in the original Action Plan. They were added in the 4th annual monitoring report.

Source: Audit Office based on data included in the fourth annual monitoring report, 2024.

Annex XIV - Original response letters from the Audited Entities

a. Water Development Depratment.

(i) We note that issue number 2, paragraph in the letter number 4.1.2.2 in the following Action Plan for the Implementation of Recommendations was amended by the WDD following clarifications requested by our Office. The modifications are presented in full in section (ii) below.

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΓΕΩΡΓΙΑΣ,
ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

ΤΜΗΜΑ ΑΝΑΠΤΥΞΕΩΣ ΥΔΑΤΩΝ

Αρ. Φακ.: 05.22.001.003
Αρ. Τηλ.: 22 609132
Αρ. Φαξ: 22 609209
E-mail: mmichael@wdd.moa.gov.cy

28 Φεβρουαρίου 2025

ΜΕ ΤΟ ΧΕΡΙ

Γενικό Ελεγκτή

(Μέσω Γενικού Διευθυντή
Γενικής Διεύθυνσης Γεωργίας
και Αγροτικής Ανάπτυξης)

Γενικός Διευθυντής
Γ.Δ. Γεωργίας και Αγροτικής Ανάπτυξης
Ημερ. 4/3/25

Ειδική Έκθεση «Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;»

Αναφέρομαι στο πιο πάνω θέμα και στην επιστολή σας ημερ. 16.01.2025 με την οποία μας υποβάλατε την Ειδική Έκθεση ΠΕ 01/2025 και με την παρούσα υποβάλλω συμπληρωμένο τον πίνακα με το Σχέδιο Δράσης Υλοποίησης Συστάσεων της Ελεγκτικής Υπηρεσίας στον οποίο περιλαμβάνονται και τα σχόλια του Τμήματος Αναπτύξεως Υδάτων επί των παρατηρήσεων και εισηγήσεων σας.

Τονίζεται πως το Τμήμα Αναπτύξεως Υδάτων λαμβάνει πάντα σοβαρά υπόψη της συστάσεις της Ελεγκτικής Υπηρεσίας και καταβάλλει κάθε προσπάθεια για την πλήρη εφαρμογή τους. Περαιτέρω αναφέρεται πως το Τμήμα στην παρούσα φάση εκπονεί τη Μελέτη Αναθεώρησης Υδατικής Πολιτικής η οποία αναμένεται να αξιολογήσει σφαιρικά τις επιπτώσεις της κλιματικής αλλαγής στον τομέα των υδάτινων πόσων στην Κύπρο και να αναδείξει συγκεκριμένες δράσεις προσαρμογής.

Πέραν της ανωτέρω μελέτης το ΤΑΥ κατά τα έτη 2023 και 2024 έχει εξασφαλίσει την έγκριση του Υπουργικού Συμβουλίου για τα ακόλουθα σημαντικά έγγραφα καθορισμού του πλαισίου της υδατικής πολιτικής τα οποία περιλαμβάνουν σημαντικά μέτρα, δράσεις και έργα προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων:

i. Σχέδιο Διαχείρισης Λεκάνης Απορροής
ii. Σχέδιο Διαχείρισης Κινδύνων Πλημμύρας
iii. Εθνικό Επενδυτικό Πλάνο Υδατικών Έργων
iv. Πρόγραμμα Δράσης για την αντιμετώπιση της λειψυδρίας.

ΓΕΩΡΓΙΟΣ ΚΑΖΑΝΤΖΗΣ
Αν. Διευθυντής

EsotElegx-L-25020702

Τμήμα Αναπτύξεως Υδάτων, Λεωφόρος Κέννεντυ 100-110, 1047 Παλλουριώτισσα, Λευκωσία, Κύπρος,
Τηλ.: (+357)22 609 000, Φαξ: (+357)22675019, E-mail: director@wdd.moa.gov.cy, Ιστοσελίδα: http://www.moa.gov.cy/wdd

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος

Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενη ωφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
1	4.1.2.2 (α)	Τα στοιχεία τα οποία περιλαμβάνονται στο υδατικό ισοζύγιο να βασίζονται σε επικαιροποιημένα στοιχεία.	Καταβάλλονται όλες οι δυνατές προσπάθειες - εντός του πλαισίου των διαθέσιμων πόρων - για τη διατήρηση των δεδομένων όσο το δυνατόν περισσότερο ενημερωμένα/ επικαιροποιημένα. Στόχος της Υπηρεσίας είναι να αναθεωρήσει και επικαιροποιήσει την μεθοδολογία υπολογισμού του υδατικού ισοζυγίου, η οποία είχε καθοριστεί στο παρελθόν, ώστε να είναι πιο ακριβής και να λαμβάνει υπόψη τα πλέον διαθέσιμα και επικαιροποιημένα στοιχεία.	Υπ. Υδρομετερίας + Υπ. Υδρολογίας	Τέλος 2025	Περισσότερη ακρίβεια στον υπολογισμό του Υδατικού Ισοζυγίου
2	4.1.2.2	Οι υδατικές ανάγκες να υπολογίζονται λαμβάνοντας υπόψη και την πραγματική κατανάλωση εντός και εκτός ΚΥΕ (περιλαμβανομένου ιδιωτικών γεωτρήσεων και Αρδευτικών Τμημάτων). Επίσης το ΤΑΥ να τηρεί στοιχεία κατανάλωσης εντός και εκτός ΚΥΕ, τα οποία θα συμβάλουν στην ενιαία και ορθολογιστική διαχείριση των υδάτινων πόρων. Σημειώνουμε ότι σύμφωνα με το άρθρο 128 (1) του Νόμου, το ΤΑΥ δύναται να απαιτήσει από, μεταξύ άλλων, Αρδευτικό Τμήμα η Αρδευτικό Σύνδεσμο να του παρέχει τέτοιες πληροφορίες ως προς την ποσότητα, την ποιότητα και τη χρήση του νερού ή ως προς τις υδατικές του εγκαταστάσεις και κατά τέτοιο χρόνο και τύπο, όπως ο Διευθυντής ήθελε εύλογα ορίσει στη σχετική απαίτηση του. Επιπλέον η χρήση τεχνολογίας θα μπορούσε να συμβάλει στην οικονομικότερη, αποδοτικότερη και αποτελεσματικότερη διαδικασία τήρησης των υπό αναφορά στοιχείων, όπως για παράδειγμα η χρήση έξυπνων μετρητών συνδεδεμένων με το μηχανογραφικό σύστημα τιμολόγησης νερού, εισαγωγή των καταναλώσεων απευθείας από τα Αρδευτικά Τμήματα κλπ.	1. Το ετήσιο Σενάριο Κατανομής Νερού, το οποίο ετοιμάζεται από το ΤΑΥ και εγκρίνεται από το Υπουργικό Συμβούλιο, αφορά αποκλειστικά τα ΚΥΕ. Η επικέντρωση στα ΚΥΕ δικαιολογείται αφενός επειδή τα έργα αυτά ανήκουν στην ευθύνη και αρμοδιότητα του ΤΑΥ, αφετέρου επειδή επιτρέπουν άμεσο, ευέλικτο και αποτελεσματικό έλεγχο της υδροληψίας, διανομής και κατανάλωσης του νερού. Αντίθετα, η ποσότητα νερού που αντλείται από ιδιωτικές γεωτρήσεις και Αρδευτικά Τμήματα εμπίπτει στην αρμοδιότητα του οικείου Έπαρχου, σύμφωνα με τον περί Αρδευτικών Τμημάτων (Χωριά) Νόμο. Παρότι οι ποσότητες αυτές δεν περιλαμβάνονται στο ετήσιο Σενάριο, παρακολουθούνται μέσω των αδειών υδροληψίας, όπως προβλέπεται στο Μέρος VIII του περί Ενιαίας Διαχείρισης Υδάτων Νόμου. Επομένως, η σύσταση για ένταξή τους στο Σενάριο θα δημιουργούσε αλληλεπικάλυψη αρμοδιοτήτων και θα επιφόρτιζε αδικαιολόγητα το ΤΑΥ με στοιχεία που δεν εμπίπτουν στην άμεση δικαιοδοσία του. 2. Το άρθρο 128(1) του Νόμου παρέχει στο ΤΑΥ το δικαίωμα να ζητά πληροφορίες για την ποσότητα, την ποιότητα και τη χρήση του νερού. Το ΤΑΥ αξιοποιεί ήδη αυτό το δικαίωμα, λαμβάνοντας τα απαραίτητα δεδομένα από τα αρμόδια Αρδευτικά Τμήματα και άλλους οργανισμούς. Ωστόσο, η υποχρέωση τήρησης πλήρων και διαρκώς επικαιροποιημένων στοιχείων κατανάλωσης για κάθε πηγή νερού εκτός ΚΥΕ ενδέχεται να επιφέρει δυσανάλογη διοικητική επιβάρυνση, χωρίς να προσφέρει σημαντικό όφελος στη διαχείριση των ΚΥΕ, που αποτελούν τον βασικό άξονα σχεδιασμού και υλοποίησης της ετήσιας στρατηγικής. 3. Το ΤΑΥ έχει ήδη προχωρήσει στην εγκατάσταση αριθμού έξυπνων μετρητών στα ΚΥΕ, γεγονός που συμβάλλει στην αποδοτικότερη και ακριβέστερη καταγραφή των καταναλώσεων. Παρόλα αυτά, η καθολική εφαρμογή τέτοιων συστημάτων απαιτεί σημαντικό χρόνο και επιπλέον οικονομικούς πόρους. Δεδομένων των δυσκολιών (οικονομικών και έλλειψης προσωπικού), η υλοποίηση ενός εκτεταμένου δικτύου έξυπνων μετρητών καθίσταται εξαιρετικά δύσκολη για το ΤΑΥ την παρούσα περίοδο. Ως εκ τούτου, προκρίνεται η συνέχιση της σταδιακής ενσωμάτωσης τέτοιων συστημάτων, αξιοποιώντας διαθέσιμους πόρους και εναλλακτικές χρηματοδοτήσεις. 4. Το ΤΑΥ παραμένει προσηλωμένο στη διασφάλιση μιας ενιαίας και ορθολογικής διαχείρισης των υδάτινων πόρων στο πλαίσιο των αρμοδιοτήτων του. Οι υφιστάμενες διαδικασίες για τα ΚΥΕ προσφέρουν την απαραίτητη ευελιξία και αποτελεσματικότητα, ενώ η παρακολούθηση των ιδιωτικών υδροληψιών μέσω των αδειοδοτικών μηχανισμών κρίνεται επαρκής. Η πρόταση για ενσωμάτωση όλων των καταναλώσεων στο ετήσιο Σενάριο και η καθολική εφαρμογή έξυπνων μετρητών, θα πρέπει να επανεξεταστεί με βάση την αναλογικότητα κόστους-οφέλους και την πραγματική δυνατότητα εφαρμογής.	Υπ. Άρδευσης		
3	4.3.2.4	Η Έκθεση για την Αξιολόγηση των Κινδύνων που επιφέρει η Κλιματική Αλλαγή χρειάζεται να επικαιροποιηθεί ώστε να αναγνωριστούν ενδεχόμενοι νέοι κίνδυνοι που πιθανόν να σχετίζονται με τις επιπτώσεις της κλιματικής αλλαγής ή/και για να επικαιροποιηθούν οι μετρήσεις και οι επιπτώσεις των κινδύνων που είχαν αναγνωριστεί παλαιότερα. Επιπλέον, ως καλή πρακτική, η αξιολόγηση κινδύνου θα πρέπει να επανεξετάζεται περιοδικά για να είναι πιο αποτελεσματική και, εάν είναι απαραίτητο, να επαναξιολογείται όταν καταστούν διαθέσιμα νέα δεδομένα. Επίσης, ανάλογα με το επίπεδο έκθεσης σε κάθε κίνδυνο, συνιστάται διαφορετική παρακολούθηση. Για παράδειγμα, ένας κίνδυνος με υψηλή αρνητική επίδραση και πιθανότητα εμφάνισης, απαιτεί ενεργή διαχείριση και θα πρέπει να παρακολουθείται και να επανεξετάζεται συνεχώς.	Αφορά το Τμ. Περιβάλλοντος			
4	4.3.5	Το Υπουργείο ΓΑΑΠ θα πρέπει να ενημερώσει, το συντομότερο δυνατό, το ΥΣ για την παράλειψη υποβολής της Στρατηγικής Μελέτης για τη Διαχείριση των Υδάτων και Αντιμετώπιση της Ανομβρίας, σε περιβαλλοντική εκτίμηση και να διασφαλίσει ότι συμμορφώνεται με τις υποχρεώσεις που προκύπτουν από τις διατάξεις της υπό αναφοράς νομοθεσίας για εκπόνηση ΣΜΠΕ.	Έχουν ληφθεί υπόψη οι συστάσεις της Ε.Υ. Σημειώνεται ότι η Στρατηγική Μελέτη Περιβαλλοντικών Επιπτώσεων (ΣΜΠΕ) δεν εκπονήθηκε για τη Στρατηγική Μελέτη Διαχείρισης των Υδάτων του 2019, καθώς αυτή αποτελούσε ενδιάμεση έκθεση και όχι την πλήρη αναθεώρηση της Υδατικής Πολιτικής, η οποία είχε εκπονηθεί το 2011. Από τον Δεκέμβριο του 2024 βρίσκεται υπό εξέλιξη η Μελέτη Αναθεώρησης της Υδατικης Πολιτικής, και με την ολοκλήρωσή της θα ακολουθήσει η ετοιμασία της ΣΜΠΕ, σύμφωνα με τις προβλεπόμενες διαδικασίες και νομοθετικές απαιτήσεις.	Υπ. Προγραμματισμού		

