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Water Management in Cyprus: Challenges and Opportunities¹²

National Report

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Introduction

During the last twenty years, the depletion of water resources has been recognized as one of the most severe environmental problems in many parts of the world. It is estimated that two billion people in the world live in areas with extended water shortages (Duraiappah, 1998). Intensified droughts have led to conflicts in many situations, leading some to predict that this century will be marked by national and international disputes over access to water (Venema and van den Breemer, 1999). In addition to water scarcity, water pollution is a problem that has affected every continent of the world (Sampat, 2000).

In the Mediterranean region water resources are limited and drought incidents occur frequently. Water resources in most Mediterranean countries are fully utilized, while water demand is increasing, as a result of population growth, tourism development, and increased standard of living. The population of the Mediterranean region is expected to increase from 424 million people in the year 2000 to more than 500 million in 2020, while tourist arrivals are expected to increase from around 200 million in the year 2000 to 300 million in 2020 (Margal and Valle, 2000). These developments are expected to exert additional pressure on the water resources of the region. Increasing water supply continuously, which has been the main policy in the past, is not a viable option. Efforts are now increasingly concentrating on the conservation of water resources, through the conservation of water-related ecosystems.

¹ This report is largely based on a study carried out by the Water Development Department of the Ministry of Agriculture, Natural Resources and Environment in Cyprus, in cooperation with the Food and Agriculture Organization of the United Nations (Water Development Department and Food and Agriculture Organization. 2002. *Re-assessment of the Water Resources and Demand of the Island of Cyprus: Synthesis Report*. FAO/WDD TCP/CYP/2801. Nicosia, Cyprus.

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Water management in Cyprus

Cyprus is the third largest island in the Mediterranean Sea, with an area of 9,251 sq. km. Like other countries in the Mediterranean region, Cyprus has a semi-arid climate and limited water resources. The island's state forests cover about 18% of its surface and are mainly confined to the Troodos mountain range in the central part of the island and the Pentadaktylos mountain range in the northern part. The conservation of the island's forests has multiple objectives, such as the conservation of biological diversity, the protection of the soil against erosion, the control of floods, and the protection of water resources. The Troodos mountain range is of particularly high ecological significance, not only because it contains rich plant and avian diversity, but also because it feeds most river basins and aquifers of the island, with maximum precipitation of 1000 mm/year. Eighty percent of surface runoff in Cyprus is generated by the Troodos mountains. Due to the rainfall conditions, surface water is confined to only a few months a year.

The two main water-consuming sectors in Cyprus are irrigated agriculture and domestic use. Agriculture accounts for about 70% total water use, while the domestic sector accounts for 20% of water use. Other sectors include tourism (5% of water demand), industry (1%), and amenities (5%). Today the total water demand in Cyprus amounts to 265.9 million cubic meters annually. It is estimated that by 2020, water demand in Cyprus will increase to 313.7 cubic meters, mainly as a result of a rise in the use of domestic water and tourism development (Water Development Department and FAO, 2002). This presents many challenges for water management and conservation in Cyprus.

Following the independence of Cyprus in 1960, the Government of Cyprus placed great importance on water management in order to secure an adequate supply of good quality water to the island's inhabitants. The main policy of the Government, implemented through the Water Development Department, was to increase water supply by constructing dams and conveyance infrastructure under the motto "No drop of water to the sea". Due to this policy, the capacity of dams increased from 6 million cubic meters in 1960 to 307.5 million cubic meters today. Additional measures taken included the construction of water treatment plants and the drilling of boreholes to provide water for domestic use and irrigation. In addition, the Government encouraged the installation of improved farm irrigation systems, promoted the application of leakage detection methods on water distribution systems, and imposed a water charge for domestic and irrigation water.

Despite of these measures, water was still not enough to satisfy the increasing water demand, while the depletion of water resources became more evident. Due to the limited supply of surface runoff in Cyprus, groundwater has traditionally provided the resource needed for domestic use and irrigation. Throughout the years, the groundwater resources of the island have been heavily over-pumped, especially during periods of drought. It is estimated that groundwater resources are overexploited by about 40% of the sustainable extraction level. The existing conditions have resulted in saline water intrusion and consequent quality deterioration in coastal aquifers and depletion of inland aquifers. Seawater intrusion in aquifers has also resulted in spoiling valuable underground water storage room. Furthermore, intensive agriculture and excessive use of fertilizers have resulted in nitrate pollution of many aquifers. Similar nitrate pollution problems appear in aquifers in inhabited areas because of direct sewage disposal in adsorption pits (Water Development Department and FAO, 2002).

Another problem that Cyprus is facing is the increased frequency and intensity of droughts during the last 30 years. Furthermore, the level of precipitation has decreased during the last century. Statistical analysis of the precipitation records available over the period of the hydrological years 1916/1917 to 1999/2000 showed that the mean precipitation of recent years (1970/1971 to 1999/2000) is lower than the mean precipitation of older years (1916/1917 –

1969/1970). The shift in mean precipitation was found to be larger in the Troodos Mountains than in the coastal areas and inland plains. This analysis does not prove that the recorded decrease in annual precipitation is due to climate change, but this possibility is not excluded (Water Development Department and FAO, 2002). It is estimated that the decrease in precipitation resulted in a 40% reduction of surface runoff. Due to the over-utilization of existing water resources, the environmental and social impacts of droughts also intensified. In the years 1990-1991 and 1996-2000 Cyprus faced a water crisis as a result of drought, forcing the Government to impose restrictions on water supply both for domestic and irrigation purposes, with adverse effects on the economy and social life.

