The Implementation of the European Union Water Framework Directive in Cyprus

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Abstract In this chapter, first the raison d'être, aims and timeline of the WFD are introduced. Particular emphasis is given to the economic and social aspects of the WFD to assist policy makers towards sustainable water resource management and social welfare enhancement. This is followed by a summary of the relevant steps taken to date to implement the WFD. The potential challenges that Cyprus will face while implementing the Directive are drawn to attention. The potential future social and economic benefits of the implementation of the WFD are examined. Finally, equity issues related to the different consumers' access to water, in the face of the Directive's requirement for full-cost recovery of water services, are discussed. As will be indicated in this chapter, the consecutive chapters in this book present more details on the impacts and challenges of, and issues related to the implementation of the WFD in Cyprus.

Keywords Water Framework Directive • Social welfare enhancement • Full-cost-recovery • Environmental cost • Resource cost

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Introduction

The importance of efficient, effective, equitable and sustainable allocation of water resources in Europe, and the need for an integrated management approach to solve water quantity and quality related problems have been recognized by the European Union (EU) policy makers, and resulted in the EU's recent Water Framework Directive (WFD 2000/60/EC).

In this chapter, first the raison d'être, aims and timeline of the WFD are introduced. Particular emphasis is given to the economic and social aspects of the WFD to assist policy makers towards sustainable water resource management and social welfare enhancement. This is followed by a summary of the relevant steps taken to date to implement the WFD. The potential challenges that Cyprus will face while implementing the Directive are drawn to attention. The potential future social and economic benefits of the implementation of the WFD are examined. Finally, equity issues related to the different consumers' access to water, in the face of the Directive's requirement for full-cost recovery of water services, are discussed. As will be indicated in this chapter, the consecutive chapters in this book present more details on the impacts and challenges of, and issues related to the implementation of the WFD in Cyprus.

A Primer on Water Framework Directive

The European Union (EU) countries have recognized that in the face of continuously increasing demand for water, the status of the quality and quantity of water resources in Europe have become far from satisfactory. According to the European Commission's (EC) recent statistics, 20% of all surface water in the EU is seriously threatened by pollution. Groundwater supplies around 65% of all Europe's drinking water, yet 60% of European cities overexploit their groundwater resources. Furthermore, 50% of all European wetlands have "endangered status" due to groundwater over-exploitation. In addition, the area of irrigated land in Southern Europe has increased by 20% since 1985, contributing to increasing water scarcity in Europe (EC 2002).

Given the increasing pressures on the quality and quantity of water resources, the EU has established the effective legislative instrument in the form of the WFD. The WFD addresses these problems by using an integrated environmental management approach, whose aim is to secure water resources for future generations. In this Directive, the integrated approach refers to consideration of both water quality and water quantity matters, as well as issues related to both surface and groundwater. This integrated management framework is based on a river basin level, in their words the river basin is the new water management unit reflecting the situation in the natural environment (Chave 2001; EC 2002).

According to this Directive all Member States are obliged to restore and upgrade the quality and quantity of their water resources to a "good status", and to ensure their sustainable use by 2015. The WFD calls for drawing of 'River Basin Management Plans', which are expected to include all measures that need to be implemented in a coordinated manner in each river basin to ensure protection for all European waters. The WFD asks for the designation of a single competent authority in charge of the implementation of the environmental objectives of the directive in each River Basin District. The Directive aims to ensure consistency and coherence in decision-making, and to guarantee that the integrated water management objective is achieved, in terms of co-ordinated protection of all waters, including surface waters, groundwater, as well as protected areas.

The key objectives of the WFD include the following (Chave 2001; EC 2002): (1) protection of all water resources, including rivers, lakes, coastal waters and groundwater; (2) establishment of ambitious targets to ensure that all waters will achieve "good status" by 2015. For surface waters "good status" is considered to be "good ecological quality" and "good chemical status", whereas for groundwaters "good status" implies "good quantitative status" and "good chemical status"; (3) prevention of pollution at source, and setting of control mechanisms to ensure all pollution sources are managed in a sustainable way. In the case of international regions of river basins, cross border co-operation between countries and all involved parties are required; (4) assurance of active participation by all stakeholders in water management activities, including NGOs and local communities; (5) establishment of efficient, as well as equitable, water pricing policies to encourage sustainable use of water; (6) implementation of the polluter pays principle with regards to the discharge of polluting materials; (7) balancing of the interests of the environment with those who depend on it, (8) designing of a management plan on river basin level and the finalization of the "River Basin Management plan" for each river basin district within the predetermined timeframe. In summary, the WFD introduces objectives and management which aim at creating a win-win situation between ecology and economy at the appropriate geographical scale and therefore truly achieving a sustainable and integrated water resource management.