1/4

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος
Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
5	4.3.8	Το ΤΑΥ να προχωρήσει, το συντομότερο δυνατό, στην αναθεώρηση/ επικαιροποίηση της Έκθεσης Υδατικής Πολιτικής, ώστε να προσαρμοστεί στις τρέχουσες συνθήκες, δεδομένα και εξελίξεις που προκύπτουν, μεταξύ άλλων, από την κλιματική αλλαγή. Αυτό θα οδηγήσει τόσο στον προσδιορισμό, όσο και την δέουσα εκτίμηση όλων των κινδύνων που επιφέρει η κλιματική αλλαγή στους υδάτινους πόρους και σχετίζονται με την αύξηση των αναγκών και τον περιορισμό των υδάτινων πόρων και θα υποβοηθήσει στον έγκαιρο σχεδιασμό και εφαρμογή των κατάλληλων μέτρων.	Η Μελέτη Αναθεώρησης της Υδατικής Πολιτικής βρίσκεται σε εξέλιξη από τον Δεκέμβριο του 2024. Με την ολοκλήρωσή της θα ακολουθήσει η εκπόνηση της Στρατηγικής Μελέτης Περιβαλλοντικών Επιπτώσεων, σύμφωνα με τις ισχύουσες διαδικασίες και νομοθετικές απαιτήσεις. Σημειώνεται πως σύμφωνα με τους όρους εντολής της Σύμβασης, ο Ανάδοχος προχωρήσει στην καταγραφή των υφιστάμενων πηγών νερού και των αντίστοιχων αναγκών και την περαιτέρω ανάλυση τους για προσδιορισμό τόσο του υφιστάμενου υδατικού ισοζυγίου όσο και του μελλοντικού μέχρι το 2050. Λαμβάνοντας υπόψη διάφορες παραμέτρους επηρεασμού όπως βροχόπτωση, πληθυσμός κ.λπ. Απαραίτητη προϋπόθεση για τον υπολογισμό της μελλοντικής κατάστασης είναι και η εκτίμηση των επιπτώσεων της κλιματικής αλλαγής και των δυνητικών κινδύνων που μπορεί να επιφέρουν στο υδατικό ισοζύγιο μέχρι και το έτος 2050	Υπ. Προγραμματισμού		
6	4.3.9	Το ΤΑΥ να ολοκληρώνει έγκαιρα την επικαιροποίηση του ΣΔΞ, ώστε να αντανακλώνται σε αυτό τα νέα δεδομένα που προκύπτουν από την κλιματική αλλαγή, για αποτελεσματικότερη διαχείριση των περιορισμένων υδατικών πόρων.	Το Σχέδιο Διαχείρισης της Ξηρασίας ετοιμάζεται και επικαιροποιείται μαζί με το ΣΔΛΑΠ στα πλαίσια της ίδιας Σύμβασης κάθε 6 χρόνια.	Υπ. Υδρολογίας		
7	4.4.1.2 (β)	Για σκοπούς ενιαίας διαχείρισης των υδάτινων πόρων, το ΤΑΥ, σε συνεργασία με τα Υπουργεία ΓΑΑΠ και Εσωτερικών, να μελετήσει, στο πλαίσιο της οικονομικότητας, αποτελεσματικότητας και αποδοτικότητας, το ενδεχόμενο ανάθεσης της διαχείρισης όλων των ταμιευτήρων/αποθεμάτων νερού σε αυτό	Ένα τέτοιο ενδεχόμενο θα αύξανε σημαντικά το εύρος εργασιών του ΤΑΥ και τις ανάγκες του σε ανθρώπινο δυναμικό και οικονομικούς πόρους. Το ΤΑΥ έχει ήδη ζητήσει από το Υπ. Εσωτερικών να υποβάλει συγκεντρωτική έκθεση που αφορά όλα τα Αρδευτικά Τμήματα που βρίσκονται υπό τη δικαιοδοσία του (πέραν των 300 παγκυπρίως) ώστε να αξιολογηθεί η απόδοση και η βιωσιμότητα τους. Το θέμα της συνολικής διαχείρισης των Αρδευτικών Τμημάτων από άλλο φορέα, αναμένεται να αξιολογηθεί στα πλαίσια του Σχεδίου Δράσης για τη Μεταρρύθμιση του Τομέα των Υδάτινων Πόρων το οποίο υλοποιείται στα πλαίσια του Σχεδίου Ανάκαμψης και Ανθεκτικότητας	Υπ. Προγραμματισμού + Υπ. Άρδευσης + Υπ. Ασφάλειας Φραγμάτων + Μονάδα Ελέγχου		
8	4.4.1.2	Η ενσωμάτωση και ευρεία εφαρμογή νέων τεχνολογιών, όπως η τοποθέτηση πλωτών φωτοβολταϊκών συστημάτων σε φράγματα και δεξαμενές, μπορεί να μειώσει την εξάτμιση, να εξοικονομήσει νερό, και να παράγει ηλεκτρική ενέργεια για τη μείωση του κόστους λειτουργίας. Επίσης, μια ενιαία προσέγγιση στη διαχείριση των αποθεμάτων νερού στα φράγματα είναι πολύ σημαντική για τη βιώσιμη διαχείριση των υδάτινων πόρων στην Κύπρο.	Το ΤΑΥ σε συνεργασία με το Υπουργείο Ενέργειας, Εμπορίου και Βιομηχανίας έχει πετύχει την τεχνική υποστήριξη από την Ευρωπαϊκή Ένωση (TSI) για υλοποίηση του έργου: Technical support for floating photovoltaics, energy storage and offshore renewables in Cyprus. Το έργο αποσκοπεί: (α) να αναδείξει τη σκοπιμότητα, τις τεχνικές απαιτήσεις και το διαθέσιμο δυναμικό για υλοποίηση έργων εγκατάστασης πλωτών φωτοβολταϊκών συστημάτων σε φράγματα, έργων αντλιοταμίευσης και υπεράκτιων έργων ΑΠΕ στην Κύπρο, (β) να προσδιορίσει τα κατάλληλα μοντέλα υλοποίησης και χρηματοδότησης των έργων και (γ) να προσδιορίσει τις δυνατότητες ανάπτυξης ενός νομικού πλαισίου και προγραμμάτων στήριξης των έργων αυτών	Υπ. Πληροφορικής + Υπ. Άρδευσης	Τέλος 2025	
9	4.4.1.3	Να προωθηθεί η εφαρμογή τεχνολογιών που βελτιώνουν την απόδοση και μειώνουν το κόστος λειτουργίας των μονάδων αφαλάτωσης και η επένδυση σε ανανεώσιμες πηγές ενέργειας (π.χ. ηλιακή ενέργεια) για τη λειτουργία τους, ώστε να μειωθεί το ενεργειακό και περιβαλλοντικό κόστος. Επίσης, με σκοπό την κάλυψη προσωρινών αναγκών σε περιπτώσεις όπως η καταστροφή στη μονάδα αφαλάτωσης στην Πάφο, να προωθηθεί η δυνατότητα ταχείας ενεργοποίησης κινητών μονάδων αφαλάτωσης, ώστε να καλύπτονται προσωρινές ανάγκες. Επίσης, να γίνεται τακτική επικαιροποίηση του ΣΔΞ, ώστε να επιτυγχάνεται η εξισορρόπηση της κάλυψης των αναγκών ύδρευσης από τις διαθέσιμες πηγές νερού και η βελτιστοποίηση της υδατικής πολιτικής.	(1) Το ΤΑΥ παρακολουθεί και διερευνά συνεχώς νέες τεχνολογίες για τη βελτίωση της απόδοσης των υδατικών του έργων και τη μείωση του ενεργειακού και περιβαλλοντικού τους κόστους. Γενικά, οι υφιστάμενες Αφαλατώσεις έχουν κατανάλωση ενέργειας (ηλεκτρικού ρεύματος) που κυμαίνεται από 3.2 έως 4.3 Kwh/m3, που είναι στα επίπεδα της παγκόσμιας αγοράς. (2) Πολύ πριν την καταστροφή της Αφαλάτωσης Πάφου τον Δεκέμβρη του 2024, λόγω της άσχημης υδατικής κατάστασης, το ΤΑΥ εκπόνησε τον Σεπτέμβριο 2024 το Πρόγραμμα Δράσης για την αντιμετώπιση της ανομβρίας και της λειψυδρίας το οποίο εγκρίθηκε από το Υπ. Συμβούλιο στις 14/11/2024. Το Πρόγραμμα μεταξύ άλλων, προνοεί την εγκατάσταση Κινητών Μονάδων Αφαλάτωσης (ΚΜΑ) αλλά και τη διερεύνηση επέκτασης των υφιστάμενων Μονάδων καθώς και τον προγραμματισμό υλοποίησης νέων Μόνιμων αφαλατώσεων. (3) Στα πλαίσια υλοποίησης του Προγράμματος Δράσης το ΤΑΥ έχει ήδη προχωρήσει με τον Διαγωνισμό ΤΑΥ 4/2025 ο οποίος προκυρήχθηκε στις 29/01/2025 και αφορά την εγκατάσταση ΚΜΑ στην Πάφο. Περαιτέρω ετοιμάζονται έγγραφα διαγωνισμού για εγκατάσταση ΚΜΑ στο Γαρύλλη, στη Μονή και στο Λιμάνι Λεμεσού. (4) Αμέσως μετά την καταστροφή της Αφαλάτωσης Πάφου, το ΤΑΥ προχώρησε, μέσω του eprocurement, σε ανακοίνωση για δήλωση ενδιαφέροντος για προκαταρκτική διαβούλευση αγοράς αφαλατωμένου νερού (WDD PMC 1/2025), με σκοπό τη διερεύνηση των διαθέσιμων επιλογών για την αγορά πόσιμου νερού από άλλες μονάδες αφαλάτωσης. Η ημερομηνία υποβολής των προτάσεων ήταν στις 03/02/2025. Η διαδικασία βρίσκεται στο στάδιο της αξιολόγησης. (5) Το Σχέδιο Διαχείρισης της Ξηρασίας ετοιμάζεται και επικαιροποιείται μαζί με το ΣΔΛΑΠ στα πλαίσια της	Υπ. Ύδρευσης + Υπ. Πληροφορικής + Υπ. Υδρολογίας		
10	4.4.1.4	Βελτίωση αξιοποίησης ανακυκλωμένου ανακτημένου νερού, περιορισμός απορρίψεων στη θάλασσα και ενίσχυση ποιοτικού ελέγχου.	Λόγω της εφαρμογής από Ιούνιο του 2023, του Κανονισμού (ΕΕ) 2020/741 του Ευρωπαϊκού Κοινοβουλίου και του Συμβουλίου της 25ης Μαΐου 2020 σχετικά με τις ελάχιστες απαιτήσεις για την επαναχρησιμοποίηση των υδάτων ο ποιοτικός έλεγχος του ανακτημένου νερού έχει εντατικοποιηθεί και πληρεί τις απαιτήσεις του Κανονισμού.	Υπ. Αποχετεύσεων		

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Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