These conditions led the Government of Cyprus to revise its general water policy, in an effort to promote effective water governance and to ensure that every person has access to safe drinking water. New measures have included the treatment of municipal waste and the use of tertiary treated water in agriculture and for groundwater recharge, and the introduction of desalination, which has enabled the Government to provide a continuous supply of drinking water to all towns and villages. At the same time, keen efforts have been undertaken towards saving water, through public education and awareness campaigns. In addition, several revisions have been made in the existing legal and institutional framework in order to create an enabling environment for the implementation of integrated water management and the conservation of water-related ecosystems.

Legal framework

Responsibility for water management has traditionally been divided between different ministries exercising overlapping jurisdictions. This sometimes resulted in the duplication of activities or the failure to take appropriate measures for effective water management. Efforts are now focusing on establishing a new Directory for Integrated Water Management, which is proposed to manage the island's water resources within the framework of the national water policy in a holistic way. The Directory will deal with the provision of water for domestic purposes and agriculture, will control water extraction from surface and underground water systems, will supervise the safety of dams and reservoirs through the formulation of an appropriate legal framework, and will promote the conservation and management of water-related ecosystems. An advisory committee will be set up, comprised of key stakeholders in the water management sector, who will have an active role in the formulation and implementation of water related policies. The Directory for Integrated Water Management will be based on the existing Water Development Department within the Ministry of Agriculture, Natural Resources and Environment.

In recent years, in light of the accession of Cyprus to the European Union, the Ministry of Agriculture, Natural Resources and Environment in Cyprus has been undertaking an effort to comply with EU policies and Directives. The two main Directives that concern water conservation and management are the Habitats Directive (92/43/EEC) and the Water Framework Directive (2000/60/EC). Both of these Directives support an integrated approach to nature conservation and water management, placing the conservation of ecosystems at the center of activity and emphasizing the need to work together with local communities and other stakeholders to obtain best results.

The Habitats Directive is EU's main policy with respect to nature conservation. Its main objective is the conservation of biological diversity "through the conservation of natural habitats and of wild fauna and flora in the European territory of the Member States to which the Treaty applies" (Council Directive 92/43/EEC, Article 2, Paragraph 1). Member States are called to compile national lists of important habitats and species and submit them to the European Commission, which is responsible for verifying that the lists are adequate. Each Member State

must then designate the sites into Special Areas of Conservation (SACs) and design management plans for their conservation, where necessary. All designated sites across Europe will form an ecological network of protected areas, labeled Natura 2000. The main agency responsible for implementing the Habitats Directive is the Environment Service of the Ministry of Agriculture, Natural Resources and Environment.

The Habitats Directive does not call for the exclusion of all human activities within the Natura 2000 sites, but human must not underpin the conservation objectives of the protected area. Being in the process of conforming to the Habitats Directive, Cyprus has already compiled national lists of important habitats and species. Certain areas of the Troodos mountain range have been included in the list of important areas for conservation. The list of important areas for Cyprus also includes other forest areas, lakes, and wetlands. By restricting mass-scale development in the selected Natura 2000 areas, the Habitats Directive can be a positive step towards the conservation of water-related ecosystems.

The Water Framework Directive has set the objectives and the strategy for the sustainable use of water in all Member States of the EU. Each Member State has the responsibility to review the status and particularities of its water resources and develop its own national implementation strategy. In Cyprus, the provisions of the Water Framework Directive have been transported into national legislation through the “Water Protection and Management Law of 2004”, which was adopted by the House of Representatives on the 5th of February, 2004. The two main agencies responsible for implementing the Water Framework Directive are the Water Development Department and Environment Service of the Ministry of Agriculture, Natural Resources and Environment.

The Water Framework Directive requires that Member States characterize river basin districts in terms of pressures, impacts, and economics of water uses, including the drawing up of a register of protected areas lying within the river basin district. Cyprus is expected to meet these requirements by December, 2004. Furthermore, an action plan for the creation of essential infrastructure is under preparation. In this context, the Water Development Department, in cooperation with the Department of Fisheries and Marine Research and the State General Laboratory have submitted a proposal for the development of integrated water monitoring programs and tools to the Transition Facility Programme of the European Union, for the total sum of €1,836,000 (EU €1,836,000 and €156,000 Joint Co-financing).

Future challenges

The future presents both challenges and opportunities for sustainable water management in Cyprus. The demand for water is expected to increase in following years, placing additional pressures on the limited water resources of the island. Over the years, the Government of Cyprus has recognized that placing sole emphasis on increasing the supply of water does not provide a sustainable solution for effective water management and conservation. Through policy reforms and the implementation of European Union Directives, a more integrated approach to water management is pursued, one that emphasizes water conservation and the protection of water-related ecosystems. Furthermore, the involvement of different stakeholders in the decision-making process is increasingly recognized as an essential element of effective water management. As recent studies have shown, local communities in Cyprus desire to collaborate with government agencies and to participate in the conservation of the island’s natural resources (Michaelidou and Decker, 2002). Through citizen participation in water management and a true emphasis on the conservation of water-related ecosystems, Cyprus will be in a better position to meet the difficult challenge that lies

ahead: to provide all people with sufficient, safe, and reliable water for their domestic and irrigation needs, while safeguarding the natural environment.

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