

Assessment of Water Monitoring System in Albania under the perspective of EU legislation and Austrian practice

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Abstract

There is a complete legal framework at EU level, providing for the establishment of integrated water management systems in all Member States. Substantial part of this legislation concerning water resource management and monitoring has been transposed so far in Albania, although an adequate monitoring system as part of the integrated water management system, is still far from being established and fully operational. The purpose of this work is to provide an overview of water resource management in Albania, with a particular focus on the assessment of water monitoring system, based on the EU legislation and Austrian practice. Several problems and concerns regarding the degree of implementation of EU directives, particularly of Water Framework Directive (WFD), such as the discrepancies in the coordination between institutions; lack of sufficient and appropriate financial means; imperative need for the development of modern laboratory infrastructure, distributed in an artery-like network in order to monitor water resources; necessity for more qualified and trained staff, lack of an electronic database, and the need for raising awareness and participation of the public in decision-making process related to environmental issues, have been observed. Based on EU legislation (WFD) in general, and the Austrian practice in particular, recommendations for establishing the water monitoring system in Albania according to EU standards and laws have been also presented.

Keywords: Water Framework Directive, water monitoring system

Introduction

Water is the essential building element for organisms of living beings of any nature, and also the basis for several and diversified human activities that ensure the existence of society. Waters encompass a wide range of uses, starting from the daily domestic use, irrigation, industry, mining activities, etc. Agriculture is the biggest consumer of fresh waters in the world, with 70% of sources [1]. Water is widely used also in the nuclear technology, as a cooler of plants where controlled nuclear energy generation takes place [2].

Water recognizes no administrative borders across the countries in the world; therefore, it is the responsibility of every one of us to think and take care of our common heritage, therefore protecting it from pollution and incorrect, uncontrolled and unjustified uses.

The European Union has a complete legal and institutional framework for the efficient and integrated management and administration of water resources, being the most important one the Water Framework Directive, approved in 2000 [3]. Several directives, supplementary to the WFD, have been further amended, drafted and approved, in order to create the complete legal framework and to ensure the integrated management of water resources in EU [4-9].

The establishment of a functional system for water management has become an imperative duty even for the countries that are in the course of accession. In the framework of the Stabilization and Association Agreement [10] and after the country was granted the candidate status on 24 August 2014, Albania has to approximate its legislation with the EU legislation in all

fields, including the field of environment and water administration.

Although there are no obligations for Albania concerning the direct application of such Directive, as a candidate country, the priorities of the Government must be in line with the purposes of the WFD, thereby making the full approximation of the Albanian legislation with the one required by the EU until 2020. According to Annual Reports on the Environmental Status, in the course of recent years, there have been several policies aiming at the most complete administration of water resources, mainly through the establishment of a monitoring and controlling framework, in order to reduce the pollution of surface and ground waters from industrial, agricultural activities, and damages resulting from direct impact of population in rural and urban areas [11-18].

Albania and Austria are countries rich in water sources, both surface and ground waters. Austria is part of three international river basins: Danube (96% of Austrian territory), Rhine (2.8%), and Elbe (1.2%). The length of river's network of Austria is more than 100000 kilometers and includes 2194 rivers, each of them with a water-collecting surface of more than 10 km². In Austria, there are more than 25000 lakes, of which 62 have a surface area of more than 50 ha. Water resources in Austria are used for various purposes: energy generation through hydro-power plants; in agriculture; forestry; mineral industry; in gas and oil production industry; wood industry; textile industry; glass industry; industry of leather treatment; or for recreation, tourism, etc. [19].

On the other side Albania is rich in vast, transboundary lakes, and highly important aquifers. The water flow is about 39.22 billion m³ / per year, of which 95% flows into Adriatic Sea and only 5% in the Ionian Sea. The country is divided into six river basins: Drin, Mat, Ishëm-Erzen, Shkumbin, Seman and Vjosa. One third of their surface is outside the state borders of Albania. Surface waters are used for the generation of electricity through numerous hydro-power plants, as well as in industry, agriculture, etc. Groundwater resources are mainly used for drinking water supply. Water resources play a very important role in the

economy of the country, with 97% of the total generation of electricity being secured by hydro-power plants, located mainly in the rivers of Drin, Mat, and Bistrica [20].