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Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
11	4.4.1.5 (α) (i)	Η ΣΕΔΥ να μελετά συνολικά την κατανομή νερού περιλαμβανομένου εκείνου που προέρχεται από ιδιωτικές γεωτρήσεις ή τυγχάνει διαχείρισης από Αρδευτικά Τμήματα	Περιλαμβάνεται στην απάντηση για τη Σύσταση 4.1.2.2	Υπ. Άρδευσης		
12	4.4.1.5 (α) (ii)	Πλήρης ενημέρωση του μητρώου γεωτρήσεων και διενέργεια ελέγχων για διαπίστωση της λειτουργίας τους.	Σύμφωνα με τους μέχρι τώρα επιτόπιους ελέγχους (όχι απλά ενημέρωση του μητρώου μέσω μηχανογράφησης των φακέλλων των γεωτρήσεων), οι γεωτρήσεις που δεν έχουν καταγραφεί μέχρι τώρα αφορούν κυρίως (50%) άρδευση κήπου κατοικίας με ποσότητες που δεν υπερβαίνουν τα 300 κ.μ. νερού το μέγιστο το χρόνο και γεωτρήσεις άρδευσης (20%) οι οποίες δεν αντλούν σημαντικές ποσότητες νερού, δηλ. κατά μέσο όρο πέραν των 700 - 1300 κ.μ. νερού ετήσια. Οι υπόλοιπες (30%) αφορούν γεωτρήσεις ανενεργές. Επομένως, δεν αναμένεται σημαντική αλλαγή στο υδατικό ισοζύγιο από την καταγραφή των γεωτρήσεων αυτών. Ούτως ή άλλως, χωρίς επιτόπια επίσκεψη στα τεμάχια και έλεγχο του τωρινού καθεστώτος της γεώτρησης δεν εξυπηρετεί η απλή καταγραφή στο μητρώο χιλιάδων φακέλλων γεωτρήσεων.	Υπ. Υπόγειων Υδάτων	Η πλήρης ενημέρωση του μητρώου (μηχανογράφηση φακέλλων) αναμένεται να γίνει μέχρι το τέλος του 2027	
13	4.4.1.5 (α) (iii)	Το Τμήμα να προχωρήσει άμεσα στην εφαρμογή υδρομετρητών με τηλεμετρικά όργανα, ιδιαίτερα στις γεωτρήσεις των Τοπικών Αρχών, αλλά και των μεγάλων καταναλωτών, για την άμεση συλλογή δεδομένων κατανάλωσης νερού εξ αποστάσεως, την καλύτερη παρακολούθηση και εντοπισμό αυτών που υπερβαίνουν τα όρια αδειοδότησης τους και την έγκαιρη λήψη μέτρων.	Το ΤΑΥ έχει εφαρμόσει σε πιλοτικό επίπεδο υδρομετρητές με τηλεμετρικά όργανα και το επόμενο διάστημα αναμένεται να προωθήσει την υποχρεωτική εγκατάσταση τους από τους κατόχους Αδειών Υδροληψίας, ξεκινώντας από τους μεγάλους καταναλωτές και τις Κοινότητες. Ο καθορισμός των συγκεκριμένων τεχνικών προδιαγραφών των υδρομετρητών θα αποτελεί μέρος των όρων των Αδειών Υδροληψίας.	Υπ. Πληροφορικής + Υπ. Υπόγειων Υδάτων + Επαρχιακά Γραφεία		
14	4.4.1.5 (β) (ii)	Τάχιστη λήψη μέτρων για τη διασφάλιση επαρκούς υδροδότησης των Κοινοτήτων που βασίζονται σε γεωτρήσεις/πηγές και πρόληψη προβλημάτων λόγω ποιοτικής ή ποσοτικής υποβάθμισης των υδροφορέων.	Το ΤΑΥ έχει εντάξει στον Κατάλογο 2 του Εθνικού Επενδυτικού Πλάνου Υδατικών Έργων έργα που αποσκοπούν στην κάλυψη των υδρευτικών αναγκών κοινοτήτων, οι οποίες σήμερα βασίζονται σε γεωτρήσεις ή πηγές, όπως το Διυλιστήριο Νερού στο Φράγμα Ευρέτου και το Διυλιστήριο Νερού στο Φράγμα Σολέας.	Υπ. Προγραμματισμού		
15	4.4.1.5	(i) Συνολική διαχείριση των υδάτινων πόρων, συμπεριλαμβανομένων των ιδιωτικών γεωτρήσεων και των αρδευτικών έργων. (ii) Ενημέρωση του μητρώου γεωτρήσεων και εφαρμογή τηλεμετρικών συστημάτων για παρακολούθηση της κατανάλωσης. (iii) Λήψη άμεσων μέτρων για τη διασφάλιση επαρκούς και ποιοτικού πόσιμου νερού στις κοινότητες που εξαρτώνται από γεωτρήσεις και πηγές.	(I) Στο πλαίσιο της Μελέτης Αναθεώρησης της Υδατικής Πολιτικής, ο μελετητής του έργου θα καταγράψει και θα υπολογίσει τις ανάγκες σε παγκύπρια βάση, συμπεριλαμβανομένων των αρδευτικών τμημάτων και των κοινοτήτων που δεν εξυπηρετούνται από ΚΥΕ. (II) Η διαχείριση των γεωτρήσεων γίνεται εδώ και καιρό και αυτό φαίνεται από την αισθητή μείωση των αιτήσεων τα τελευταία χρόνια (αναφέρεται στην έκθεση του Γ.Ε) και επομένως και της άντλησης. Αυτό έγινε λόγω των μέτρων που λαμβάνονται μέσω της σχετικής πολιτικής αδειοδότησης που εφαρμόζεται στο ΤΑΥ. Περαιτέρω το ΤΑΥ προωθεί την εγκατάσταση τηλεμετρητών ξεκινώντας από τους μεγάλους καταναλωτές και τις Κοινότητες (οι τηλεμετρητές αναμένεται να φθάνουν περίπου τους 1000 σε αριθμό). (III) Το ΤΑΥ προσπαθεί να ικανοποιήσει όλες τις ανάγκες με τις εκάστοτε κατάλληλες δράσεις: (α) με ένταξη των κοινοτήτων σε Κυβερνητικά Συστήματα Υδατοπρομήθειας, (β) με δημιουργία Ταχυδιυλιστηρίων επιφανειακών υδάτων και (γ) με αξιοποίηση νέων γεωτρήσεων όπου απαιτείται (βλ. και απάντηση με Α/Α 14)	Υπ. Προγραμματισμού + Υπ. Άρδευσης + Υπ. Υπόγειων Υδάτων + Υπ. Πληροφορικής	Τα τηλεμετρικά συστήματα αναμένεται να εφαρμοστούν μέχρι το 2027 για μέρος των μεγάλων καταναλωτών και κοινοτήτων	
16	4.4.1.6	Το νερό, ως κοινό αγαθό, θα πρέπει να είναι διαθέσιμο σε όλους τους πολίτες της Δημοκρατίας σε ομοιόμορφη τιμή, προς διασφάλιση της ισότιμης μεταχείρισης των πολιτών ανεξάρτητως του τόπου διαμονής τους, γι' αυτό θα πρέπει να εξεταστεί η θέσπιση ρυθμίσεων που να διασφαλίζουν τη δίκαιη και κατά το δυνατό ομοιόμορφη κατανομή του κόστους παροχής νερού ύδρευσης στους καταναλωτές παγκύπρια. Επιπλέον, η τιμολόγηση πρέπει να αντανακλά την πραγματική αξία του νερού, ώστε να ενθαρρύνει την εξοικονόμηση και τη βιώσιμη διαχείρισή του, μειώνοντας την πίεση στους υδάτινους πόρους σε περιόδους ξηρασίας.	Το ΤΑΥ ετοιμάζει έγγραφα διαγωνισμού για ανάθεση σύμβασης σε εμπειρογνώμονες για την εκπόνηση Μελέτης Αναθεώρησης της Τιμολογιακής Πολιτικής. Η Μελέτη αναμένεται να αξιοποιήσει δεδομένα και στοιχεία που θα προκύψουν από την αντίστοιχη Μελέτη Αναθεώρησης Υδατικής Πολιτικής που βρίσκεται υπό εκπόνηση.	Υπ. Προγραμματισμού + Υπ. Άρδευσης	Φεβρουάριος 2026	
17	4.4.2.1 (α)	Εφαρμογή της Απόφασης αρ. 82.555, ημερ. 18.5.2017 του ΥΣ.	Αφορά το Τμ. Περιβάλλοντος			

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Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος
Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
18	4.4.2.1 (β)	(i) Εφαρμογή των Αποφάσεων του ΥΣ από το ΤΠ, τη ΓΔ Περιβάλλοντος του Υπουργείου ΓΑΑΠ και τα εμπλεκόμενα Υπουργεία/Υφυπουργεία. (ii) Παρακολούθηση της υλοποίησης της στρατηγικής και του Σχεδίου Δράσης από το ΤΠ και τα εμπλεκόμενα Υπουργεία/Υφυπουργεία. (iii) Έλεγχος των ενημερωτικών σημειωμάτων που ετοιμάζει το ΤΠ και που το Υπουργείο ΓΑΑΠ προωθεί στο ΥΣ, σε σχέση με τις Υπουργικές Αποφάσεις. (iv) Λήψη διορθωτικών μέτρων για αύξηση του βαθμού υλοποίησης της στρατηγικής και του Σχεδίου Δράσης.	Αφορά το Τμ. Περιβάλλοντος			
19	4.4.2.1 (γ)	(i) Τα μέτρα τα οποία περιλαμβάνονται στο Σχέδιο Δράσης να συνδέονται με συγκεκριμένες, μετρήσιμες, επιτεύξιμες, σχετικές και χρονικά καθορισμένες δράσεις υλοποίησης, η οποία να παρακολουθείται με κατάλληλους δείκτες. (ii) Να διενεργείται εκτίμηση του κόστους υλοποίησης για κάθε μία συγκεκριμένη δράση. (iii) Για κάθε δράση να καθοριστεί συγκεκριμένο χρονοδιάγραμμα υλοποίησης. (iv) Η κάθε δράση να προτεραιοποιηθεί βάσει του αντικτύπου που αναμένεται να επιφέρει στην επίτευξη του σκοπού του μέτρου και της αντιμετώπισης του σχετικού κινδύνου.	Αφορά το Τμ. Περιβάλλοντος			
20	4.4.2.2 (α) (i)	Το Τμήμα να παρακολουθεί τον βαθμό υλοποίησης των μέτρων που περιλαμβάνονται στο ΣΔΛΑΠ σε συχνότερη βάση, ώστε να μπορεί να λαμβάνει έγκαιρα κατάλληλα μέτρα για τη βελτίωση της υλοποίησης του σχεδίου.	Η πρόοδος της υλοποίησης των προγραμματισμένων μέτρων του προγράμματος μέτρων του ΣΔΛΑΠ παρακολουθείται όπως ορίζει η Οδηγία 2000/60/ΕΚ: κάθε έξι χρόνια στο ΣΔΛΑΠ και τρία χρόνια μετά τη δημοσίευση του κάθε ΣΔΛΑΠ σε ενδιάμεση έκθεση σύμφωνα με το άρθρο 15 της Οδηγίας. Η παρακολούθηση της προόδου σε πιο συχνή βάση θα λαμβάνεται υπόψη μόλις το επιτρέψουν οι διαθέσιμοι πόροι.	Υπ. Υδρομετρίας		
21	4.4.2.2 (α) (ii)	Στο πλαίσιο της παρακολούθησης του εκάστοτε ΣΔΛΑΠ, να υπολογίζεται ο βαθμός υλοποίησης του κάθε μέτρου και να παρακολουθείται η εφαρμογή της προτεραιοποίησης των μέτρων και των σχετικών χρονοδιαγραμμάτων που τίθενται στο σχέδιο.	Ο βαθμός υλοποίησης κάθε μέτρου αξιολογείται ήδη ποσοτικά ως προς τον υλοποιημένο προϋπολογισμό (μερίδιο του συνολικού προϋπολογισμού του μέτρου που έχει ήδη υλοποιηθεί). Περισσότερη έμφαση θα δοθεί στα επόμενα ΣΔΛΑΠ στην παρακολούθηση της εφαρμογή της προτεραιοποίησης των μέτρων και των σχετικών χρονοδιαγραμμάτων.	Υπ. Υδρομετρίας		
22	4.4.2.2 (β)	Το Τμήμα να εφαρμόζει τις προτάσεις που περιλαμβάνονται στο εν ισχύει ΣΔΞ.	Το ΤΑΥ λαμβάνει υπόψη τα αποτελέσματα των δεικτών ξηρασίας όπως προκύπτουν από το ΣΔΞ κατά τη διαδικασία ετοιμασίας της πρότασης προς ΣΕΔΥ για καθορισμό των ετήσιων ποσοτήτων νερού που θα δοθούν από τα ΚΥΕ για άρδευση και Ύδρευση.	Υπ. Άρδευσης + Υπ. Ύδρευσης + Υπ. Υδρολογίας		
23	1.2.1 (Πρόσθετες παράγραφοι Έκθεσης)	Το Τμήμα θα πρέπει να διασφαλίσει την έγκαιρη υλοποίηση των χρονοδιαγραμμάτων των πιο πάνω έργων/ δράσεων/ ενεργειών για τη βέλτιστη λειτουργία του μοντέλου λειτουργίας των μονάδων αφαλάτωσης.	Το ΤΑΥ στα πλαίσια των διαθέσιμων πόρων καταβάλλει κάθε δυνατή προσπάθεια για προώθηση όλων των αναπτυξιακών του δράσεων θέτοντας ως προτεραιότητα την υλοποίηση των έργων ενίσχυσης και ασφάλειας της ύδρευσης.	Υπ. Προγραμματισμού + Υπ. Μελετών		

4/4

(ii) **Sent:** 07 March 2025 07:45

Καλημέρα σας,

Αναφορικά με το πιο πάνω θέμα και σε συνέχεια της επιστολή του Αν. Διευθυντή ΤΑΥ με αρ. φακ. 05.22.001.003 ημερ. 28.02.2025 με την οποία σας υποβλήθηκε ο πίνακας με το Σχέδιο Δράσης Υλοποίησης Συστάσεων της Ελεγκτικής Υπηρεσίας που περιλαμβάνονται στην Ειδική Έκθεση ΠΕ 01/2025, επισυνάπτω αναθεωρημένο πίνακα και παρακαλώ για αντικατάσταση του προηγούμενου που είχε υποβληθεί.

Η αναθεώρηση του πίνακα αφορά σε διόρθωση/αναδιατύπωση της δράσης για υλοποίηση της Σύστασης που καταγράφεται στην παράγραφο 4.1.2.2 και κρίθηκε ως αναγκαία μετά από διευκρινίσεις που ζητήθηκαν από Λειτουργούς της Ελεγκτικής Υπηρεσίας.

Στη διάθεση σας για περαιτέρω διευκρινίσεις.

Το παρόν κοινοποιείται στη Γενική Διεύθυνση Γεωργίας και Αγροτικής Ανάπτυξης.

Sent: 10 March 2025 14:07

Χαιρετώ,

Σε συνέχεια της πιο κάτω ηλεκτρονικής αλληλογραφίας και μετά από διευκρινίσεις που ζητήθηκαν από Λειτουργούς της Ελεγκτικής Υπηρεσίας σας αναφέρω τα ακόλουθα:

1. Η εφαρμογή του Άρθρου 128(1) του περί της Ενιαίας Διαχείρισης Υδάτων Νόμου του 2010 [Ν.79(Ι)/2010] για απαίτηση πληροφοριών από Αρδευτικά Τμήματα, γίνεται κυρίως στα Αρδευτικά Τμήματα που υδροδοτούνται από Κυβερνητικά Υδατικά Έργα.
2. Για τα υπόλοιπα Αρδευτικά Τμήματα που δεν υδροδοτούνται από ΚΥΕ δεν είναι εύκολη η επικοινωνία με τους υπεύθυνους διαχειριστές.
3. Ωστόσο, το ΤΑΥ λαμβάνει πληροφορίες από όσα Αρδευτικά Τμήματα υποβάλλουν αίτηση για παροχή χορηγίας μέσω του Σχεδίου Ενισχύσεων Ήσσονος Σημασίας για Αντιμετώπιση Προβλημάτων Αρδευτικών Τμημάτων, μέσω του επισυναπτόμενου Εντύπου – Αίτηση προς τον Διευθυντή ΤΑΥ.
4. Περαιτέρω, επισυνάπτω δύο επιστολές με απορρέοντα συναντήσεων με τις οποίες ζητήθηκαν από το Υπουργείο Εσωτερικών και τις Επαρχιακές Διοικήσεις στοιχεία που αφορούν τα Αρδευτικά Τμήματα:
   i. Επιστολή ΤΑΥ ημερ. 11.10.2024 με απορρέοντα συνάντησης που διεξήχθη στο ΤΑΥ στις 14.11.2024, με θέμα την προώθηση δράσεων εξοικονόμησης νερού/ μείωσης απωλειών δικτύων διανομής νερού. – Ζητήθηκε όπως γίνει καταγραφή όλων των ενεργών Αρδευτικών Τμημάτων και Αρδευτικών Συνδέσμων από τις Επαρχιακές Διοικήσεις, με σκοπό να προσδιοριστούν οι πηγές νερού από τις οποίες εξυπηρετούνται και ο αντίστοιχος αριθμός καταναλωτών.
   ii. Επιστολή ΥΓΑΑΠ ημερ. 28.01.2025 με απορρέοντα σύσκεψης που διεξήχθη στο ΥΓΑΑΠ στις 17.01.2025, με θέμα τη διαχείριση Αρδευτικών Τμημάτων και Αρδευτικών Συνδέσμων. – Αποφασίστηκε όπως το Υπουργείο Εσωτερικών, μέσω των Επαρχιακών Διοικήσεων, να αξιολογήσει και να διαχωρίσει τα ΑΤ/ ΑΣ σε δύο πίνακες, τα βιώσιμα και τα μη βιώσιμα.

