Water management: The serious reduction of water reserves in Cyprus

(a) The need for the conveyance of potable (drinking) water, by ship tankers, from Greece to Cyprus. As a result of the depletion of the water stored in dams and the significant reduction of water reserves in general during 2007-2008, it became necessary to impose severe restrictions in the supply of water to households and farmers and to implement costly measures for securing the absolutely necessary quantity of potable water. Our Office carried out a general evaluation of the reasons that led to the reduction of water reserves, a problem which started to present itself from 2005.

As it is stated in the following paragraphs of this Report, the main reasons for the reduction in water reserves was the failure to apply promptly the decisions of the Council of Ministers relating to the restriction of the supply of water both for irrigation and human consumption purposes, as well as the delay in the construction of the third desalination plant in Limassol. As a consequence, severe cuts were imposed on the supply of water, causing much inconvenience to the consumers, and it became necessary to adopt very expensive solutions for securing the absolutely necessary quantities of potable water. Specifically, in April 2008, an agreement was signed for the conveyance of 8 million c.m. of water from Greece to Cyprus, at a cost of €35 m (transportation cost only). An additional amount of €4,4 m was required to pay for the cost of the water, and the necessary infrastructure at the port of Limassol cost another €1,6 m. It was pointed that the cost of the imported water is much higher than the cost of water supplied by the dams (€0,7/c.m.) or the desalination plants (average cost

€0,836/c.m.), and even the mobile desalination unit (€1,39/c.m), which also became necessary to construct as a partial solution to the problem.

(b) Supply of water. The annual needs of potable water in Cyprus are about 85 million c.m of water and are mainly met through the water reserves available in the dams, the water received from the desalination units and the water pumped from Government boreholes.

An additional quantity of 180 million c.m. of water is required for covering the annual irrigation needs, 70 million c.m. of which are covered by Government irrigation schemes and 110 million c.m are irrigated by private schemes. Water to cover irrigation needs is supplied from the dams, private boreholes and springs, Government boreholes and recycled water.

The water which is received from the dams is allocated according to the available reserves and during periods of drought, restrictions are imposed and irrigation needs are only partly covered.

Due to the very satisfactory rainfall during the period 2002-2004, all the dams were full and overflowing. Although the rainfall and flow of water to the dams was low in 2005, no restrictions were imposed for the supply of water and 63 million c.m. of water were allocated for irrigation purposes. As a result, there was a reduction in the reserves of water in the dams by 61 million c.m., during the year, from 189 million c.m. on 1.1.2005 to 128,2 million c.m. on 1.1.2006.

In view of the low rainfall in 2006, the Ministry of Agriculture, Natural Resources and Environment submitted a proposal for the imposition of restrictions in the quantities of water supplied for irrigation purposes, which was approved on 5.4.2006 by the Council

of Ministers. According to the proposal, the total quantity of water which was to be allocated for irrigation was estimated at 39,5 m.c.m., however, the actual quantity supplied amounted to 48,6 million c.m. of water. As a consequence, the water reserves in the dams on 1.1.2007 were reduced further to 61 million c.m.

Due to the prolonged period of drought and the further reduction of water reserves, the Ministry of Agriculture, Natural Resources and Environment proposed the imposition of restrictions in the supply of water, for both irrigation and drinking purposes, which were approved by the Council of Ministers on 17.1.2007. According to the proposal, the percentage coverage of the irrigation needs would be 40% for permanent plantations, 50% for green houses, and 30% for golf courses, while no water was to be allocated to cover the needs of seasonal plantations after 1.5.2007. On the basis of the above, it was estimated that the total quantities of water, which were to be allocated for irrigation purposes during 2007, were 20 million c.m., out of which the quantity of 10,3 million c.m. was to be supplied from the dams. Additional restrictions amounting to 20%, were to be applied on water supplied for covering consumers' needs for drinking water, and the total quantity of water to be supplied was estimated at 57 million c.m.

In spite of the above, the actual quantities of water which were allocated for human consumption and irrigation, amounted to 74 million c.m. and 35,6 million c.m., respectively, i.e an additional quantity of 17 million c.m. and 15,6 million c.m. of water was allocated for human consumption and irrigation purposes, respectively.