In order to achieve these ambitious aims, the EU proposes not only active participation by all those stakeholders and users of water resources, but also integration of various other European policies, such as those on agriculture and fisheries, transport, energy and tourism, as well as integration of all available instruments, including emission control measures and polluter pays principle, as well as economic instruments such as water charges, subsidies, deposit refund systems and market creation (Chave 2001; EC 2002).

As mentioned above, the implementation of the WFD is obligatory to all member states and delay or unjustifiable failure to successfully implement the WFD involves serious penalties. For certain water resources, however, provided that they fulfill certain conditions, the Directive permits extension of the deadline further than 2015, and/or relaxation of the environmental targets than those required normally.

Implementation Timetable

A summary of the important deadlines set on the implementation of the WFD is given in this section (EC 2002; Demetriou and Georgiou 2004) while the degrees to which Cyprus has achieved or is likely to achieve to meet these deadlines is examined in the following section.

Phase 1 of the implementation process was scheduled to be completed by December 2003 and should have achieved adaptation of the national and regional water laws to the WFD (see Chapter 5), as well as identification of the river basin districts and make operational the river basin co-operation (see Chapters 2 and 6). Phase 2 was scheduled to be completed by December 2004, by when reference conditions and reference sites for the inter-calibration network should have been established; the specification of values for ecological status classification systems should have been prepared (see Chapter 8), and the analyzes of the characteristics of the river basin and of the various pressures and impacts on water resources should have been completed, including a thorough economic analysis (see Chapters 7 and 10). Phase 3, which entails operationalization of the monitoring of programs for water management, was bound to be completed by December 2006 (see Chapter 7). By December 2009, the rivers basin management plans should be presented to the public, and by December 2010 the water-pricing policies should be established to promote efficient water use and to recover the costs of water services by each economic sector (see Chapter 10). By December 2012 all measures established under the program of measures should be made operational, and finally, by December 2015 all waters should meet "good status".

The key activities and their importance as they relate to the different phases of the implementation process are determined by these deadlines laid down in the WFD. Priority was given to all projects for which the outcome is needed to fulfill the requirements of Phases 1 and 2, in particular those that are fundamental for the development of guidance documents on the key requirements of the WFD. Moreover, prioritization of projects is based on a principle of voluntary participation depending on national importance of resources, as well as of national interests. Development of the classification system in order to identify the reference sites, as well as specification of reference conditions need to be initiated during Phase 2. Similarly, all guidance documents required for the analyzes of the characteristics of the river basin, of pressures and impacts and for the economic analysis should also be developed in Phase 2 (Demetriou and Georgiou 2004). In addition, one important feature of the Directive is that great importance is given to the information and participation of the public, i.e., all stakeholders in water management.

Conformity Assessment and Future Challenges in Implementation of the WFD for Cyprus

In this section an assessment of the effectiveness of the implementation of the Water Framework Directive 2000/60/EC (WFD) and all related EU Acquis and policy in Cyprus is performed while future challenges are also identified. The particular

emphasis is on the policy reforms undertaken by Cyprus Authorities to strengthen institutional capacity for the effective implementation of the acquis communautaire in relation to water resource management and the policy implications of the implementation for Cyprus.

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 fifth of February, 2004 (Cyprus Law N.13 (I)/2004).[1] 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. To meet the requirements of the WFD the Cyprus Authorities have revised their 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 (Michaelidou et al. 2004) and thus help Cyprus in its efforts to harmonize with EU policies and in particular EU water policies.