The purpose of this work is to provide an overview of the current situation of water monitoring in Albania, while identifying the issues and main shortcomings, and to offer recommendations on adjusting the Albanian system with the EU requirements and laws, as well as with the Austrian best practices.

Methodology

Information and relevant data in regard to water management and monitoring, both in Austria and Albania, has been collected by various sources: official publications in central administration's web-sites, official journals, different strategic and research projects together with the literature in the field and/or related areas, as well as direct contacts with representatives of responsible institutions in Albania, which deal with water management matters. Constructive discussions have been organized with representatives of Parliamentary Committee for Production activities, Trade and Environment, and the heads of the Technical Secretariat of National Water Council, representatives of the Ministry of Agriculture, Ministry of Environment, representatives of the Councils for Basin Management, etc. Representatives of national and international organizations engaged in projects related to the management of water quality, such as OSCE, ADA, etc., and representatives of scientific research institutions, such as the Faculty of Natural Sciences at the University of Tirana, Agricultural University of Tirana, University of Shkodra, etc., have been part of discussions and organized round tables, and their expertise has been considered in order to identify handicaps and all problematic issues in this sector and to present some recommendations to the establishment of a fully functional water monitoring system in Albania, in compliance with EU standards.

Results and discussions

3.1 Legal framework for water management and monitoring

Water Management in Austria is governed by a highly consolidated legal package. The main provisions are summarized in the Water Act – WRG 1959 with its amendments, which contains a series of measures necessary to implement the legal instruments related to the use of water sources, protection and prevention of pollution and protection from floods [21]. The amendments of 2003 at the Water Act, together with relevant regulations transposed the EU Water Framework Directive into national law. The annexes of regulations “On Water Monitoring Status” (GZÜV) and “On Chemical Status of Underground Waters” (QZVWG) determine all parameters to be monitored, in all surface and ground waters, including chemical pollutants, list of prohibited compounds, such as organo-halogenic and organo-phosphorus ones, carcinogenic products, mineral oils and hydrocarbons, cyanides, Hg and Cd with their respective compounds, as well as a the list of substances that are subject to authorization and which might have harmful effects on underground waters; substances with negative effect on the taste and/or odor of underground waters, making them unsuitable for human consumption; substances that contribute to eutrophication, as well as others that have an impact on the oxygen balance [22,23].

All these regulations, with significant number of annexes with technical specifications, are interlinked and function as a single body, thereby providing the basis for the establishment in Austria of an integrated water management system, and ensuring a synopsis of the water status in real time, together with a complete information on high quality waters of all categories.

WFD and Bathing Water Directive have been largely transposed in Albania. The Law “On the Integrated Water Resources Management” [24] charges the Council of Ministers, National Water Council with its Technical Secretariat and the Ministry of Environment as central bodies responsible for water resources administration and management. It also

stipulates the duties of local authorities including the Councils for Water Basins and Agencies for Water Basins, which responsibilities are partly clarified in the 2015 local government law [25]. The legal framework in the field of water resources management and administration is composed of International Agreements ratified by Albanian Assembly, other laws and Council of Ministers decisions, which are paving the way for creation of an operational Water Management System [26-33]. Notwithstanding the alignment with the directives on urban waste water treatment, drinking water and groundwater in Albania is insufficient and regulations to strengthen implementation are still lacking [25].

3.2 Institutional mechanisms to establish water monitoring network

The general water monitoring system in Austria, like in any EU Member State, is established based on the three main WFD components: surveillance monitoring, operational monitoring, and investigative monitoring. Ministry of Life (the former Federal Ministry of Agriculture, Forestry, Environment and Water Management) implements all monitoring programs, in cooperation with Federal Environment Agency and the offices of 9 provinces (*Länders*), and with technical support from the Federal Environment Agency [19].

Surveillance and operational monitoring is carried out by the Ministry of Life which has the competence of the Federal-level coordinator, whilst investigative monitoring is regulated by the offices of 9 provincial governments [21]. Provinces are responsible for checking the data through the assessment/interpretation of data for various country reports; in case that the environmental issues are at risk, recommendations would be provided to the water authorities through reports and action plans; the Ministry of Agriculture, Forestry, Environment and Water Management is responsible also for approving the data, securing funds from federal budget, etc. Division VII 1 of the Ministry is responsible for the assessment/interpretation of the data and issuance of

annual reports and making them available at the website of the Ministry [19].