Στη διάθεση σας για περαιτέρω διευκρινίσεις.

Το παρόν κοινοποιείται στη Γενική Διεύθυνση Γεωργίας και Αγροτικής Ανάπτυξης.

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος
Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
1	4.1.2.2 (α)	Τα στοιχεία τα οποία περιλαμβάνονται στο υδατικό ισοζύγιο να βασίζονται σε επικαιροποιημένα στοιχεία.	Καταβάλλονται όλες οι δυνατές προσπάθειες - εντός του πλαισίου των διαθέσιμων πόρων - για τη διατήρηση των δεδομένων όσο το δυνατόν περισσότερο ενημερωμένα/ επικαιροποιημένα. Στόχος της Υπηρεσίας είναι να αναθεωρήσει και επικαιροποιήσει την μεθοδολογία υπολογισμού του υδατικού ισοζυγίου, η οποία είχε καθοριστεί στο παρελθόν, ώστε να είναι πιο ακριβής και να λαμβάνει υπόψη τα πλέον διαθέσιμα και επικαιροποιημένα στοιχεία.	Υπ. Υδρομετερτίας + Υπ. Υδρολογίας	Τέλος 2025	Περισσότερη ακρίβεια στον υπολογισμό του Υδατικού Ισοζυγίου
2	4.1.2.2	Οι υδατικές ανάγκες να υπολογίζονται λαμβάνοντας υπόψη και την πραγματική κατανάλωση εντός και εκτός ΚΥΕ (περιλαμβανομένου ιδιωτικών γεωτρήσεων και Αρδευτικών Τμημάτων). Επίσης το ΤΑΥ να τηρεί στοιχεία κατανάλωσης εντός και εκτός ΚΥΕ, τα οποία θα συμβάλουν στην ενιαία και ορθολογιστική διαχείριση των υδάτινων πόρων. Σημειώνουμε ότι σύμφωνα με το άρθρο 128 (1) του Νόμου, το ΤΑΥ δύναται να απαιτήσει από, μεταξύ άλλων, Αρδευτικό Τμήμα η Αρδευτικό Σύνδεσμο να του παρέχει τέτοιες πληροφορίες ως προς την ποσότητα, την ποιότητα και τη χρήση του νερού ή ως προς τις υδατικές του εγκαταστάσεις και κατά τέτοιο χρόνο και τύπο, όπως ο Διευθυντής ήθελε εύλογα ορίσει στη σχετική απαίτησή του. Επιπλέον η χρήση τεχνολογίας θα μπορούσε να συμβάλει στην οικονομικότερη, αποδοτικότερη και αποτελεσματικότερη διαδικασία τήρησης των υπό αναφορά στοιχείων, όπως για παράδειγμα η χρήση έξυπνων μετρητών συνδεδεμένων με το μηχανογραφικό σύστημα τιμολόγησης νερού, εισαγωγή των καταναλώσεων απευθείας από τα Αρδευτικά Τμήματα κλπ.	1. Το ετήσιο Σενάριο Κατανομής Νερού, το οποίο ετοιμάζεται από το ΤΑΥ και εγκρίνεται από το Υπουργικό Συμβούλιο, αφορά αποκλειστικά τα ΚΥΕ. Η επικέντρωση στα ΚΥΕ δικαιολογείται αφενός επειδή τα έργα αυτά ανήκουν στην ευθύνη και αρμοδιότητα του ΤΑΥ, αφετέρου επειδή επιτρέπουν άμεσο, ευέλικτο και αποτελεσματικό έλεγχο της υδροληψίας, διανομής και κατανάλωσης του νερού. Αντίθετα, η γενικότερη εποπτεία των Αρδευτικών Τμημάτων εμπίπτει στην αρμοδιότητα του αικείου Έπαρχου, σύμφωνα με τον περί Αρδευτικών Τμημάτων (Χωρικά) Νόμο. Η ποσότητα νερού που αντλείται από ιδιωτικές γεωτρήσεις για τις ανάγκες των Αρδευτικών Τμημάτων δεν περιλαμβάνονται στο ετήσιο Σενάριο. Η παρακολούθηση τους όμως είναι δυνατή μέσω των αδειών υδροληψίας, όπως προβλέπεται στο Μέρος VIII του περί Ενιαίας Διαχείρισης Υδάτων Νόμου. Σημειώνεται όμως πως η ένταξη τους στο Σενάριο απαιτεί την εκ των προτέρων επικαιροποίηση των αδειών υδροληψίας καθώς οι πλείστες είχαν εκδοθεί όταν την αρμοδιότητα είχαν οι Επαρχιακές Διοικήσεις. 2. Το άρθρο 128(1) του Νόμου παρέχει στο ΤΑΥ το δικαίωμα να ζητά πληροφορίες για την ποσότητα, την ποιότητα και τη χρήση του νερού. Το ΤΑΥ αξιοποιεί ήδη αυτό το δικαίωμα, λαμβάνοντας τα απαραίτητα δεδομένα από τα αρμόδια Αρδευτικά Τμήματα και άλλους οργανισμούς. Ωστόσο, η υποχρέωση τήρησης πλήρων και διαρκώς επικαιροποιημένων στοιχείων κατανάλωσης για κάθε πηγή νερού εκτός ΚΥΕ ενδέχεται να επιφέρει δυσανάλογη διοικητική επιβάρυνση, χωρίς να προσφέρει σημαντικό όφελος στη διαχείριση των ΚΥΕ, που αποτελούν τον βασικό άξονα σχεδιασμού και υλοποίησης της ετήσιας στρατηγικής. Το ΤΑΥ έχει ήδη ζητήσει από το Υπ. Εσωτερικών να υποβάλει συγκεντρωτική έκθεση που αφορά όλα τα Αρδευτικά Τμήματα ώστε να γίνει προπαρασκευή της απαιτούμενης εργασίας επικαιροποίησης των Αδειών Υδροληψίας που περιγράφεται στην προηγούμενη παράγραφο. 3. Το ΤΑΥ έχει ήδη προχωρήσει στην εγκατάσταση αριθμού έξυπνων μετρητών στα ΚΥΕ, γεγονός που συμβάλλει στην αποδοτικότερη και ακριβέστερη καταγραφή των καταναλώσεων. Παρόλα αυτά, η καθολική εφαρμογή τέτοιων συστημάτων απαιτεί σημαντικό χρόνο και επιπλέον οικονομικούς πόρους. Δεδομένων των δυσκολιών (οικονομικών και έλλειψης προσωπικού), η υλοποίηση ενός εκτεταμένου δικτύου έξυπνων μετρητών καθίσταται εξαιρετικά δύσκολη για το ΤΑΥ την παρούσα περίοδο. Ως εκ τούτου, προκρίνεται η συνέχιση της σταδιακής ενσωμάτωσης τέτοιων συστημάτων, αξιοποιώντας διαθέσιμους πόρους και εναλλακτικές χρηματοδοτήσεις. 4. Το ΤΑΥ παραμένει προσηλωμένο στη διασφάλιση μιας ενιαίας και ορθολογικής διαχείρισης των υδάτινων πόρων στο πλαίσιο των αρμοδιοτήτων του. Οι υφιστάμενες διαδικασίες για τα ΚΥΕ προσφέρουν την απαραίτητη ευελιξία και αποτελεσματικότητα, ενώ η παρακολούθηση των ιδιωτικών υδροληψιών μέσω των αδειοδοτικών μηχανισμών κρίνεται επαρκής. Η πρόταση για ενσωμάτωση όλων των καταναλώσεων στο ετήσιο Σενάριο και η καθολική εφαρμογή έξυπνων μετρητών, θα πρέπει να επανεξεταστεί με βάση την αναλογικότητα κόστους-οφέλους και την δυνατότητα σταδιακής εφαρμογής βάσει των διαθέσιμων πόρων.	Υπ. Άρδευσης + Υπ. Υπόγειων Υδάτων		
3	4.3.2.4	Η Έκθεση για την Αξιολόγηση των Κινδύνων που επιφέρει η Κλιματική Αλλαγή χρειάζεται να επικαιροποιηθεί ώστε να αναγνωριστούν ενδεχόμενοι νέοι κίνδυνοι που πιθανόν να σχετίζονται με τις επιπτώσεις της κλιματικής αλλαγής ήκαι για να επικαιροποιηθούν οι μετρήσεις και οι επιπτώσεις των κινδύνων που είχαν αναγνωριστεί παλαιότερα. Επιπλέον, ως καλή πρακτική, η αξιολόγηση κινδύνου θα πρέπει να επανεξετάζεται περιοδικά για να είναι πιο αποτελεσματική και, εάν είναι απαραίτητο, να επαναξιολογείται όταν καταστούν διαθέσιμα νέα δεδομένα. Επίσης, ανάλογα με το επίπεδο έκθεσης σε κάθε κίνδυνο, συνιστάται διαφορετική παρακολούθηση. Για παράδειγμα, ένας κίνδυνος με υψηλή αρνητική επίδραση και πιθανότητα εμφάνισης, απαιτεί ενεργή διαχείριση και θα πρέπει να παρακολουθείται και να επανεξετάζεται συνεχώς.	Αφορά το Τμ. Περιβάλλοντος			

