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The implementation of the Water Framework Directive in Italy

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Abstract. This paper presents the main issues and trends in water resources management in Italy. After a description of water resources availability and use, as well as patterns of water management organization, the paper sketches the legislative history on national environmental issues and the administrative steps taken to transpose the European directive in Italian law. Furthermore, the actual implementation of WFD is discussed. In Italian legislation, water and environmental protection consisted of laws that gave incentives to water use to increase productivity. The aim of recent Italian legislation has been the development of land-use planning policies in correspondence with the physical and environmental characteristics of the land. The reference to these two aspects is one of the most innovative features of the new legislation, adopting a systemic approach to the problem of hydro-geological balance, at the same time protecting both land and water resources. Finally, we report on the case of the Po River District, which complies with the administrative and normative requirements of the European directives on environment and water. For this reason it represents a useful guidance for the rest of Italy, demonstrating how to implement the WFD and to develop effective, efficient and integrated water policy.

Keywords. Environment – Efficiency – Productivity – Water use – Water balance – Policies

La mise en œuvre de la directive-cadre sur l'eau en Italie

Résumé. Cet article a pour objet de présenter, d'une manière générale, les principales dispositions au regard de la gestion de l'eau et des ressources en eau en Italie. L'article traite d'abord de la disponibilité des ressources en eau et de l'usage de l'eau à l'intérieure des organisations de gestion des eaux, puis il aborde l'histoire de la législation dans ce domaine et toutes les actions entreprises pour transposer la directive européenne en Italie. Dans la loi italienne, le rôle de la protection de l'eau et de l'environnement est d'améliorer l'usage de l'eau et d'augmenter la productivité. L'objet des récentes lois italiennes est de développer les politiques de planification des sols qui s'alignent sur les caractéristiques de l'environnement et du territoire. La référence à ces deux aspects est une des plus importantes améliorations des récentes lois, qui adoptent une approche systématique au bilan hydrogéologique et, dans le même temps, protègent à la fois le territoire et les ressources en eau. Dans cette étude est présenté l'exemple du district du fleuve Pô, qui satisfait les requêtes administratives et normatives de la directive européenne au regard de l'eau et de l'environnement. Il constitue pour cette raison un bon exemple à suivre pour savoir comment mettre en œuvre ces directives en Italie pour développer une politique de l'eau qui soit efficiente et intégrée.

Mots clés. Environnement – Efficience – Productivité – Usage de l'eau – Bilan d'eau – Politique

I – Introduction

Water policy has changed in all industrialized countries. In the past respecting both quality and quantity of water resources was promoted, imposing socio-economic procedures and methods to adapt the overall system to it. Today, the protection, conservation and rational use of water resources are essential to guarantee a balanced hydrological cycle and the rights of future generations to use this precious natural good. Due to the expected climate change, water is destined to become a crucial issue in the twenty-first century as social stability partly depends on the availability of water resources.

The Water Framework Directive 2000/60/EC (WFD) establishes a European frame for the protection and management of water resources. The main aims are the prevention of water resources deterioration, both in terms of quality and quantity, compared to the present condition and the improvement of the quality of all water bodies in order to reach a 'good status' before 2015. These objectives should be considered part of a more general framework for the protection and the improvement of the environmental quality. This framework calls for the rational and restrained use of natural resources, through the application of the 'precautionary' principle, i.e. the reduction of the pollution at its source. The directive also introduces the 'the polluter pays' principle, including the concept of 'responsibility' of polluters for the damage caused, connected to the attribution of the costs of repairing the damages to those that caused them.

The WFD in Italy was transposed in 2006, with the legislative decree no. 152. Delay in the identification of water districts and in the attribution of the related competences forced the Italian Government to introduce a specific administrative procedure for the active participation of all the involved stakeholders, in order to respect the European Directive procedures and deadlines.

The Italian legislation already foresaw the needs for planning activities at hydrographical basin scale. Several plans at both the hydrographical basin and sub-district level were the basis for the preparation of the RBMPs.