It was pointed out that 14,4 m.c.m., out of the total quantity of 15,6 m. c.m. of water, which were allocated for irrigation, were drawn from the dams, and concerned areas which are covered by the Integrated Scheme of the South Conveyor. Consequently, this quantity could have been used to cover consumers' needs for potable water. The

supply of the additional quantity of water from the dams resulted in the significant decrease of the reserves therein which, on 1.1.2008, amounted to a mere 25,2 million c.m.

It was also observed that, during 2007, no restrictions were imposed in the supply of potable water, although, as stated above, the Council of Ministers decided to restrict the quantities supplied for this purpose by 20%.

The Director of the Department informed us that the additional quantities of water were used for the irrigation of seasonal winter plantations, which were not provided for, and for the potato plantations, at Kokkinochoria area, firstly to fight frost and secondly because their irrigation period was extended for about two months due to adverse weather conditions. He also stated that these actions were based on oral instructions received by the Minister of Agriculture, Natural Resources and Environment, following his meetings with the affected Communities, Agricultural Organisations and farmers' representatives.

With regard to the failure to apply the decision of the Council of Ministers, for the reductions in the supply of water allocated for human consumption by 20%, the Director of the Department informed us that instructions for the application of these measures were not given to his Department, despite the repeated reminders which were sent to the Ministry of Agriculture and Natural Resources.

It was also ascertained that, in some cases, additional quantities of water were supplied to farmers, over and above their entitlement, based on approvals given by the District Engineers of the Department. Furthermore, it was ascertained that, during 2007, there was an overconsumption of 2,3 million c.m of water, mainly relating to the Irrigation Project of Pafos (953.000 c.m of water or 42% of total overconsumption).

As it was stated, the additional quantities for Pafos District, were supplied from the available water reserves in Asprokremmos dam, which is not connected with the Integrated Scheme of the South Conveyor and for this reason these reserves may be used only in the Pafos District area. In view of the above and for the better utilisation of the water resources in Cyprus, we suggested that the Department should consider the possibility of connecting the Asprokremmos dam with the Arminou dam, which is connected with the Kourris dam (which is connected with the Integrated Scheme of the South Conveyor).

(c) Delay in the construction of the water desalination plant in Limassol. The Department of Water Development proceeded to the construction of two water desalination plants at Dekelia and Larnaka, which were put into operation in 1997 and 2001, respectively, with the purpose of minimising dependence on weather conditions (ie rainfall) for securing the necessary quantities of potable water. On 25.8.1999 the Council of Ministers decided for the construction of a third desalination plant at the Limassol area. Due to the reactions of the affected Communities the project was not executed, but the Council of Ministers reaffirmed, on 23.2.2000, that, for the radical solution of the potable water supply problem of Limassol, there is a need for the construction of a desalination plant, with a daily capacity of 20.000 c.m. of water. The conditional consent of the affected Community Boards was obtained and the Council of Ministers decided, on 6.10.2000, that efforts should be made to complete the project the soonest possible, ie, based on the initial time schedule, that the desalination plant would be operational in 2004.

However, the House of Representatives did not approve the budget provision of the project in 2000 and, due to the reactions of many political parties and other agencies in

2002, about the construction of the new desalination plant, the tender procedure was suspended.

While the Council of Ministers did not revoke its initial decision of 2000, for the construction of the desalination unit in Limassol, and provisions were included in the Budgets of 2002 and 2003, for the amount of £1,1 m., no provision was included in the Budgets for 2005 and 2006, for the execution of the project. In the Budgets for 2004 and 2007 the provisions included were for very low amounts, of £100.000 and £50.000, respectively.

The Ministry of Agriculture, Natural Resources and Environment requested the Department, on 30.3.2006, to submit a proposal to the Council of Ministers, for the construction of a water desalination unit in Limassol.

On 8.6.2006, the Department submitted a letter to the Ministry, on which two different reports, which were prepared by the two Services of the Department, were attached. The first report, which was prepared by the Planning Service of the Department, concluded that if the total quantity of recycled water was utilized, then the desalination unit of Limassol would not be necessary. The second report, which was prepared by the Limassol District Office of the Department, and which was eventually adopted by the Department, concluded that the desalination unit should be constructed.