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος
Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
4	4.3.5	Το Υπουργείο ΓΑΑΠ θα πρέπει να ενημερώσει, το συντομότερο δυνατό, το ΥΣ για την παράλειψη υποβολής της Στρατηγικής Μελέτης για τη Διαχείριση των Υδάτων και Αντιμετώπιση της Ανομβρίας, σε περιβαλλοντική εκτίμηση και να διασφαλίσει ότι συμμορφώνεται με τις υποχρεώσεις που προκύπτουν από τις διατάξεις της υπό αναφοράς νομοθεσίας για εκπόνηση ΣΜΠΕ.	Έχουν ληφθεί υπόψη οι συστάσεις της Ε.Υ. Σημειώνεται ότι η Στρατηγική Μελέτη Περιβαλλοντικών Επιπτώσεων (ΣΜΠΕ) δεν εκπονήθηκε για τη Στρατηγική Μελέτη Διαχείρισης των Υδάτων του 2019, καθώς αυτή αποτελούσε ενδιάμεση έκθεση και όχι την πλήρη αναθεώρηση της Υδατικής Πολιτικής, η οποία είχε εκπονηθεί το 2011. Από τον Δεκέμβριο του 2024 βρίσκεται υπό εξέλιξη η Μελέτη Αναθεώρησης της Υδατικής Πολιτικής, και με την ολοκλήρωσή της θα ακολουθήσει η ετοιμασία της ΣΜΠΕ, σύμφωνα με τις προβλεπόμενες διαδικασίες και νομοθετικές απαιτήσεις.	Υπ. Προγραμματισμού		
5	4.3.8	Το ΤΑΥ να προχωρήσει, το συντομότερο δυνατό, στην αναθεώρηση/ επικαιροποίηση της Έκθεσης Υδατικής Πολιτικής, ώστε να προσαρμοστεί στις τρέχουσες συνθήκες, δεδομένα και εξελίξεις που προκύπτουν, μεταξύ άλλων, από την κλιματική αλλαγή. Αυτό θα οδηγήσει τόσο στον προσδιορισμό, όσο και την δέουσα εκτίμηση όλων των κινδύνων που επιφέρει η κλιματική αλλαγή στους υδάτινους πόρους και σχετίζονται με την αύξηση των αναγκών και τον περιορισμό των υδάτινων πόρων και θα υποβοηθήσει στον έγκαιρο σχεδιασμό και εφαρμογή των κατάλληλων μέτρων.	Η Μελέτη Αναθεώρησης της Υδατικής Πολιτικής βρίσκεται σε εξέλιξη από τον Δεκέμβριο του 2024. Με την ολοκλήρωσή της θα ακολουθήσει η εκπόνηση της Στρατηγικής Μελέτης Περιβαλλοντικών Επιπτώσεων, σύμφωνα με τις ισχύουσες διαδικασίες και νομοθετικές απαιτήσεις. Σημειώνεται πως σύμφωνα με τους όρους εντολής της Σύμβασης, ο Ανάδοχος προχωρήσει στην καταγραφή των υφιστάμενων πηγών νερού και των αντίστοιχων αναγκών και την περαιτέρω ανάλυση τους για προσδιορισμό τόσο του υφιστάμενου υδατικού ισοζυγίου όσο και του μελλοντικού μέχρι το 2050, λαμβάνοντας υπόψη διάφορες παραμέτρους επηρεασμού όπως βροχόπτωση, πληθυσμός κ.λπ. Απαραίτητη προϋπόθεση για τον υπολογισμό της μελλοντικής κατάστασης είναι και η εκτίμηση των επιπτώσεων της κλιματικής αλλαγής και των δυνητικών κινδύνων που μπορεί να επιφέρουν στο υδατικό ισοζύγιο μέχρι και το έτος 2050	Υπ. Προγραμματισμού		
6	4.3.9	Το ΤΑΥ να ολοκληρώνει έγκαιρα την επικαιροποίηση του ΣΔΞ, ώστε να αντανακλώνται σε αυτό τα νέα δεδομένα που προκύπτουν από την κλιματική αλλαγή, για αποτελεσματικότερη διαχείριση των περιορισμένων υδατικών πόρων.	Το Σχέδιο Διαχείρισης της Ξηρασίας ετοιμάζεται και επικαιροποιείται μαζί με το ΣΔΛΑΠ στα πλαίσια της ίδιας Σύμβασης κάθε 6 χρόνια.	Υπ. Υδρολογίας		
7	4.4.1.2 (β)	Για ακαποδότικες ενιαίας διαχείρισης των υδάτινων πόρων, το ΤΑΥ, σε συνεργασία με τα Υπουργεία ΓΑΑΠ και Εσωτερικών, να μελετήσει, στο πλαίσιο της οικονομικότητας, αποτελεσματικότητας και αποδοτικότητας, το ενδεχόμενο ανάθεσης της διαχείρισης όλων των ταμιευτήρων/αποθεμάτων νερού, σε αυτό.	Ένα τέτοιο ενδεχόμενο θα αύξανε σημαντικά το εύρος εργασιών του ΤΑΥ και τις ανάγκες του σε ανθρώπινο δυναμικό και οικονομικούς πόρους. Το ΤΑΥ έχει ήδη ζητήσει από το Υπ. Εσωτερικών να υποβάλει συγκεντρωτική έκθεση που αφορά όλα τα Αρδευτικά Τμήματα που βρίσκονται υπό τη δικαιοδοσία του (πέραν των 300 παγκυπρίως) ώστε να αξιολογηθεί η απάδοση και η βιωσιμότητα τους. Το θέμα της συνολικής διαχείρισης των Αρδευτικών Τμημάτων από άλλο φορέα, αναμένεται να αξιολογηθεί στα πλαίσια του Σχεδίου Δράσης για τη Μεταρρύθμιση του Τομέα των Υδάτινων Πόρων το οποίο υλοποιείται στα πλαίσια του Σχεδίου Ανάκαμψης και Ανθεκτικότητας	Υπ. Προγραμματισμού + Υπ. Άρδευσης + Υπ. Ασφάλειας Φραγμάτων + Μονάδα Ελέγχου		
8	4.4.1.2	Η ενσωμάτωση και ευρεία εφαρμογή νέων τεχνολογιών, όπως η τοποθέτηση πλωτών φωτοβολταϊκών συστημάτων σε φράγματα και δεξαμενές, μπορεί να μειώσει την εξάτμιση, να εξοικονομήσει νερό, και να παραγάγει ηλεκτρική ενέργεια για τη μείωση του κόστους λειτουργίας. Επίσης, μια ενιαία προσέγγιση στη διαχείριση των αποθεμάτων νερού στα φράγματα είναι πολύ σημαντική για τη βιώσιμη διαχείριση των υδάτινων πόρων στην Κύπρο.	Το ΤΑΥ σε συνεργασία με το Υπουργείο Ενέργειας, Εμπορίου και Βιομηχανίας έχει πετύχει την τεχνική υποστήριξη από την Ευρωπαϊκή Ένωση (TSI) για υλοποίηση του έργου: Technical support for floating photovoltaics, energy storage and offshore renewables in Cyprus. Το έργο αποσκοπεί: (α) να αναδείξει τη σκοπιμότητα, τις τεχνικές απαιτήσεις και το διαθέσιμο δυναμικό για υλοποίηση έργων εγκατάστασης πλωτών φωτοβολταϊκών συστημάτων σε φράγματα, έργων αντλιοταμίευσης και υπεράκτιων έργων ΑΠΕ στην Κύπρο, (β) να προσδιορίσει τα κατάλληλα μοντέλα υλοποίησης και χρηματοδότησης των έργων και (γ) να προσδιορίσει τις δυνατότητες ανάπτυξης ενός νομικού πλαισίου και προγραμμάτων στήριξης των έργων αυτών	Υπ. Πληροφορικής + Υπ. Άρδευσης	Τέλος 2025	

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος
Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
9	4.4.1.3	Να προωθηθεί η εφαρμογή τεχνολογιών που βελτιώνουν την απόδοση και μειώνουν το κόστος λειτουργίας των μονάδων αφαλάτωσης και η επένδυση σε ανανεώσιμες πηγές ενέργειας (π.χ. ηλιακή ενέργεια) για τη λειτουργία τους, ώστε να μειωθεί το ενεργειακό και περιβαλλοντικό κόστος. Επίσης, με σκοπό την κάλυψη προσωρινών αναγκών σε περιπτώσεις όπως η καταστροφή στη μονάδα αφαλάτωσης στην Πάφο, να προωθηθεί η δυνατότητα ταχείας ενεργοποίησης κινητών μονάδων αφαλάτωσης, ώστε να καλύπτονται προσωρινές ανάγκες. Επίσης, να γίνεται τακτική επικαιροποίηση του ΣΔΞ, ώστε να επιτυγχάνεται η εξισορρόπηση της κάλυψης των αναγκών ύδρευσης από τις διαθέσιμες πηγές νερού και η βελτιστοποίηση της υδατικής πολιτικής.	**(1)** Το ΤΑΥ παρακολουθεί και διερευνά συνεχώς νέες τεχνολογίες για τη βελτίωση της απόδοσης των υδατικών του έργων και τη μείωση του ενεργειακού και περιβαλλοντικού τους κόστους. Γενικά, οι υφιστάμενες Αφαλατώσεις έχουν κατανάλωση ενέργειας (ηλεκτρικού ρεύματος) που κυμαίνεται από 3.2 έως 4.3 Kwh/m3, που είναι στα επίπεδα της παγκόσμιας αγοράς. **(2)** Πολύ πριν την καταστροφή της Αφαλάτωσης Πάφου τον Δεκέμβριο του 2024, λόγω της άσχημης υδατικής κατάστασης, το ΤΑΥ εκπόνησε τον Σεπτέμβριο 2024 το Πρόγραμμα Δράσης για την αντιμετώπιση της ανομβρίας και της λειψυδρίας το οποίο εγκρίθηκε από το Υπ. Συμβούλιο στις 14/11/2024. Το Πρόγραμμα μεταξύ άλλων, προνοεί την εγκατάσταση Κινητών Μονάδων Αφαλάτωσης (ΚΜΑ) αλλά και τη διερεύνηση επέκτασης των υφιστάμενων Μονάδων καθώς και τον προγραμματισμό υλοποίησης νέων Μόνιμων αφαλατώσεων. **(3)** Στα πλαίσια υλοποίησης του Προγράμματος Δράσης το ΤΑΥ έχει ήδη προχωρήσει με τον Διαγωνισμό ΤΑΥ 4/2025 ο οποίος προκυρήχθηκε στις 29/01/2025 και αφορά την εγκατάσταση ΚΜΑ στην Πάφο. Περαιτέρω ετοιμάζονται έγγραφα διαγωνισμού για εγκατάσταση ΚΜΑ στο Γαρύλλη, στη Μονή και στο Λεμύθι Λεμεσού. **(4)** Αμέσως μετά την καταστροφή της Αφαλάτωσης Πάφου, το ΤΑΥ προχώρησε, μέσω του eprocurement, σε ανακοίνωση για δήλωση ενδιαφέροντος για προκαταρκτική διαβούλευση αγοράς αφαλατωμένου νερού (WDD PMC 1/2025), με σκοπό τη διερεύνηση των διαθέσιμων επιλογών για την αγορά πόσιμου νερού από άλλες μονάδες αφαλάτωσης. Η ημερομηνία υποβολής των προτάσεων ήταν στις 03/02/2025. Η διαδικασία βρίσκεται στο στάδιο της αξιολόγησης. **(5)** Το Σχέδιο Διαχείρισης της Ξηρασίας ετοιμάζεται και επικαιροποιείται μαζί με το ΣΔΛΑΠ στα πλαίσια της ίδιας Σύμβασης κάθε 6 χρόνια.	**Υπ. Ύδρευσης + Υπ. Πληροφορικής + Υπ. Υδρολογίας**		
10	4.4.1.4	Βελτίωση αξιοποίησης ~~ανακυκλωμένου~~ ανακτημένου νερού, περιορισμός απορρίψεων στη θάλασσα και ενίσχυση ποιοτικού ελέγχου.	Λόγω της εφαρμογής από Ιούνιο του 2023, του Κανονισμού (ΕΕ) 2020/741 του Ευρωπαικού Κοινοβουλίου και του Συμβουλίου της 25ης Μαΐου 2020 σχετικά με τις ελάχιστες απαιτήσεις για την επαναχρησιμοποίηση των υδάτων ο ποιοτικός έλεγχος του ανακτημένου νερού έχει εντατικοποιηθεί και πληρεί τις απαιτήσεις του Κανονισμού.	**Υπ. Αποχετεύσεων**		
11	4.4.1.5 (α) (i)	Η ΣΕΔΥ να μελετά συνολικά την κατανομή νερού περιλαμβανομένου εκείνου που προέρχεται από ιδιωτικές γεωτρήσεις ή τυγχάνει διαχείρισης από Αρδευτικά Τμήματα	Περιλαμβάνεται στην απάντηση για τη Σύσταση 4.1.2.2	**Υπ. Άρδευσης**		
12	4.4.1.5 (α) (ii)	Πλήρης ενημέρωση του μητρώου γεωτρήσεων και διενέργεια ελέγχων για διαπίστωση της λειτουργίας τους.	Σύμφωνα με τους μέχρι τώρα επιτόπιους ελέγχους (όχι απλά ενημέρωση του μητρώου μέσω μηχανογράφησης των φακέλλων των γεωτρήσεων), οι γεωτρήσεις που δεν έχουν καταγραφεί μέχρι τώρα αφορούν κυρίως (50%) άρδευση κήπου κατοικίας με ποσότητες που δεν υπερβαίνουν τα 300 κ.μ. νερού το μέγιστο τα χρόνο και γεωτρήσεις άρδευσης (20%) οι οποίες δεν αντλούν σημαντικές ποσότητες νερού, δηλ. κατά μέσο όρο πέραν των 700 -1300 κ.μ. νερού ετήσια. Οι υπόλοιπες (30%) αφορούν γεωτρήσεις ανενεργές. Επομένως, δεν αναμένεται σημαντική αλλαγή στο υδατικό ισοζύγιο από την καταγραφή των γεωτρήσεων αυτών. Ούτως ή άλλως, χωρίς επιτόπια επίσκεψη στα τεμάχια και έλεγχο του τωρινού καθεστώτος της γεώτρησης δεν εξυπηρετεί η απλή καταγραφή στο μητρώο χιλιάδων φακέλλων γεωτρήσεων.	**Υπ. Υπόγειων Υδάτων**	Η πλήρης ενημέρωση του μητρώου (μηχανογράφηση φακέλλων) αναμένεται να γίνει μέχρι το τέλος του 2027	
13	4.4.1.5 (α) (iii)	Το Τμήμα να προχωρήσει άμεσα στην εφαρμογή υδρομετρητών με τηλεμετρικά όργανα, ιδαίτερα στις γεωτρήσεις των Τοπικών Αρχών, αλλά και των μεγάλων καταναλωτών, για την άμεση συλλογή δεδομένων κατανάλωσης νερού εξ αποστάσεως, την καλύτερη παρακολούθηση και εντοπισμό αυτών που υπερβαίνουν τα όρια αδειοδότησής τους και την έγκαιρη λήψη μέτρων.	Το ΤΑΥ έχει εφαρμόσει σε πιλοτικό επίπεδο υδρομετρητές με τηλεμετρικά όργανα και το επόμενο διάστημα αναμένεται να προωθήσει την υποχρεωτική εγκατάσταση τους από τους κατόχους Αδειών Υδροληψίας, ξεκινώντας από τους μεγάλους καταναλωτές και τις Κοινότητες. Ο καθορισμός των συγκεκριμένων τεχνικών προδιαγραφών των υδρομετρητών θα αποτελεί μέρος των όρων των Αδειών Υδροληψίας.	**Υπ. Πληροφορικής + Υπ. Υπόγειων Υδάτων + Επαρχιακά Γραφεία**		
14	4.4.1.5 (β) (ii)	Τάχιστη λήψη μέτρων για τη διασφάλιση επαρκούς υδροδότησης των Κοινοτήτων που βασίζονται σε γεωτρήσεις/πηγές και πρόληψη προβλημάτων λόγω ποιοτικής ή ποσοτικής υποβάθμισης των υδροφορέων	Το ΤΑΥ έχει εντάξει στον Κατάλογο 2 του Εθνικού Επενδυτικού Πλάνου Υδατικών Έργων έργα που αποσκοπούν στην κάλυψη των υδρευτικών αναγκών κοινοτήτων, οι οποίες σήμερα βασίζονται σε γεωτρήσεις ή πηγές, όπως το Δικλειστήριο Νερού στο Φράγμα Ευρέτου και το Δικλειστήριο Νερού στο Φράγμα Σολέας.	**Υπ. Προγραμματισμού**		
15	4.4.1.5	(i) Συνολική διαχείριση των υδάτινων πόρων, συμπεριλαμβανομένων των ιδιωτικών γεωτρήσεων και των αρδευτικών έργων. (ii) Ενημέρωση του μητρώου γεωτρήσεων και εφαρμογή τηλεμετρικών συστημάτων για παρακολούθηση της κατανάλωσης. (iii) Λήψη άμεσων μέτρων για τη διασφάλιση επαρκούς και ποιοτικού πόσιμου νερού στις κοινότητες που εξαρτώνται από γεωτρήσεις και πηγές.	(i) Στο πλαίσια της Μελέτης Αναθεώρησης της Υδατικής Πολιτικής, ο μελετητής του έργου θα καταγράψει και θα υπολογίσει τις ανάγκες σε παγκύπρια βάση, συμπεριλαμβανομένων των αρδευτικών τμημάτων και των κοινοτήτων που δεν εξυπηρετούνται από ΚΥΕ. (ii) Η διαχείριση των γεωτρήσεων γίνεται εδώ και καιρό και αυτό φαίνεται από την αισθητή μείωση των αιτήσεων τα τελευταία χρόνια (αναφέρεται στην έκθεση του Γ.Ε) και επομένως και της άντλησης. Αυτό έγινε λόγω των μέτρων που λαμβάνονται μέσω της σχετικής πολιτικής αδειοδότησης που εφαρμόζεται στο ΤΑΥ. Περαιτέρω το ΤΑΥ προωθεί την εγκατάσταση τηλεμετρητών ξεκινώντας από τους μεγάλους καταναλωτές και τις Κοινότητες (οι τηλεμετρητές ανανέωνεται να φθάνουν περίπου τους 1000 σε αριθμό). (iii) Το ΤΑΥ προσπαθεί να ικανοποιήσει όλες τις ανάγκες με τις εκάστοτε κατάλληλες δράσεις: (α) με ένταξη των κοινοτήτων σε Κυβερνητικά Συστήματα Υδατοπρομήθειας, (β) με δημιουργία Ταχυδιυλιστηρίων επιφανειακών υδάτων και (γ) με αξιοποίηση νέων γεωτρήσεων όπου απαιτείται (βλ. και απάντηση με Α/Α 14)	**Υπ. Προγραμματισμού + Υπ. Άρδευσης + Υπ. Υπόγειων Υδάτων + Υπ. Πληροφορικής**	Τα τηλεμετρικά συστήματα αναμένεται να εφαρμοστούν μέχρι το 2027 για μέρος των μεγάλων καταναλωτών και κοινοτήτων	