In line with the articles and relevant annexes of the WFD, river, lake and coastal water bodies and its types are identified, using the methods described in the directive together with databases, maps and literature containing hydromorphological and ecological information an overview of pressures and impacts resulted in an estimation of water bodies at risk. Furthermore, improvements in the field of database and software tools, monitoring requirements etc. further facilitated the compliance with the WFD objectives. Effective and sustainable water management is only possible with the aid of information systems, integrated databases and associated tools supported by Geographical Information System (GIS) technology. Easily accessible databases and GIS also facilitates public information and hence the required public participation in water resources development. Finally, a register of protected areas, including the Bathing Directive, Drinking water Directive, Habitat Directive and Bird Directive, is performed.

To evaluate the performance of each Member State a scoreboard is developed by the European Commission to show achievements and highlight gaps on the legal transposition and implementation of the Water Framework Directive (WFD) and is available under: http://ec.europa.eu/comm/environment/water/water-framework/scoreboard.html. Conformity progress is based on the summary reports from the

[1] A detailed presentation of the modifications of the national legislation undertaken to meet the requirements of the WFD is provided in Chapter 5.

Member States. The intention is to inform the EU institutions and the public on the WFD implementation while providing a feedback to the Member States on their current performance. The Commission is currently drafting the WFD implementation report according to Article 18(3) of the Directive Member States are encouraged to take these findings into account in the further national implementation, in particular the preparation of the river basin management plans. Following the publication of the report, the Commission services will engage in discussions with the Member States, in the context of the Common Implementation Strategy and bilaterally, in order to address some of the identified issues in more detail.

The performance checking results for the three main reporting steps to date, i.e. the transposition, the designation of river basin district and competent authorities (article 3) and the environmental and economic analysis of the river basin districts (article 5) demonstrate that Cyprus has been able to fulfill nearly all of its reporting obligations to date within timelines agreed by the Council and the European Parliament with no serious delays in submitting the required reports. The assessment has further revealed an overall satisfactory transposition. Cyprus has set up the necessary administrative arrangements to accomplish the WFD legal requirements. The government of Cyprus has also achieved to face the challenge of meeting the obligations of articles 5 and 6 and relevant Annexes of the Water Framework Directive (Ministry of Agriculture, Natural Resources and Environment 2005). For article 5 this included the characterization of the river basin district in terms of reference conditions, pressures and impact, and the economics of water uses whereas for article 6 a register of protected areas lying within the river basin district was required.

Although the results of this first analysis are rather encouraging, based on the performance indicators (a simple scoring system in which a number of points are attributed to several policy reforms) there are some open issues which require clarification as well as challenges towards the full compliance with the EU requirements. Despite the promising first performance emerging results in which Cyprus is clearly among the States with the highest compliance degree the current picture of implementation is not all “rosy” in the island. Addressing gaps, deficiencies or shortcomings should be a motivation to avoid becoming complacent and to increase efforts to tackle these challenges.

Other than the lack of suitable, specialized expertise; high costs of implementation, and the extremely tight and demanding timetable, there are several other problems encountered in Cyprus while planning on the implementation of the WFD (Demetriou and Georgiou 2004; Michaelidou et al. 2004; Kridiotis 2004; Kambourides 2005). Demetriou and Georgiou 2004 identify one of the main problems to be the lack of an integrated and rationally organized national network for data collection. The recently developed database for storing and analyzing information is at its initial stages with many teething problems. In addition, much of the information collected over the years is still in paper form. Data on water quality, especially on chemical analysis information is lacking. Moreover, the points of pressure were not monitored in a systematic way and are also not geo-referenced.

Cyprus is also facing specific challenges related to regional and/or local situations and conditions. As explained in detail in various other chapters of this book,

there are several problems related to the management of water quality and quantity in Cyprus. There are difficulties associated with the extended periods of low rainfalls observed in Cyprus in the last decades. These have resulted in frequent droughts causing water shortage problems, and resulting in serious water quantity and quality problems. Coastal waters have been polluted by nutrient run offs from agricultural and other economic activities, and aquifers have been exhausted. Moreover, there has been a considerable amount of salinization in the coastal areas. Increased irrigation demand from the agricultural sector tends to aggravate water shortages, as well as other environmental problems such as groundwater pollution from nutrients and pesticides. In addition to these, construction of a large number of dams has resulted in reduction in groundwater recharge and increase in saline intrusion (Kambourides 2005).

The fact that serious co-ordination efforts are required among responsible authorities and stakeholders for implementation of the WFD also causes great challenges for Cyprus. As explained above and in more detail in Chapter 4, the administration of water management and the related legislation in Cyprus have traditionally been fragmented, and several property rights problems with regards to water persists (Kridiotis 2004).