More specifically, *surveillance monitoring* for rivers is organized in three sub-divisions, based on the fulfillment of the objectives required under Article 7(1) of GZÜV, therefore carrying out a surveillance monitoring of the ecological and chemical situation of rivers and establishing a considerable number of stations of surface water bodies that provide a general assessment of the water flow situation in any site of the river basins. In *lakes*, measurement points serve to continuously document the status of surface water resources and provide information about long-term natural changes. The parameters and their frequency may change depending on the classification of surveillance monitoring stations. Surveillance monitoring period and parameters are the same with those determined in the WFD, whilst the frequency of measurements for some parameters, according to the Austrian system, is 3-6 times higher than the level determined in Annex V of WFD [19,22]

Operational monitoring, conducted under the direction of Ministry of Life, involves temporary measurement points for those parameters that are at risk of failing to meet the objectives or that are used as risk indicators. The purpose is to examine the quality elements having the highest amount of data. All parameters are monitored over a one-year period with a monthly frequency. The methodology has been specified in Article 10 of the Regulation on Water Status Monitoring, which contains the relevant Annexes as well

Investigative monitoring, is regulated by 9 provinces (Länders), which carry out various tests for further measurements depending on the dimensions of water bodies. After the test results, in case that the environmental issues are at risk, recommendations would be provided to the water authorities through reports and action plans. Investigative monitoring is rare and performed, in particular, in case of accidents or water pollution, due to activities such as: flow of fuel during the transport or death of water species resulting from chemical damages, etc. This type of monitoring, as a rule, involves experts who provide suggestions and

concrete proposals submitted to the competent authorities, for further decisions to improve the situation [19].

Several projects, such as CEMSA, StEMA, have been developed in the recent years, in order to implement a National Monitoring Program in Albania, through an operational Integrated Environmental Monitoring System. These projects and strategies are based on both EU environmental standards and directives concerning the environmental protection, thereby giving their contribution to monitoring procedures and system, by providing technical assistance and some modern analytical instruments and equipment [17]. However, water management has always taken a secondary position as regards the priorities and the relevant institutions have had and still have a discrepancy and overlap of actions and responsibilities, often being accompanied with a lack of transparency in decision-making in this sector [34].

Moreover, various institutions such as Institute of Geosciences, Energy, Water and Environment, Albanian Geological Service, Institute of Public Health, Institute for Applied Nuclear Physics and Faculty of Natural Sciences, have been engaged as contractors or subcontractors for particular aspects of water monitoring and in certain periods of time. Apart from the fact that many institutions have been or are involved in water monitoring procedures, methodologies and analytical instruments used, are not always fulfilling EU requirements. In some of them, advanced research instruments, like AAS, GC-MS, etc, are not functioning, either because people are not trained, or some spare parts and technical assistance for maintenance are missing.

Therefore, due to continuous structural reforms at institutional level, to the lack of coordination among state institutions at both central and local level, together with gaps and/or overlaps in responsibilities and competencies across ministries, agencies, and local authorities, the level of water resources management, in particular the process related to the water quality monitoring, has been rendered unsatisfactory.

Actually, water quality monitoring is in place under the National Environment Agency, including annual reporting on bathing waters to the EU Environment Agency since 2013 [25]. Surface water monitoring network in Albania includes monitoring of rivers and lakes, as well as coastal and bathing waters, whilst ground water monitoring is conducted at quaternary porous aquifers in 7 detention basins. The network includes the basin of Drin, Mat, Erzen-Ishëm, Shkumbin, Seman, Vjosa, and Ionian Area [18].

Monitoring programs are carried out every year based on the National Environment Monitoring Plan. Monitoring stations and parameters are determined in the annexes of NEMP's for all environmental components [35-37].

An increase in the number of stations for monitoring rivers, lakes, bathing waters and a decrease in the number of monitoring sites for urban liquid discharges, has been noticed in the period from 2008 until 2015. The data are summarized in Table 1.

Table 1. Monitoring stations for surface and underground waters in Albania in the period 2008-2015.