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση:" Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;"

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Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
16	4.4.1.6	Το νερό, ως κοινό αγαθό, θα πρέπει να είναι διαθέσιμο σε όλους τους πολίτες της Δημοκρατίας σε ομοιόμορφη τιμή, προς διασφάλιση της ισότιμης μεταχείρισης των πολιτών ανεξαρτήτως του τόπου διαμονής τους, γι'αυτό θα πρέπει να εξεταστεί η θέσπιση ρυθμίσεων που να διασφαλίζουν τη δίκαιη και κατά το δυνατό ομοιόμορφη κατανομή του κόστους παροχής νερού ύδρευσης στους καταναλωτές παγκύπρια. Επιπλέον, η τιμολόγηση πρέπει να αντανακλά την πραγματική αξία του νερού, ώστε να ενθαρρύνει την εξοικονόμηση και τη βιώσιμη διαχείρισή του, μειώνοντας την πίεση στους υδάτινους πόρους σε περιόδους ξηρασίας	Το ΤΑΥ ετοιμάζει έγγραφα διαγωνισμού για ανάθεση σύμβασης σε εμπειρογνώμονες για την εκπόνηση Μελέτης Αναθεώρησης της Τιμολογιακής Πολιτικής. Η Μελέτη αναμένεται να αξιοποιήσει δεδομένα και στοιχεία που θα προκύψουν από την αντίστοιχη Μελέτη Αναθεώρησης Υδατικής Πολιτικής που βρίσκεται υπό εκπόνηση.	Υπ. Προγραμματισμού + Υπ. Άρδευσης	Φεβρουάριος 2026	
17	4.4.2.1 (α)	Εφαρμογή της Απόφασης αρ. 82.555, ημερ. 18.5.2017 του ΥΣ.	Αφορά το Τμ. Περιβάλλοντος			
18	4.4.2.1 (β)	(i) Εφαρμογή των Αποφάσεων του ΥΣ από το ΤΠ, τη ΓΔ Περιβάλλοντος του Υπουργείου ΓΑΑΠ και τα εμπλεκόμενα Υπουργεία/Υφυπουργεία. (ii) Παρακολούθηση της υλοποίησης της στρατηγικής και του Σχεδίου Δράσης από το ΤΠ και τα εμπλεκόμενα Υπουργεία/Υφυπουργεία. (iii) Έλεγχος των ενημερωτικών σημειωμάτων που ετοιμάζει το ΤΠ και που το Υπουργείο ΓΑΑΠ προωθεί στο ΥΣ, σε σχέση με τις Υπουργικές Αποφάσεις. (iv) Λήψη διορθωτικών μέτρων για αύξηση του βαθμού υλοποίησης της στρατηγικής και του Σχεδίου Δράσης.	Αφορά το Τμ. Περιβάλλοντος			
19	4.4.2.1 (γ)	(i) Τα μέτρα τα οποία περιλαμβάνονται στο Σχέδιο Δράσης να συνδέονται με συγκεκριμένες, μετρήσιμες, επιτεύξιμες, σχετικές και χρονικά καθορισμένες δράσεις υλοποίησης, η οποία να παρακολουθείται με κατάλληλους δείκτες. (ii) Να διενεργείται εκτίμηση του κόστους υλοποίησης για κάθε μία συγκεκριμένη δράση. (iii) Για κάθε δράση να καθοριστεί συγκεκριμένο χρονοδιάγραμμα υλοποίησης. (iv) Η κάθε δράση να προτεραιοποιηθεί βάσει του αντικτύπου που αναμένεται να επιφέρει στην επίτευξη του σκοπού του μέτρου και της αντιμετώπισης του σχετικού κινδύνου.	Αφορά το Τμ. Περιβάλλοντος			
20	4.4.2.2 (α) (i)	Το Τμήμα να παρακολουθεί τον βαθμό υλοποίησης των μέτρων που περιλαμβάνονται στο ΣΔΛΑΠ σε συχνότερη βάση, ώστε να μπορεί να λαμβάνει έγκαιρα κατάλληλα μέτρα για τη βελτίωση της υλοποίησης του σχεδίου.	Η πρόοδος της υλοποίησης των προγραμματισμένων μέτρων του προγράμματος μέτρων του ΣΔΛΑΠ παρακολουθείται όπως ορίζει η Οδηγία 2000/60/ΕΚ: κάθε έξι χρόνια στο ΣΔΛΑΠ και τρία χρόνια μετά τη δημοσίευση του κάθε ΣΔΛΑΠ σε ενδιάμεση έκθεση σύμφωνα με το άρθρο 15 της Οδηγίας. Η παρακολούθηση της προόδου σε πιο συχνή βάση θα λαμβάνεται υπόψη μόλις τα επιτρέψουν οι διαθέσιμοι πόροι.	Υπ. Υδρομετρίας		
21	4.4.2.2 (α) (ii)	Στο πλαίσιο της παρακολούθησης του εκάστοτε ΣΔΛΑΠ, να υπολογίζεται ο βαθμός υλοποίησης του κάθε μέτρου και να παρακολουθείται η εφαρμογή της προτεραιοποίησης των μέτρων και των σχετικών χρονοδιαγραμμάτων που τίθενται στο σχέδιο.	Ο βαθμός υλοποίησης κάθε μέτρου αξιολογείται ήδη ποσοτικά ως προς τον υλοποιημένο προϋπολογισμό (μερίδιο του συνολικού προϋπολογισμού του μέτρου που έχει ήδη υλοποιηθεί). Περισσότερη έμφαση θα δοθεί στα επόμενα ΣΔΛΑΠ στην παρακολούθηση της εφαρμογής της προτεραιοποίησης των μέτρων και των σχετικών χρονοδιαγραμμάτων.	Υπ. Υδρομετρίας		
22	4.4.2.2 (β)	Το Τμήμα να εφαρμόζει τις προτάσεις που περιλαμβάνονται στο εν ισχύει ΣΔΞ.	Το ΤΑΥ λαμβάνει υπόψη τα αποτελέσματα των δεικτών ξηρασίας όπως προκύπτουν από το ΣΔΞ κατά τη διαδικασία ετοιμασίας της πρότασης προς ΣΕΔΥ για καθορισμό των ετήσιων ποσοτήτων νερού που θα δοθούν από τα ΚΥΕ για άρδευση και ύδρευση.	Υπ. Άρδευσης + Υπ. Ύδρευσης + Υπ. Υδρολογίας		
23	1.2.1 (Πρόσθετες παραγράφοι Έκθεσης)	Το Τμήμα θα πρέπει να διασφαλίσει την έγκαιρη υλοποίηση των χρονοδιαγραμμάτων των πιο πάνω έργων/ δράσεων/ ενεργειών για τη βέλτιστη λειτουργία του μοντέλου λειτουργίας των μονάδων αφαλάτωσης.	Το ΤΑΥ στα πλαίσια των διαθέσιμων πόρων καταβάλλει κάθε δυνατή προσπάθεια για προώθηση όλων των αναπτυξιακών του δράσεων θέτοντας ως προτεραιότητα την υλοποίηση των έργων ενίσχυσης και ασφάλειας της ύδρευσης.	Υπ. Προγραμματισμού + Υπ. Μελετών		

β. Department of Environment.

05.14.009
26.12.003.001
26.12.006.001

ΤΜΗΜΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

ΚΥΠΡΙΑΚΗ ΔΗΜΟΚΡΑΤΙΑ

ΥΠΟΥΡΓΕΙΟ ΓΕΩΡΓΙΑΣ, ΑΓΡΟΤΙΚΗΣ ΑΝΑΠΤΥΞΗΣ ΚΑΙ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

ΤΜΗΜΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ
1498 ΛΕΥΚΩΣΙΑ

Αρ. Φακ.: 02.10.017.008
Αρ. Τηλ.: 22408954
E-mail: mpapanicolaou@environment.moa.gov.cy

18 Φεβρουαρίου 2024

Γενικό Ελεγκτή της Δημοκρατίας ✓
(μέσω Αν. ΓΔ Γενικής Διεύθυνσης Περιβάλλοντος)

Γενικός Διευθυντής
Γ.Δ. Περιβάλλοντος
Ημερ. 20/2/25

Ειδική Έκθεση ΠΕ/01/2025
«Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;».

Αναφορικά με το πιο πάνω θέμα και σε συνέχεια σχετικής επιστολής σας ημερομηνίας 16.01.2025 και Αρ. Φακ. 05.14.009, 26.12.003.001, 26.12.006.001, επισυνάπτονται τα σχόλια του Τμήματος Περιβάλλοντος επί του προσχέδιου της εν λόγω Ειδικής Έκθεσης όπως και συμπληρωμένο το Σχέδιο Δράσης Υλοποίησης Συστάσεων.

Θεόδουλος Μεσημέρης
Διευθυντής

Ειδική Έκθεση: «Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;».

ΣΧΟΛΙΑ ΤΜΗΜΑΤΟΣ ΠΕΡΙΒΑΛΛΟΝΤΟΣ

Η Ειδική Έκθεση του Γενικού Ελεγκτή αναδεικνύει ορισμένες αδυναμίες και καθυστερήσεις στις δράσεις προσαρμογής της Κύπρου στην κλιματική αλλαγή, με ιδιαίτερη αναφορά στο έργο του Τμήματος Περιβάλλοντος. Στο πλαίσιο αυτό, ακολουθεί σχολιασμός των βασικών ευρημάτων της έκθεσης, καθώς και της ανταπόκρισης του Τμήματος Περιβάλλοντος μέσω της Αναθεωρημένης Εθνικής Στρατηγικής για την Προσαρμογή στην Κλιματική Αλλαγή. Σκοπός είναι να παρουσιαστούν οι βελτιώσεις που έχουν γίνει, αλλά και τα σημεία που απαιτούν περαιτέρω ενίσχυση.

Πολλές από τις αδυναμίες της υφιστάμενης στρατηγικής έχουν εντοπιστεί και λαμβάνουν ιδιαίτερο χειρισμό μέσα από την αναθεώρησή της, όπως για παράδειγμα τα θέματα παρακολούθησης και συντονισμού της υλοποίησης.

Αναγνώριση και Διαχείριση Κινδύνων Κλιματικής Αλλαγής:

Η Ειδική Έκθεση επισημαίνει ότι το Τμήμα Περιβάλλοντος δεν έχει εντοπίσει και εκτιμήσει επαρκώς τους κινδύνους της κλιματικής αλλαγής σε διάφορους τομείς. Υπογραμμίζεται ότι, ενώ έχει αναπτυχθεί στρατηγική για την κλιματική προσαρμογή, αυτή δεν έχει εναρμονιστεί πλήρως με τις τελευταίες επιστημονικές εκτιμήσεις και τις νέες εξελίξεις της κλιματικής πολιτικής της ΕΕ.

Στην αναθεωρημένη Στρατηγική για την Προσαρμογή στην Κλιματική Αλλαγή, η οποία θα τεθεί προς δημόσια διαβούλευση στις 18/2/25, το Τμήμα Περιβάλλοντος έχει προχωρήσει σε πιο ολοκληρωμένες και επικαιροποιημένες εκτιμήσεις μέσω του **Climate Change Risk and Vulnerability Assessment (CRVA)**, που αναλύει σε βάθος τους κινδύνους για το περιβάλλον, την υγεία, τη βιοποικιλότητα και άλλους τομείς. Η εν λόγω Στρατηγική έχει ενσωματώσει τα τελευταία επιστημονικά δεδομένα και έχει ευθυγραμμιστεί με την **Ευρωπαϊκή Στρατηγική για την Προσαρμογή στην Κλιματική Αλλαγή (2021)**, διασφαλίζοντας ότι οι δράσεις για την κλιματική προσαρμογή ανταποκρίνονται στους νέους κινδύνους.

Αναποτελεσματική Εφαρμογή Δράσεων Προσαρμογής:

Η Ειδική Έκθεση αναφέρει ότι οι δράσεις προσαρμογής που ανέλαβε το Τμήμα Περιβάλλοντος δεν έχουν αποφέρει τα αναμενόμενα αποτελέσματα. Η εφαρμογή αυτών των δράσεων ήταν αργή και πολλές φορές αναποτελεσματική, με τα κενά να παραμένουν σταθερά, ιδιαίτερα στον τομέα της διαχείρισης της βιοποικιλότητας και της προστασίας των οικοσυστημάτων.