In the Italian national context a particular case is the Po River Basin, the largest in Italy and an economic strategic area for the country. This basin district has actively participated in the programme developed by the Ministry for the Environment of Land and Sea (in the following called Ministry for the Environment) to implement the WFD in Italy. Moreover, in many respects the basin authority has anticipated the implementation of the WFD, by putting into effect procedures that are included in the water directive, prior to the transposition of WFD.

A final relevant aspect of the River Basin Management Plans is the economic analysis; according to the directive, this aspect has to be taken into account in all phases of the decision making process, integrated with other components. In Italy, as in other Member States, economic analysis has been carried out at a preliminary level only, due to the difficulty of procuring the needed information. This gap will be filled when data are collected by the monitoring system that has been set up. When the economic analysis is integrated, the Italian RBMPs will be really effective to evaluate the efficiency of the costs linked to the different scenarios. These economic analyses will be integrated in the RBMPs during the revision phase foreseen by the directive.

The main aim of this paper is to illustrate the national water policy and the status of WFD implementation in Italy. We discuss the principal legislative aspects of water matters, before and after the WFD came into force, because it is fundamental to share knowledge and plans for accurate integrated water management. The laws and legislative decrees, preceding the WFD, on the one hand, have strongly facilitated the preparation of all the needed actions, to achieve the 'good ecological status' before 2015, as WFD requires, but, on the other hand, it showed that the national normative frame is very complex and fragmented, making it often difficult to apply. For this reason it is necessary to rapidly adapt the laws to the new situation, in order to reach the environmental objectives. Furthermore, the present status, both quantity and quality, of the water bodies in Italy is described, distinguishing four regions: north, central, south and islands. Finally, the case study of the largest river basin in Italy (Po basin) is described, because the Po River Basin Authority and the regions of the basin have actively participated to implement the WFD in Italy and in many aspects the basin authority has anticipated the legislation implementing the WFD. In fact, the River Po Basin Authority since 2003, in advance of the transposition of the WFD at the national level, developed a plan for studying and monitoring activities, with the aim of increasing knowledge on the water resource at basin scale in accordance with the classification system provided by the WFD.

II – The Italian normative framework before the WFD

The first law anticipating the WFD was called 'Norms for the organizational and functional rearrangement of soil protection' (Law no. 183 of 1989). The purpose of this law was to enhance the 'protection of lands, water rehabilitation, use and management of resources for a rational, economic and social development, and for the protection of the related environment' (art. 1). Therefore, the law stated the need of planning at the hydrographical basin scale and created new ad hoc public agencies: the River Basin Authorities (6 national River Basins and 18 inter-regional River Basin Authorities). The main objective of these authorities was to develop and apply the River Basin Management Plan. This plan includes four transitional plans: i) the transitional plan for the restoration of hydraulic structures; ii) the transitional plan for the hydro-geological Settlement (PAI), also containing the transitional plan for fluvial areas; iii) the special plan for areas with high hydro-geological risks; iv) the transitional plan for the control of eutrophication. The same law introduced the innovative concepts of the minimum stream flow (also called environmental flow), aimed at the protection and safeguarding of river ecosystems and several issues of water quality remediation. Furthermore, its following modification and upgrading resulted in the concept of 'water balance' in standard classical sense (inputs – outputs), as the central element for water resources management. So, the law 183/89 enabled the change from the culture of mere protection to the culture of environmental improvement.

In 1994 on the basis of the law no. 36 'Provisions concerning water resources' (also known as Galli Law) water supply, urban drainage and wastewater treatment systems were reorganised in Optimal Territorial Areas (ATO) on the basis of efficiency, effectiveness and economic criteria, leading to integrated and comprehensive management of water resources under the ATO authority. The law assigns pollution control and environmental monitoring to the Regional Environmental Agencies. It also states that water quality has to be seen in the context of 'final use requirements'. In fact, the 'the polluter pays' principle was introduced. Moreover, the law also affirmed the concept of the public nature of all surface and groundwater and gave priority to water for human consumption.