<i>Year</i>	2008	2009	2010	2011	2012	2013	2014	2015
<i>No. of stations</i>								
Rivers	31	30	30	31	18	18	34	34
Lakes	5	9	5	5	5	5	7	9
Bathing waters	72	72	70	73	73	73	78	78
Urban liquid effluents	35	35	35	35	35	0	10	10
Underground waters	40	40	40	40	40	40	40	40

As it can be observed from the table, the number of monitoring stations has been significantly reduced for urban liquid effluents after 2012, and also for rivers in the period 2012-2013. It has fluctuated almost at the same levels for lakes and bathing waters, whilst has remained constant for underground waters. The number of underground water monitoring stations, as indicated in NEMP 2015, was expected to be 151. In fact it has been increased by 7 in 2016, and is foreseen to reach 59 in 2017, which is probably a more realistic approach.

The same reasoning can be applied for the rest of monitoring stations. According to 2017 NEMP, 151 monitoring stations are expected to be operational for rivers, 35 monitoring points will serve for lakes and 33 for lagoons. In coastal area, 28 monitoring points shall be established for physico-chemical parameters, whilst 100 monitoring points are (pre)selected for bacteriologic indicators. The measurement frequency will be four times a year, which is consistent with the requirements specified in Annex V of the WFD.

The parameters to be monitored include: meteorological and hydrological indicators, pH, O₂,

alkalinity, salinity, TOC, nutrients (N, P), heavy metals, and organic compounds, as well as indicators for bathing waters. In regard to bio-quality 95 monitoring stations have been selected, where phytoplanktons, intervertebrates and fish will be the main parameters to be monitored[37].

The abovementioned figures indicate a substantial increase, both in terms of monitoring points or stations and parameters to be controlled, compared to the previous years, therefore require a strong financial support from the state budget to be realized

3.3 Data collection and transparency

Austria has in place an electronic system for public information, and in particular, for publishing environmental data related to the management of water resources. WISA is the core platform for accessing the data and information about water management. This website provides highly important information about important topics, such as: water management plans, flood risk management, discharges, water bodies and other matters of technical importance. The public

interested in the Water Management System and the Flood Risk Management plans have at their availability several annexes and maps, containing, in addition to general information, particular information and statistical data. The Federal Ministry of Agriculture, Forestry, Environment and Water Management, in cooperation with the Provincial Water Management authorities, create every six years a National Water Management Plan, which is also available for general public: authorities at Central or Local Administration, researchers and scientists, third parties, European Union, etc.

As supplement to the main platform of WISA information system, other additional platforms have been established already, being as most important the eHYD and H₂O ones. The platform of eHYD contains various maps with general information obtained from all monitoring sites about rainfalls, underground waters, including hydraulic flow of water sources. It also provide data obtained over the course of several years and registered in the Hydrographic Yearbook. On the other hand, H₂O, as part of WISA family, is also a database that provides necessary information about the water quality [38].

Contrary in Albania, due to considerable lack of data, especially for the period 1990-1996, when the monitoring process was totally suspended, a credible database, necessary for a full picture of water resource monitoring over the years, is not available [39].

In order to establish a complete database in compliance with EU standards, the entire monitoring process must be subject to statistical and analytical processing and methods of the so-called “*quality assurance*”. Actually, water monitoring data, together with other environmental indicators, are processed and published in the form of an annual report by the National Environment Agency. The Environmental Status Report is published in the official website of the Ministry of Environment and the official website of NEA. Line ministries submit annual reports to NEA whereby providing explanations in regard to environmental status,

environmental aspects of sectorial policies implemented by them, etc. Monitoring institutions submit semi-annual and annual technical reports. In addition, data are submitted to the Regional Environment Departments also by natural and legal persons, whose activities are subject to environmental permits [35].

Even being stipulated in articles 88 and 89 of the Law 111/2012, there is still no complete electronic database, as one of the most essential elements of integrated water resource management and monitoring. For general public, the information can be achieved only in the web-site of NEA and of the Ministry of Environment, where ESR’s published since 2011, can be assessed. Nevertheless, monitoring data in all sites and for all parameters are not publicly available. Moreover, Albania is still far from establishing *on-line* monitoring and having a thorough and complete information of monitoring network in real time.