Η Αναθεωρημένη Στρατηγική προχωρά στην εφαρμογή πιο **στοχευμένων και αποτελεσματικών δράσεων**, με την ενίσχυση της **διατομεακής συνεργασίας** και την ανάπτυξη **μέτρων ενίσχυσης της ανθεκτικότητας της βιοποικιλότητας** και των οικοσυστημάτων. Η στρατηγική περιλαμβάνει τη δημιουργία ειδικών σχεδίων δράσης για την προστασία της φύσης και την εφαρμογή **μετρικών παρακολούθησης**

ώστε να διασφαλιστεί η αποτελεσματικότητα των μέτρων. Υπογραμμίζεται η ανάγκη για **ενίσχυση των τοπικών και περιφερειακών δράσεων**, ώστε να υπάρξει πραγματική πρόοδος στην εφαρμογή της στρατηγικής.

Συντονισμός και Διακυβερνητική Συνεργασία:

Σύμφωνα με την Ειδική Έκθεση, το Τμήμα Περιβάλλοντος δεν έχει επιτύχει τον απαιτούμενο συντονισμό με άλλους αρμόδιους φορείς, γεγονός που έχει προκαλέσει καθυστερήσεις στην εφαρμογή δράσεων και στρατηγικών για την κλιματική προσαρμογή.

Η Αναθεωρημένη Στρατηγική τονίζει τη σημασία **του συντονισμού με άλλους φορείς**, καθώς η κλιματική προσαρμογή απαιτεί συνεργασία σε διακυβερνητικό επίπεδο και σε επίπεδο τοπικών αρχών. Προβλέπεται η δημιουργία μιας **διάρθρωσης για διατομεακή συνεργασία**, ώστε να εξασφαλιστεί ότι οι δράσεις του Τμήματος Περιβάλλοντος συντονίζονται με τις πολιτικές άλλων τομέων, όπως η ενέργεια, η γεωργία και η υγεία. Η στρατηγική καθορίζει σαφείς ρόλους και ευθύνες για όλους τους εμπλεκόμενους φορείς, προκειμένου να βελτιωθεί η υλοποίηση των δράσεων και να επιτευχθούν οι στόχοι της προσαρμογής.

Επιπλέον, στο πλαίσιο ενίσχυσης αυτής της διακυβερνητικής συνεργασίας και ενσωμάτωσης των δράσεων προσαρμογής, αναμένεται η ετοιμασία του **Κλιματικού Νόμου** ο οποίος θα καθορίσει μεταξύ άλλων, το νομικό και θεσμικό πλαίσιο για την προσαρμογή της Κύπρου στην κλιματική αλλαγή. Ο Κλιματικός Νόμος περιλαμβάνει προνοίες που αφορούν τη στρατηγική προσαρμογής και τη διακυβέρνηση των κλιματικών δράσεων, διασφαλίζοντας την αποτελεσματική συνεργασία μεταξύ των Υπουργείων και άλλων εμπλεκόμενων φορέων. Στόχος του είναι να δημιουργηθεί μια πιο συνεκτική και συντονισμένη προσέγγιση για την αντιμετώπιση των κλιματικών κινδύνων και την ενίσχυση της ανθεκτικότητας της Κύπρου σε όλους τους τομείς.

Αναγκαία Ενημέρωση και Εκπαίδευση του Κοινού:

Η Ειδική Έκθεση αναγνωρίζει ότι υπάρχει έλλειψη ενημέρωσης και ευαισθητοποίησης του κοινού σχετικά με τις επιπτώσεις της κλιματικής αλλαγής και τις δράσεις προσαρμογής που υλοποιούνται από το Τμήμα Περιβάλλοντος.

Η Αναθεωρημένη Στρατηγική προγραμματίζει **στοχευμένες δράσεις επικοινωνίας και εκπαίδευσης** για την κλιματική αλλαγή και την προσαρμογή, απευθυνόμενες τόσο στους πολίτες όσο και στους επαγγελματίες σε τομείς όπως η γεωργία και η βιομηχανία. Στοχεύει στην **ενίσχυση της ευαισθητοποίησης για τη σημασία της βιωσιμότητας και της προσαρμογής**, μέσω ενημερωτικών εκστρατειών και εκπαιδευτικών προγραμμάτων που θα υποστηρίξουν την καλύτερη κατανόηση των κινδύνων και των δράσεων για την προστασία του περιβάλλοντος.

ΤΜΗΜΑ ΠΕΡΙΒΑΛΛΟΝΤΟΣ
18/2/2025

Σχέδιο Δράσης Υλοποίησης Συστάσεων

Ειδική Έκθεση: «Έχουν προωθηθεί δράσεις προσαρμογής στην κλιματική αλλαγή στον τομέα των υδάτινων πόρων στην Κύπρο με τον πιο αποτελεσματικό, αποδοτικό και οικονομικό τρόπο;».

Ελεγχόμενος φορέας: Τμήμα Αναπτύξεως Υδάτων και Τμήμα Περιβάλλοντος

Ημερομηνία Έκθεσης: 16.1.2025

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
	4.1.2.2 (α)	Τα στοιχεία τα οποία περιλαμβάνονται στο υδατικό ισοζύγιο να βασίζονται σε επικαιροποιημένα στοιχεία.				
	4.1.2.2	Οι υδατικές ανάγκες να υπολογίζονται λαμβάνοντας υπόψη και την πραγματική κατανάλωση εντός και εκτός ΚΥΕ (περιλαμβανομένου ιδιωτικών γεωτρήσεων και Αρδευτικών Τμημάτων). Επίσης το ΤΑΥ να τηρεί στοιχεία κατανάλωσης εντός και εκτός ΚΥΕ, τα οποία θα συμβάλουν στην ενιαία και ορθολογιστική διαχείριση των υδάτινων πόρων. Σημειώνουμε ότι σύμφωνα με το άρθρο 128 (1) του Νόμου, το ΤΑΥ δύναται να απαιτήσει				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		από, μεταξύ άλλων, Αρδευτικό Τμήμα η Αρδευτικό Σύνδεσμο να του παρέχει τέτοιες πληροφορίες ως προς την ποσότητα, την ποιότητα και τη χρήση του νερού ή ως προς τις υδατικές του εγκαταστάσεις και κατά τέτοιο χρόνο και τύπο, όπως ο Διευθυντής ήθελε εύλογα ορίσει στη σχετική απαίτησή του. Επιπλέον η χρήση τεχνολογίας θα μπορούσε να συμβάλει στην οικονομικότερη, αποδοτικότερη και αποτελεσματικότερη διαδικασία τήρησης των υπό αναφορά στοιχείων, όπως για παράδειγμα η χρήση έξυπνων μετρητών συνδεδεμένων με το μηχανογραφικό σύστημα τιμολόγησης νερού, εισαγωγή των καταναλώσεων απευθείας από τα Αρδευτικά Τμήματα κλπ.				
	4.3.2.4	Η Έκθεση για την Αξιολόγηση των Κινδύνων που επιφέρει η Κλιματική Αλλαγή χρειάζεται να επικαιροποιηθεί ώστε να αναγνωριστούν ενδεχόμενοι νέοι κίνδυνοι που πιθανόν να σχετίζονται	Ήδη στο πλαίσιο της αναθεώρησης της Εθνικής Στρατηγικής για την Προσαρμογή στην Κλιματική Αλλαγή, έχει	Η ευθύνη για την επικαιροποίηση της Έκθεσης Αξιολόγησης των Κινδύνων ανήκει στο Τμήμα	Η επικαιροποίηση της Έκθεσης Αξιολόγησης Κινδύνου έχει πραγματοποιηθεί.	• Βελτίωση της ακρίβειας εκτίμησης κινδύνων με την ενσωμάτωση νέων δεδομένων και

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		με τις επιπτώσεις της κλιματικής αλλαγής ή/και για να επικαιροποιηθούν οι μετρήσεις και οι επιπτώσεις των κινδύνων που είχαν αναγνωριστεί παλαιότερα. Επιπλέον, ως καλή πρακτική, η αξιολόγηση κινδύνου θα πρέπει να επανεξετάζεται περιοδικά για να είναι πιο αποτελεσματική και, εάν είναι απαραίτητο, να επαναξιολογείται όταν καταστούν διαθέσιμα νέα δεδομένα. Επίσης, ανάλογα με το επίπεδο έκθεσης σε κάθε κίνδυνο, συνιστάται διαφορετική παρακολούθηση. Για παράδειγμα, ένας κίνδυνος με υψηλή αρνητική επίδραση και πιθανότητα εμφάνισης, απαιτεί ενεργή διαχείριση και θα πρέπει να παρακολουθείται και να επανεξετάζεται συνεχώς.	επικαιροποιηθεί η Έκθεση Αξιολόγησης των Κινδύνων. Επίσης η Αναθεωρημένη Στρατηγική για την συνεχή επικαιροποίηση της Αξιολόγησης Κινδύνων, προβλέπει τις εξής δράσεις: • Σύσταση ομάδας Εργασίας • Συλλογή και ανάλυση νέων δεδομένων σχετικά με τις επιπτώσεις της κλιματικής αλλαγής σε κρίσιμους τομείς (υγεία, γεωργία, νερό, δασικά οικοσυστήματα, πολιτιστική κληρονομιά).	Περιβάλλοντος, Κλάδος Κλιματικής Δράσης και Ενέργειας.	Για τη συνεχή επικαιροποίηση της θα συσταθεί ομάδα εργασίας εντός του 2025 με σκοπό την υλοποίηση των δράσεων που περιγράφονται κάτω από το πεδίο «Ενέργειες που θα ληφθούν».	αναβαθμισμένων εργαλείων πρόβλεψης. • Ενίσχυση των συστημάτων πρώιμης προειδοποίησης, με στόχο τη μείωση των επιπτώσεων από ακραία καιρικά φαινόμενα. • Καλύτερη κατανομή πόρων και στοχευμένη χρηματοδότηση μέτρων προσαρμογής. • Συμμόρφωση με τις απαιτήσεις της Ευρωπαϊκής Στρατηγικής για την Προσαρμογή στην Κλιματική Αλλαγή και