A milestone, regarding the integration of the protection of water ecosystems into Italian legislation was the legislative decree no. 152 of 1999 'Arrangements for the protection of waters against pollution and implementing directive 91/271/EC concerning urban wastewater treatment and directive 91/676/EC concerning the protection of waters against pollution caused by nitrates from agricultural sources'. This was integrated with and amended by legislative decree no. 258/2000 on 'the protection of waters against pollution' that re-examined environmental protection from a new pro-active perspective and anticipated some aspects of the WFD. The decree defines the general procedures to safeguard water, pursuing the objectives of (i) preventing and reducing pollution, (ii) reclaiming and improving the water status, (iii) protecting the water allocated to special uses, (iv) ensuring the sustainable use of the resources and (v) supporting well diversified animal and plant communities. These objectives can be achieved through the application of proper water quality and quantity planning, represented in the Water Protection Plan within each hydro-graphical basin. By the introduced measures the water bodies are expected to reach a good environmental status for surface and groundwater by December 31, 2016. The River Basin Authorities charged to set up a preliminary definition of objectives and priorities at basin scale for the protection plans.

III – Analysis of the Water Resources Status

3.1 Availability

Water in Italy is abundant, since the renewable water resources are theoretically around 185 km³ per year and the availability per capita is about 3,000 m³ per year (Shiklomanov and Rodda, 2003).

As a result of the seasonal and regional patterns of rainfall distribution, but also due to low efficiency of water supply systems, water losses and technical and socio-economic constraints, the effective availability is much lower: about 45 km³/year, which is about 750 m³ per capita per year (IRSA, 1999). This availability corresponds to more than 2,000 litres per capita per day, which is higher than the European average (1,677 litres per capita per day). The average water availability is shared unevenly throughout the country: 65% in northern Italy, 15% in central Italy, 12% in southern Italy and 8% in the islands. While the runoff of Alpine rivers is well distributed during the year (9%, 24%, 41% and 26% respectively for winter, spring, summer and autumn), in the rest of the country between 60 and 90% of total run-off water is concentrated in winter and spring (Rusconi, 1996). Since this distribution has a strong impact on water resources availability, flood management often causes dramatic problems.

3.2 Water use

Water use can be divided into four main categories: civil, energy production, industry, agriculture. According to the study by IRSA-CNR (Water Research Institute, 1999), in Italy, on average, 19% of all water uses are for civil purposes, 11% for energy production, 21% for industry, 49% for irrigation.

In the last decade water use per capita increased, even though water consumption for residential use (70 m³ per inhabitant in 2007) shows a decreasing trend in the last six years (ISTAT, 2008).

In metropolitan areas, the percentage of the population served by wastewater treatment plants in the last six years shows a sharp increasing trend going from 72.2% in 2002 to 82.4% in 2007 (Ministry of environment, 2009).

Civil uses are basically related to groundwater, being around 23%, while the European average is 13%. In the north, groundwater and springs account for roughly 90% of household supply. In southern Italy, especially in the islands, 15-25% of water supplies are based on surface water resources. Whole provinces rely on reservoirs in the upstream area for the entire supply (Massarutto, 2001). In Italy the most water demanding industrial activities are the petrochemical and metallurgic industries, together with textile and food production. In the last years, the water demand for industrial purposes has decreased, due to the reduction of manufacturing activities and the introduction of new, more efficient, technologies that consume little water. Hydro-electric energy production does not consume water resources, from a quantitative point of view, because after its use the water is released back to the water body, but the displacement in time of water volumes operated by reservoirs can often endanger other downstream uses. Groundwater resources represent the main source of supply for industrial uses, especially in the north, in general by direct private extractions. Industrial use of surface waters occurs generally for cooling purposes.

Surface water in the north is essentially used for irrigation, in general after an intensive upstream use for hydro-power generation. At the present, in Italy more than 503,000 farms use water for irrigation purposes; this represents more than 29% of utilized agricultural surface (UAS). The irrigated surface (adding to more than 2,600,000 hectares) represents 20.4% of the cultivated surface, with water requirements of over 20 km³ per year. Concerning southern Italy, a study by INEA¹ (Lamoglie, 2004) estimated that the water use for irrigation purposes is over 3,300 millions of m³ per year, while the water requirements are about 3,700 millions of m³ per year. This

deficit can be attributed to both distribution deficiencies and to insufficient availability of suitable resources (Lamoglie, 2004).