3.4 Financial and budgetary issues on water monitoring

Statistical data obtained from the official website of the Ministry of Agriculture, Forestry, Environment and Water Management, have demonstrated that in Austria there is a fully functional system for surface and underground water monitoring, with a separate and continuous financial support from budgetary lines. Thus, for every three year period (half of a normal monitoring cycle) in the last decade, the budget allocated for surface waters monitoring has reached 4.4 million Euros, whilst for underground waters was from 2.14 -2.5 million Euros, which indicate a stability in financial support and expenses to make the monitoring network operational. Figure 1 presents the costs and expenses of every Province (*Länder*) in the previous monitoring cycle (2007-2012), which demonstrate an increasing trend, except of the year 2007, when the allocated funds for Provinces of Styria and Tirol have been almost two times more than of the other years. This is due to natural disasters like floods and landslides occurred in those regions by that time.

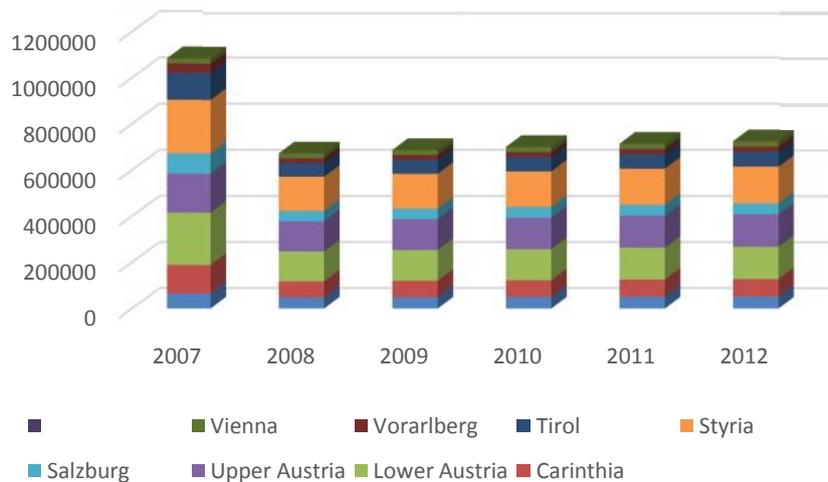


Figure 1. Annual expenses for surface and ground water monitoring in Austrian Provinces during monitoring cycle 2007-2012. Source BMLFUW

The National Environment Monitoring Program in Albania contains data regarding the financial aspect of monitoring process for every year. However, the data are publicly accessible only for last NEMPs – 2015, 2016, 2017. It can be observed that there is a significant discrepancy between the forecasted expenses/costs and the funds delivered in practice. The amount necessary for environmental monitoring, according to NEMP of 2015 was 53.5 million ALL, of which 12.5 million ALL should be demanded only for

water monitoring. The allocated funds were at about half of the required amounts, being 29.6 million ALL and 5.5 million ALL for monitoring all environmental fields and for water monitoring respectively. The situation has been worsened in 2016, when the allocated funds have been about 8 times less than the required ones.

Figure 2 shows the share of allocated funds for water monitoring versus total budget for environmental monitoring, in the period 2006 -2016.

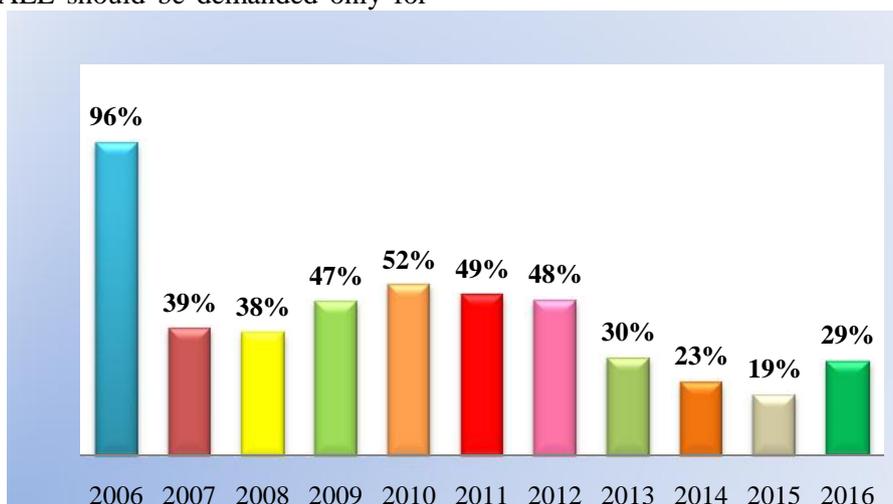


Figure 2. Water monitoring funds vs total budget of environmental monitoring (2006 -2016) Source: NEA