Finally, on 5.7.2006, a draft proposal was submitted by the Department to the Ministry and this was forwarded to the Ministry of Finance and the Planning Bureau, on 5.9.2006, for views and comments. The Planning Bureau replied positively, but with a significant delay, on 22.1.2007. On 7.2.2007, the Council of Ministers approved the construction of the new unit with a daily capacity of 40.000 c.m. of water and the possibility of extending it to 60.000 c.m., with the method of self financing and the final

date for the submission of tenders was the 12.5.2008. The delay in the invitation of tenders was attributed to the time consuming negotiations with the affected Communities in order to obtain their final consent.

We pointed out that, in addition to the serious problems caused on the water balance, the great delay which was observed in the execution of the above project resulted in the increase of the cost of expropriation of the affected plots of land, due to the significant increase of prices during the last years.

(d) Mobile Desalination Unit. In order to mitigate the water shortage situation, the Council of Ministers approved, on 25.7.2007, the installation of a mobile/prefabricated or floating desalination unit, at the area of Pyrgos, in the Limassol District, with a daily capacity of 20.000 c.m. of water (7million c.m for the year), with a three-year life span.

The tender was awarded to the lowest bidder, for the purchase of water at €1,39/c.m. The unit was expected to start its operation before the end of 2008.

On the basis of the tenders which were submitted for the immobile desalination unit of Limassol, the cost of water is estimated at €0,78/c.m., while the cost of purchase of water from the mobile unit is more expensive by €0,61. Therefore, it is estimated that, for the supply of 20 million c.m. of water, in 3 years, the additional amount of €12,2 m. will be paid. Additionally, the Community of Pyrgos, is expected to receive the amount of €2 m., in the form of counterbalancing measures, for the consent which was given for the operation of the mobile unit, within the area of the Community. The above had been pursued promptly.

(e) Reconciliation of the quantities of water supplied by Government irrigation projects. We noted that the quantities of water supplied by the Government Irrigation

Projects are not reconciled to the quantities billed, giving rise to a difference of 20%. We suggested that the Department should investigate the reasons that caused this difference so as to ascertain whether this is due to incorrect indications of the water meters or theft. In this respect we suggested that the Department examines all the water meters which are installed at the Irrigation Projects in view of replacing those which are faulty and in order to take all the appropriate measures so that the quantity of water which is not invoiced is reduced to the minimum.

The Director of the Department informed me that the above is attributed to the different levels of accuracy of the central and the local water meters and that the Department is carrying out all the necessary inspections and proceeds to the replacement of water meters, where necessary.

(f) Opening of private boreholes. According to the Wells Law (Cap. 351), the opening of boreholes is subject to the approval of the respective District Officer. On the basis of article 4 of the Law, when the Council of Ministers is satisfied that there is a need for taking special measures for the preservation of water at any area, for the public interest, no licence will be issued at this area by the District Officer, without the consent of the Department of Water Development.

According to article 4(5) of the Law, in order to decide on whether to grant its consent or not, the Department should take into consideration the consequential effect on the general water condition of the area and the needs of the existing users of water in the area, resulting from the opening of the proposed borehole. Any terms/conditions that the Department considers necessary to be met, are incorporated in the licences issued by the District Officer. Some of the conditions which are included in these licences are, inter alia, the installation of water meters, so as to control the quantity of water pumped,

the specification of the maximum quantity of water that is permitted to be pumped annually and the purpose for which the pumped water can be used. Under the Law, the District Officer has the power to carry out any investigation deemed necessary or measure and record the quantity of the water pumped from the above boreholes.

According to the records kept by the Department, 2.784 licences were issued in 2007 by the District Officers, with the consent of the Department of Water Development, for the opening of boreholes for irrigation purposes (2.826 in 2006) and 2.006 licences for the opening of boreholes for domestic purposes (1.037 in 2006). It was also stated that a great number of illegal boreholes are opened annually.

It is apparent that the supervision exercised by the District Officers, for the opening of illegal boreholes and the pumping of water from the approved boreholes, is very limited. As a result, there is a great possibility of over pumping from these boreholes , which is not identified so as to take the appropriate measures to limit it. It was also pointed out that, according to the relevant report which was submitted, in March 2005, by the Republic of Cyprus to the European Commission, on the basis of the provisions of the E.U. Water Framework Directive, 15 out of the 19 systems of underground water in Cyprus are under risk, mainly due to overpumping and brackishness, which is also attributed, mainly, to overpumping. According to the aforesaid Directive, the member states should take measures to avoid the further deterioration of the present condition of the water bearing strata at risk and to suggest and adopt appropriate measures for the improvement of their present condition, so that they will be in a good condition by 2015.