Furthermore, it has been argued that the requirements of the WFD are more suited to the realities of the large river basins of Europe with wet climates. Cyprus, on the other hand, has a semi-arid climate, and numerous catchments, which are small but of great importance, even though none provides perennial flow (Kridiotis 2004). Most importantly, the separated state of the island causes serious problems with respect to its management as a single River Basin. Cooperation and collaboration between the two communities of the island is needed in order to manage the river basin in a sustainable, efficient and effective manner, in accordance with the requirements of the WFD.

Overall, although the results for Cyprus are satisfactory and the Cypriot Government seems to have established the necessary structures and administrative arrangement as highlighted in Chapter 5, several policy reforms still have to be undertaken to address the aforementioned shortcomings and challenges and to ensure that the administrative structure will deliver the results under the WFD.

Policy Recommendations Towards the Implementation of the WFD: Efficiency and Equity Issues

This section explains in greater detail the economic analysis that needs to be integrated with other field expertise, such as hydrology, geology, engineering and law to inform the decision making process for sustainable management of the water resources according to the WFD. In addition to the economic analysis, equity issues arising from water resource allocation and water use should also merit consideration in policy making to ensure social and economic welfare.

There are three main steps that should be taken in order to carry out an economic analysis of the integrated management plan, and to design the efficient and cost

effective economic incentives that could enable sustainable use and management of water resources. The first step is the economic characterisation of the river basin, once it is identified, and the identification of the significant issues related to the river basin. To this end, firstly the importance of water in the region of the river basin should be evaluated. This involves documentation of the volume of water demand and water use patterns of the residential, industrial, agricultural and tourism sectors. Secondly, the key economic drivers, which put pressures on water resources, should be identified. These include identification of the social and economic indicators, such as population, income and employment; key sector policies that affect water use, including those related to the agriculture and the environment; production levels and patterns of the main water using sectors; implementation of the planned investments according to the previous water regulations, as well as implementation of the future policies that are likely to affect water use. Third, the potential future changes in these economic drivers and their expected impacts on water resources should be projected. This can be done by studying the trend variables, including changes in demographic factors; economic growth and economic activity composition, as well as changes in land use. In addition, external factors such as globalization, climate change, and several other policies that impact water use should be taken into consideration. Further, the possible developments in technology and investments for improving the quality and quantity of water services should be taken into account. Finally trajectories for water demand and supply should be drawn for each sector and for the economy as whole, and the potential problems that the divergence of these paths might cause should be identified. Water supply can be determined by hydrological study of the water resources, while demand can be estimated using economic methods including profit or cost function approaches, econometric demand estimation, hedonic pricing analysis to name a few. If a gap is identified between the water demand and supply trajectories, i.e., if the water balance and the quality of the water fall short of the "good water status" that needs to be achieved by 2015, measures should be taken to close this gap.

The second step includes the assessment of the recovery of the cost of water services. To this end, the cost of the water services, including financial and environmental resource costs, should be estimated by sector. The stakeholders who bear these costs should also be identified. In addition, the current cost recovery level should be determined, by investigating issues such as the status of the key water services; their costs; the present institutional set up for cost-recovery; contributions from the key water users to the recovery of costs, and by linking the resulting extent of cost recovery levels to the affordability of water users. Finally, the various cost recovery mechanisms that can be employed to efficiently and effectively manage water resources should be identified. These might include a combination of selling permits for water abstraction and/or pollution, taxing of water abstraction and/or pollution, charges for the use of irrigation systems, and charges on energy use, to name a few. In order to correct for potential losses from these cost-recovery measures, i.e., to compensate those whose welfare are diminished from such measures, transfers such as subsidies to low income households, as well as capital subsidies

to investments in infrastructure should be considered. Cyprus compliance with the water pricing requirements of the WFD is addressed in detail in Chapter 7.

The final step to implementation of the WFD is the economic assessment of potential measures for reaching "good water status". This includes identification of the least cost measures (or combination thereof), as well as their impacts on various sectors in the economy and water user segments. To this end, all financial (capital, operational, maintenance and administrative) and indirect (e.g., non-water related environmental costs, and costs of prevention and mitigation measures) costs, as well as the key parameters that influence these costs over time, such as the development of these sectors, should be measured. In addition, whether or not the costs of these measures are disproportionate should be assessed, by allocating costs of measures to water users and by identification of winners and losers from undertaking these measures.