It can be noticed that the share of funds for water resources over total budget for environmental monitoring has shown significant oscillations. The maximum has been reached in 2006 (96%) as almost all the amount has been allocated to monitor quality

parameters on rivers, lake of Ohrid, and urban liquid effluents. The remaining 4% was delivered for air monitoring. Extending the categories of monitoring and including other environmental components, such as forests, soil, biodiversity, noise, etc., has produced a

significant impact in this particular field, not only in relative terms, but also in absolute values. It can also be observed that 2015 marked the year in which the water monitoring hold the smallest share in relation to the total annual budget for environmental monitoring tasks,

compared to other years. In absolute terms, the maximum amount of 9.35 million ALL was allocated for water monitoring in 2006, whilst the minimum amount of 1.22 million ALL was allocated in 2007 for that purpose.

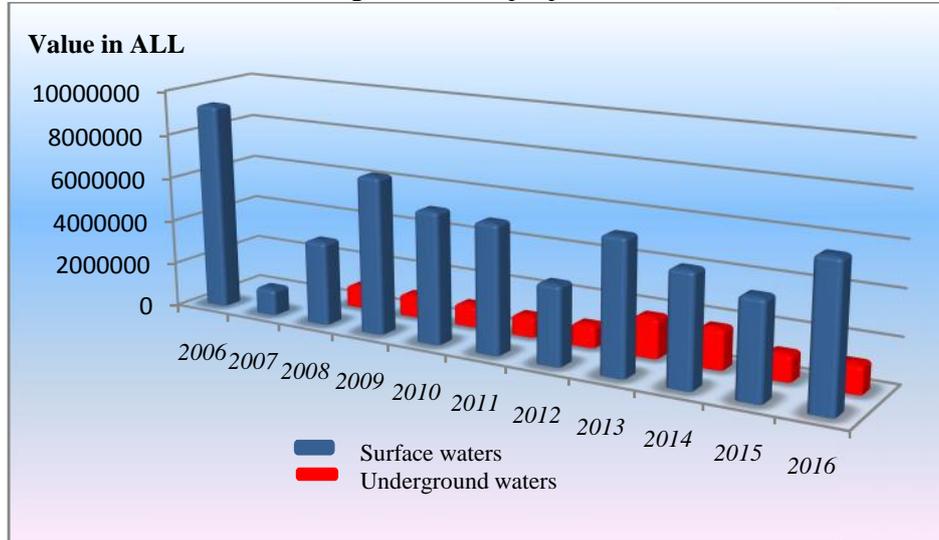


Figure 3. Trend of budget from 2006 until 2016 for surface and underground water monitoring.

Figure 3 shows the allocated funds for surface waters *versus* ground waters monitoring, in the period from 2006 until 2016, and their specific weight. As it may be easily noticed, monitoring of underground water resources has, regardless of their immense importance, taken a small share of total budget for water monitoring in Albania. In 2006 and 2007, underground water monitoring has not been conducted at all, and the entire water monitoring budget was allocated for surface waters monitoring.

Conclusions and recommendations

Establishing a genuine system for monitoring all categories of water resources cannot be viewed as a single problem. On the contrary, there is a set of issues that should be solved, starting with the transposition of all EU directives concerning the field of water policy, which are closely related to the WFD, and ending with the implementation of a non-exclusive list of supplementary measures, which the Member States, within each water basin district, may choose to approve as part of the program of measures, including: legislative instruments; administrative instruments; economic or fiscal instruments. Contrary to Austria,

where the implementation of WFD and other EU Directives, is at the highest levels, in Albania the situation is not stable. Regardless of the attempts made with respect to the transposition of the EU legislation, the proper implementation of WFD and all legal package requires substantial technical and financial support, an adequate and modern laboratory infrastructure, a fully functional monitoring network, as well as cooperation of all institutions responsible for water resources management, so as to eliminate overlapped responsibilities and reach the required transparency in both financial and technical terms.

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