On the basis of the above, and especially in view of the general deterioration of the water reserves in Cyprus, we expressed the view that the Department, in co-operation with all the appropriate agencies, should immediately take all the necessary measures

for ensuring that the owners of private boreholes comply fully with the terms of their licence, especially with regard to the quantities of water pumped. It is noted that the Director of the Department, in his letter dated 21.6.2007, gave instructions to the District Engineers not to recommend or give their consent for the opening of boreholes for the irrigation of new plantations in the areas which are under risk or where there is over pumping of water.

(g) Planning of the provision of water for irrigation purposes. Taking into account the weather conditions in Cyprus, where periods of drought are becoming a frequent phenomenon and the need for the preservation of farming in the island, as a viable employment sector, we suggested that the Department, in co operation with the Department of Agriculture, should develop a strategy regarding the provision of water for irrigation purposes, and through campaigns and incentive schemes, encourage the farmers to produce goods that would contribute to the best possible management of the water resources so that the production of goods that require disproportionate quantities of water for their production, in comparison with their financial contributions to the economy, is eliminated.

As an indication, we pointed out that, during the years 2006 and 2007, about 2,6 million and 1,4 million c.m. of water was allocated from the Pafos irrigation project, for the irrigation of banana plantations. According to the records kept by the Agricultural Payments Organisation, these plantations produced 5,4 and 5 tones of bananas, out of which 0,4 and 0,7 tones, respectively, were compensated for withdrawal from the market. In addition, several quantities of oranges were also withdrawn. It was also stated that one tonne of water is required for the production of just one kilo of taro!

(h) Use of potable water for the irrigation of football playing grounds, green parks and the filling of swimming pools. We observed that in some cases, potable water is supplied by the Water Boards or the Community Boards for the irrigation of the grass of football playing grounds and parks. In view of the water scarcity in Cyprus we suggested that this matter should be investigated further in order to ascertain the degree in which it affects the availability of potable water, and if deemed necessary, to revise and legally regulate the policy for the supply of potable water to playing grounds and parks so that these are irrigated primarily with recycled water.

Also, while in many cases, the terms of the relevant planning permit explicitly prohibit the filling of swimming pools with potable water, it appears that no control is exercised for ascertaining whether this is adhered to. As a result, there is a possibility that a large amount of potable water is used for the filling of swimming pools, especially when taking into account the significant increase in holiday houses with swimming pools, and that no measures are taken to prevent this phenomenon. We suggested the legal regulation of the planning permit term relating to the filling of swimming pools and that the Department, in cooperation with the appropriate Authorities, should take measures to ensure that the aforementioned term is complied with.

(i) Establishment of a single Authority for the Management of Water. On the basis of the existing legal framework, the jurisdictions relating to the management of the water resources of Cyprus are exercised by various agencies, such as the Department of Water Development, the District Officers and the Department of Town Planning and Housing and are regulated by 15 different Laws. As a result, it is difficult to monitor and control the water resources as well as the complete and detailed regulation of their management and development.

This matter was discussed by the Council Ministers about 11 years ago, and it was decided, on 10.9.1997, to establish a single Authority for the Management of Water. For this purpose, a Bill was prepared, bearing the title “The single Agency for Water Law of 2001”, which was approved by the Council of Ministers on 4.7.2001 and was submitted to the House of Representatives on 12.7.2001. The Bill was pending for enactment until March 2003, when the Minister of Agriculture, Natural Resources and Environment asked for its withdrawal, as the impending accession of Cyprus to the European Union would bring about many changes to the Bill .

Subsequently, a new Bill was prepared, bearing the title “The Jurisdictions of the Management for the Single Administration of Water Law of 2008”, which was approved by the Council of Ministers on 6.2.2008, but this has not yet been submitted to the House of Representatives for enactment, due to the preparation of a study by the Department of Public Administration and Personnel, regarding the manning needs of the Authority.

The Bill provides, inter alia, for the legal regulation of the jurisdictions, which are exercised at present by the Department of Water Development as well as of all the other jurisdictions relevant to the management of water, regulates matters of safety of the dams, makes possible the exercise of complete control over the use of water and the imposition of fees and charges for the water provided so that the cost of the services rendered is recovered and water is used in the most efficient and economic way.