Along with economic efficiency in water use patterns and demand-side measures to eliminate pressures on water resources, social and economic welfare is likely to depend upon the efficiency in the allocation of resources, and the fairness of distribution of resources across the society. Given the aforementioned economic implications of the WFD, the optimal allocation of water resources will take into consideration the relative values placed on water in the various sectors of the economy (e.g., residential, agricultural, industrial, environmental), and allocate the resource according to dynamic supply and demand considerations. Hence, the implementation of the WFD has the potential to decrease inefficiency in the allocation and use of water, which will result in higher total economic welfare for the society as a whole. However, there are other important factors, which may or may not be taken into consideration under this allocation. These considerations include equity.

Examples of equity considerations for water policy are: equal access to water resources; the distribution of property (water) rights, and the distribution of the costs and benefits of water policy interventions on different income (social) groups. The implementation of the WFD should be evaluated with regards to the resulting distribution of the costs and benefits to the society. The change in social deadweight loss resulting from water allocation changes should be determined, together with the actual distribution of this change.

Challenges that might arise in the WFD implementation process in Cyprus will include situations where full-cost recovery pricing will eliminate the deadweight loss of the current system, but its benefits will be distributed in favor of the higher income groups. As such, the policy could be considered to be inequitable. Another example concerns the potential unfavorable impact of reducing subsidies to agriculture upon employment.[2] Overall, the WFD proposes effective tools for water management and allocation (over space and time), however, it may also lead to socially undesirable distributional effects in the society. Policymakers should use economic and social policy to smooth the undesirable distributional impacts.

[2] See Chapter 11 for a detailed discussion of both of these examples.

Future Benefits of the WFD to Cyprus and Conclusions

The future presents both challenges and opportunities for sustainable water management in Cyprus (Michaelidou et al. 2004). As explained in Chapter 2, the ever-increasing demand for water has been placing additional pressures on the quality and quantity of the limited water resources of the island. Even though the previous policy of the Cypriot Government has been increasing the supply of water, it has been recently recognized that this strategy does not provide a sustainable solution for effective water management and conservation.

The EU WFD provides Cyprus with an unprecedented opportunity for introducing and implementing water policies, which can not only enhance the quality and quantity of the water resources, but also ensure sustainable use of water resources and environment resources in general (Michaelidou et al. 2004). Similarly to the other 24 EU Member States, Cyprus is obliged to stop further deterioration of the quality and quantity of all its water resources and to improve them to a "good status" by 2015. To achieve this Cyprus is required to further develop river basin level intervention programs based on cost-effective measures that are technically feasible and not disproportionately expensive. Economic instruments, including pricing policy, should also be considered and there should be specific attempts to allocate costs to polluters. All this is to be delivered using some form of participatory approach to maximize stakeholder buy-in. In particular, based on sound monitoring and the analysis of the characteristics of the river basin, Cyprus is obliged to identify by 2009 a program of measures for achieving the environmental objectives of the Water Framework Directive cost-effectively (Article 11, Annex III).

As Kambourides 2005 states, the implementation of the WFD is very timely as the water resources of Cyprus are facing increasing pressures, and there is no time like the present to tackle the challenges for current and future generations alike In addition, consideration of the island as a single river basin also presents a great opportunity not only for sustainable management of the island's most scarce resource, but also for collaboration and cooperation between the two communities on the island. The effective implementation of the WFD in Cyprus requires appropriate infrastructure; great effort from the Cypriot government and the public alike, in addition to long term planning; a structural change in the tradition of thinking; efficient allocation of adequate financial resources, and most importantly, a strong political will (Kridiotis 2004).

In summary, the initial compliance assessment illustrates that significant steps forward have been made towards sustainable water management in Cyprus. However, there is still a long and challenging road ahead. The Commission is offering a continuous partnership to the Member States in order to address some of the difficult questions and share experiences and best practices. The work program for the Common Implementation Strategy has already been set up for the period 2007–2009. On the basis of the past achievements, it will provide the platform for working together.

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