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			• Αναβάθμιση των εργαλείων και των μοντέλων πρόβλεψης για την καλύτερη εκτίμηση ακραίων καιρικών φαινομένων και μακροπρόθεσμων κλιματικών επιπτώσεων. • Διασύνδεση της επικαιροποιημένης έκθεσης με το Εθνικό Σύστημα Παρακολούθησης και Αναφοράς για την Κλιματική Αλλαγή, το οποίο θα διασφαλίσει συνεχή ροή δεδομένων και ενημερώσεις των κινδύνων.			ευθυγράμμιση με τις βέλτιστες πρακτικές της ΕΕ.
	4.3.5	Το Υπουργείο ΓΑΑΠ θα πρέπει να ενημερώσει, το συντομότερο δυνατό,				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		το ΥΣ για την παράλειψη υποβολής της Στρατηγικής Μελέτης για τη Διαχείριση των Υδάτων και Αντιμετώπιση της Ανομβρίας, σε περιβαλλοντική εκτίμηση και να διασφαλίσει ότι συμμορφώνεται με τις υποχρεώσεις που προκύπτουν από τις διατάξεις της υπό αναφοράς νομοθεσίας για εκπόνηση ΣΜΠΕ.				
	4.3.8	Το ΤΑΥ να προχωρήσει, το συντομότερο δυνατό, στην αναθεώρηση/ επικαιροποίηση της Έκθεσης Υδατικής Πολιτικής, ώστε να προσαρμοστεί στις τρέχουσες συνθήκες, δεδομένα και εξελίξεις που προκύπτουν, μεταξύ άλλων, από την κλιματική αλλαγή. Αυτό θα οδηγήσει τόσο στον προσδιορισμό, όσο και την δέουσα εκτίμηση όλων των κινδύνων που επιφέρει η κλιματική αλλαγή στους υδάτινους πόρους και σχετίζονται με την αύξηση των αναγκών και τον περιορισμό των υδάτινων πόρων και θα υποβοηθήσει				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		στον έγκαιρο σχεδιασμό και εφαρμογή των κατάλληλων μέτρων.				
	4.3.9	Το ΤΑΥ να ολοκληρώνει έγκαιρα την επικαιροποίηση του ΣΔΞ, ώστε να αντανακλώνται σε αυτό τα νέα δεδομένα που προκύπτουν από την κλιματική αλλαγή, για αποτελεσματικότερη διαχείριση των περιορισμένων υδατικών πόρων.				
	4.4.1.2 (β)	Για σκοπούς ενιαίας διαχείρισης των υδάτινων πόρων, το ΤΑΥ, σε συνεργασία με τα Υπουργεία ΓΑΑΠ και Εσωτερικών, να μελετήσει, στο πλαίσιο της οικονομικότητας, αποτελεσματικότητας και αποδοτικότητας, το ενδεχόμενο ανάθεσης της διαχείρισης όλων των ταμιευτήρων/αποθεμάτων νερού, σε αυτό.				
	4.4.1.2	Η ενσωμάτωση και ευρεία εφαρμογή νέων τεχνολογιών, όπως η τοποθέτηση πλωτών φωτοβολταϊκών συστημάτων σε φράγματα και δεξαμενές, μπορεί να μειώσει την				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		εξάτμιση, να εξοικονομήσει νερό, και να παραγάγει ηλεκτρική ενέργεια για τη μείωση του κόστους λειτουργίας. Επίσης, μια ενιαία προσέγγιση στη διαχείριση των αποθεμάτων νερού στα φράγματα είναι πολύ σημαντική για τη βιώσιμη διαχείριση των υδάτινων πόρων στην Κύπρο.				
	4.4.1.3	Να προωθηθεί η εφαρμογή τεχνολογιών που βελτιώνουν την απόδοση και μειώνουν το κόστος λειτουργίας των μονάδων αφαλάτωσης και η επένδυση σε ανανεώσιμες πηγές ενέργειας (π.χ. ηλιακή ενέργεια) για τη λειτουργία τους, ώστε να μειωθεί το ενεργειακό και περιβαλλοντικό κόστος. Επίσης, με σκοπό την κάλυψη προσωρινών αναγκών σε περιπτώσεις όπως η καταστροφή στη μονάδα αφαλάτωσης στην Πάφο, να προωθηθεί η δυνατότητα ταχείας ενεργοποίησης κινητών μονάδων αφαλάτωσης, ώστε να καλύπτονται προσωρινές ανάγκες. Επίσης, να				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		γίνεται τακτική επικαιροποίηση του ΣΔΞ, ώστε να επιτυγχάνεται η εξισορρόπηση της κάλυψης των αναγκών ύδρευσης από τις διαθέσιμες πηγές νερού και η βελτιστοποίηση της υδατικής πολιτικής.				
	4.4.1.4	Βελτίωση αξιοποίησης ανακυκλωμένου νερού, περιορισμός απορρίψεων στη θάλασσα και ενίσχυση ποιοτικού ελέγχου.				
	4.4.1.5 (α) (i)	Η ΣΕΔΥ να μελετά συνολικά την κατανομή νερού περιλαμβανομένου εκείνου που προέρχεται από ιδιωτικές γεωτρήσεις ή τυγχάνει διαχείρισης από Αρδευτικά Τμήματα.				
	4.4.1.5 (α) (ii)	Πλήρης ενημέρωση του μητρώου γεωτρήσεων και διενέργεια ελέγχων για διαπίστωση της λειτουργίας τους.				
	4.4.1.5 (α) (iii)	Το Τμήμα να προχωρήσει άμεσα στην εφαρμογή υδρομετρητών με τηλεμετρικά όργανα, ιδιαίτερα στις γεωτρήσεις των Τοπικών Αρχών, αλλά και των μεγάλων καταναλωτών, για				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		την άμεση συλλογή δεδομένων κατανάλωσης νερού εξ αποστάσεως, την καλύτερη παρακολούθηση και εντοπισμό αυτών που υπερβαίνουν τα όρια αδειοδότησής τους και την έγκαιρη λήψη μέτρων.				
	4.4.1.5 (β) (ii)	Τάχιστη λήψη μέτρων για τη διασφάλιση επαρκούς υδροδότησης των Κοινοτήτων που βασίζονται σε γεωτρήσεις/πηγές και πρόληψη προβλημάτων λόγω ποιοτικής ή ποσοτικής υποβάθμισης των υδροφορέων.				
	4.4.1.5	(i) Συνολική διαχείριση των υδάτινων πόρων, συμπεριλαμβανομένων των ιδιωτικών γεωτρήσεων και των αρδευτικών έργων. (ii) Ενημέρωση του μητρώου γεωτρήσεων και εφαρμογή τηλεμετρικών συστημάτων για παρακολούθηση της κατανάλωσης.				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		(iii) Λήψη άμεσων μέτρων για τη διασφάλιση επαρκούς και ποιοτικού πόσιμου νερού στις κοινότητες που εξαρτώνται από γεωτρήσεις και πηγές.				
	4.4.1.6	Το νερό, ως κοινό αγαθό, θα πρέπει να είναι διαθέσιμο σε όλους τους πολίτες της Δημοκρατίας σε ομοιόμορφη τιμή, προς διασφάλιση της ισότιμης μεταχείρισης των πολιτών ανεξαρτήτως του τόπου διαμονής τους, γι΄αυτό θα πρέπει να εξεταστεί η θέσπιση ρυθμίσεων που να διασφαλίζουν τη δίκαιη και κατά το δυνατό ομοιόμορφη κατανομή του κόστους παροχής νερού ύδρευσης στους καταναλωτές παγκύπρια. Επιπλέον, η τιμολόγηση πρέπει να αντανακλά την πραγματική αξία του νερού, ώστε να ενθαρρύνει την εξοικονόμηση και τη βιώσιμη διαχείρισή του, μειώνοντας την πίεση στους υδάτινους πόρους σε περιόδους ξηρασίας.				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
	4.4.2.1 (α)	Εφαρμογή της Απόφασης αρ. 82.555, ημερ. 18.5.2017 του ΥΣ.				
	4.4.2.1 (β)	(i) Εφαρμογή των Αποφάσεων του ΥΣ από το ΤΠ, τη ΓΔ Περιβάλλοντος του Υπουργείου ΓΑΑΠ και τα εμπλεκόμενα Υπουργεία/Υφυπουργεία. (ii) Παρακολούθηση της υλοποίησης της στρατηγικής και του Σχεδίου Δράσης από το ΤΠ και τα εμπλεκόμενα Υπουργεία/Υφυπουργεία. (iii) Έλεγχος των ενημερωτικών σημειωμάτων που ετοιμάζει το ΤΠ και που το Υπουργείο ΓΑΑΠ προωθεί στο ΥΣ, σε σχέση με τις Υπουργικές Αποφάσεις. (iv) Λήψη διορθωτικών μέτρων για αύξηση του βαθμού υλοποίησης της στρατηγικής και του Σχεδίου Δράσης.				
	4.4.2.1 (γ)	(i) Τα μέτρα τα οποία περιλαμβάνονται στο Σχέδιο				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		Δράσης να συνδέονται με συγκεκριμένες, μετρήσιμες, επιτεύξιμες, σχετικές και χρονικά καθορισμένες δράσεις υλοποίησης, η οποία να παρακολουθείται με κατάλληλους δείκτες. (ii) Να διενεργείται εκτίμηση του κόστους υλοποίησης για κάθε μία συγκεκριμένη δράση. (iii) Για κάθε δράση να καθοριστεί συγκεκριμένο χρονοδιάγραμμα υλοποίησης. (iv) Η κάθε δράση να προτεραιοποιηθεί βάσει του αντικτύπου που αναμένεται να επιφέρει στην επίτευξη του σκοπού του μέτρου και της αντιμετώπισης του σχετικού κινδύνου.				
	4.4.2.2 (α) (i)	Το Τμήμα να παρακολουθεί τον βαθμό υλοποίησης των μέτρων που περιλαμβάνονται στο ΣΔΛΑΠ σε συχνότερη βάση, ώστε να μπορεί να				

α/α	Αριθμός παραγράφου Επιστολής	Σύσταση	Ενέργειες που θα ληφθούν	Αρμόδιος Τομέας ελεγχόμενου φορέα	Χρονοδιάγραμμα	Αναμενόμενα οφέλη (ποσοτικοποιημένα, αν είναι δυνατό)
		λαμβάνει έγκαιρα κατάλληλα μέτρα για τη βελτίωση της υλοποίησης του σχεδίου.				
	4.4.2.2 (α) (ii)	Στο πλαίσιο της παρακολούθησης του εκάστοτε ΣΔΛΑΠ, να υπολογίζεται ο βαθμός υλοποίησης του κάθε μέτρου και να παρακολουθείται η εφαρμογή της προτεραιοποίησης των μέτρων και των σχετικών χρονοδιαγραμμάτων που τίθενται στο σχέδιο.				
	4.4.2.2 (β)	Το Τμήμα να εφαρμόζει τις προτάσεις που περιλαμβάνονται στο εν ισχύει ΣΔΞ.				

Annex XV – Audit office recommendations made in this Report

Paragraph of the Report	Audit Office Recommendations
3.1.2.2	Water needs should be calculated taking into account the total actual consumption, both within and outside of GWWs (including private boreholes and Irrigation Departments which are not connected to GWWs). Additionally, the WDD should maintain data on water consumption outside the GWWs, which would contribute to the integrated and rational management of water resources. We noted that, according to Article 128(1) of the Law, the WDD may require, among other things, an Irrigation Department or Irrigation Association to provide such information regarding the quantity, quality, and use of water, or regarding their water infrastructure, and in such time and manner as the Director may reasonably specify in the relevant request. Furthermore, the use of technology could contribute to a more cost-effective, efficient, and effective process for maintaining the data in question, such as the use of smart meters connected to the water billing system, direct input of consumption data from the Irrigation Departments to the system, etc.
3.3.2.4	The DE needs to update the Climate Change Risk Assessment Report in order to identify potential new risks associated with the impacts of climate change and/or to revise the measurements and impacts of previously identified risks. Moreover, as a good practice, the risk assessment should be reviewed periodically to enhance its effectiveness, and, if necessary, re-evaluated when new data become available. Also, monitoring should be adjusted according to the level of exposure of each risk. For instance, a risk with high negative impact and likelihood of occurrence requires active management and should be continuously monitored and reviewed.
3.3.5	The Ministry of ARDE should promptly inform the Council of Ministers regarding the failure to submit the Strategic Study for Water Management and Drought Response for environmental assessment and ensure compliance with the obligations set forth by the relevant legislation requiring the preparation of SEIA.
3.3.8	The WDD should proceed as soon as possible with the revision/update of the Water Policy Report to align it to current conditions, data, and developments, including those arising from climate change. This will facilitate both the identification and appropriate assessment of all climate change risks to water resources, related to increasing needs and the decreasing water resources, and will support the timely planning and implementation of appropriate measures.

Paragraph of the Report	Audit Office Recommendations
3.3.9	The WDD should complete promptly the update of the DMP as soon as possible to reflect the new data emerging from climate change, enabling more effective management of the Cyprus' s limited water resources.
3.4.1.2 (b)	For the purposes of unified management of water resources, the WDD, in collaboration with the Ministries of ARDE and Interior, should consider, within the framework of economy, efficiency and effectiveness, the possibility of undertaking the management of all reservoirs/water reserves to it.
3.4.1.2 (d)	The application of new technologies should be considered, such as the installation of floating photovoltaic systems on dams and reservoirs, which can reduce evaporation, conserve water, and generate electricity to reduce operating costs. Additionally, a unified approach to managing water reserves in dams would positively contribute to the sustainable management of water resources in Cyprus.
3.4.1.3	**(i)** The WDD should promote the implementation of technologies that improve efficiency and reduce operational costs of desalination plants and to invest in renewable energy sources (e.g., solar energy) to power these plants, so as to decrease both energy and environmental costs. **(ii)** To address temporary urgent needs in cases such as the destruction of the Paphos desalination plant, a strategic plan for handling emergency situations should be developed. For this purpose, the recently acquired mobile desalination plants, through a donation, could be utilized. **(iii)** To regularly revise the DMP, to ensure a balanced approach to meeting domestic water supply needs from available water resources and to optimise water management policies. **(iv)** WDD should ensure the timely implementation of the projects/actions timelines for connecting the plants to the domestic water supply systems, so that the operational model of the desalination plants can be optimized.
3.4.1.4	WDD should improve the utilization of recycled water, reduce discharges into the sea and strengthen quality control.
3.4.1.5 (a) (i)	The AWMC should comprehensively analyse water allocation, including water sourced from private boreholes or managed by Irrigation Departments.

Paragraph of the Report	Audit Office Recommendations
3.4.1.5 (a)(ii)	WDD should fully update the borehole register and conduct inspections to determine their operational status.
3.4.1.5 (a)(iii)	WDD should proceed immediately with the installation of water meters equipped with telemetry instruments, particularly for boreholes operated by Local Authorities and large consumers, for enabling real-time remote data collection on water consumption, better monitoring and identification of over-extraction beyond limits per permit and the timely adoption of corrective measures.
3.4.1.5 (b)(ii)	**(i)** WDD should ensure the integrated management of water resources, including private boreholes and irrigation projects, **(ii)** update the borehole registry and implement telemetric systems for monitoring water consumption and ensure sufficient domestic water for communities which rely on boreholes and wells.
3.4.1.6 (c)	Water, as a basic good, should be available to all citizens of the Republic at a uniform price, to ensure equal treatment of citizens regardless of their place of residence. Therefore, it should be ensured that a fair and uniform distribution of the cost of domestic water supply among consumers across the island is achieved. Furthermore, without disregarding the social aspect of the issue, which is the provision of drinking water at affordable prices to all citizens, water pricing should reflect the true value of water, encouraging its conservation and sustainable management, while reducing pressure on water resources during periods of drought.
3.4.2.1 (b)	**(i)** Compliance of the DE and other competent Ministries/Deputy Ministries with the Council of Ministers' Decisions through the following actions: ♦ The DE and Ministry of ARDE should submit the monitoring reports to Council of Ministers in a timely manner on an annual basis. ♦ The competent Ministries/Deputy Ministries should forward to the Department the degree of implementation of the actions, the reasons for any deviations, as well as proposals for corrective measures. **(ii)** Monitoring of the implementation of the Strategy and the Action Plan by the DE and the involved Ministries/Deputy Ministries.

Paragraph of the Report	Audit Office Recommendations
	(iii) Oversight of the informative notes prepared by the DE and forwarded to the Council of Ministers by the Ministry of ARDE, in relation to the relevant Decisions of the Council of Ministers. **(iv)** Adoption of corrective measures to increase the degree of implementation of the Strategy and the Action Plan.
3.4.2.1 (c)	**(i)** The measures included in the Action Plan should be linked to specific, measurable, achievable, relevant, and time-bound implementation actions, which should be monitored with appropriate indicators. **(ii)** An estimation of the implementation cost should be carried out for each specific action. **(iii)** A specific timeline for the implementation of each action should be determined. **(iv)** Each action should be prioritised based on the impact it is expected to have on achieving the objective of the measure and addressing the related risk.
3.4.2.2(a) (i)	The Department should monitor the degree of implementation of the measures included in the RBMP on a more frequent basis, so that it can take appropriate actions in a timely manner to improve the implementation of the plan. We also draw attention to the risks involved in monitoring the implementation of the Plan solely through the purchase of services, such as the lack of internal expertise and continuous oversight, limited control and dependency on third parties.
3.4.2.2 (a)(ii)	In the context of monitoring each RBMP in force, WDD should calculate the degree of implementation of each measure, and monitor the application of the prioritisation of measures and the related timelines set in the plan.
3.4.2.2 (b)	The WDD should implement the proposals included in the DMP in force.