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CYPRUS NATIONAL REPORT

Water Management in Cyprus: Challenges and Opportunities[1][2]

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