Nonetheless, a further 10-25% of water for irrigation is derived from groundwater, small streams, small private rain water harvesting systems and springs. In the north and centre this occurs basically in mountains and hilly areas, where irrigation is often practiced during the winter in order to prevent damage from hard-frost; in the south and in the islands, on the contrary, groundwater is used intensively during the summer, either in the centre or along the coastal plains. Local resources – basically groundwater and ‘non conventional’ sources like desalinated and brackish water – are used as complimentary resources, in particular in southern Italy.

The analysis of water availability and irrigation use in the Country presents specific characteristics that are consequences of traditional agricultural practices and morphological shape of territory. This fact explains the different and not homogeneous conditions existing among north and south areas of Italy in terms of forms of agricultural practices, irrigation systems and of water body management for supply and distribution. The Italian water system can be characterized by positive as well as negative aspects. The positive issues are (i) the high level of technical competence and system technologies, (ii) the accurate spatial covering of water supply and urban drainage systems. On the other hand, the weaknesses are (i) backwardness of facilities, (ii) uneven water distribution, (iii) high water losses from the distribution network (at National level it is estimated at an average of around 40%²), (iv) high administrative fragmentation, (v) inadequate pricing, (vi) scarcity of financial resources (Gilardoni e Marangoni, 2004; Rossi, 2001).

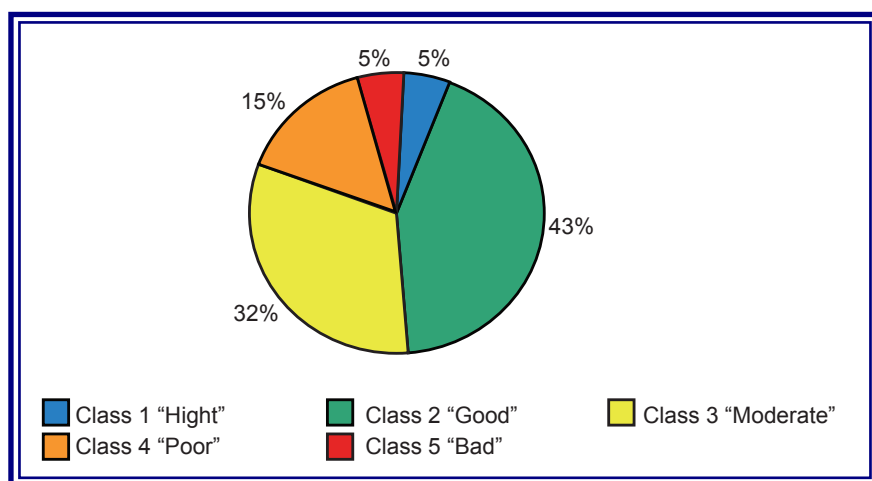


Figure 1: Percentage distribution of the classes of the Ecological Status Watercourses quality index. (ISPRA, 2009).

3.3 Water quality

Decree no. 152/1999 introduced the ‘integrated system for monitoring and control’ of water resources for quality and quantity. The monitoring system is based upon the DPSIR model (Determinant-Pressure-Status-Impact-Response, i.e. the analysis of driving forces that can assert pressure on the state of water bodies). It is very important in order to plan actions as part of the Water Protection Plan. The decree defined standard parameters for expressing the overall environmental quality of surface water resources by integrating the chemical (LIM- Level of Pollution from Macro-descriptors) and biological approaches (IBE- Extended Biotic Index).

In Italy, in 2007, 48% (1,014) of monitored sites fall into quality class 1 (very good) and 2 (good), 32% fall into class 3 (sufficient) and the remaining 20% of sites are of poor quality (fig. 1). In general, the biological parameters are the most sensitive to different kinds of pollution, contributing to the poor quality of a watercourse.

From the data shown in figure 2 it appears that in northern Italy the watercourses have a good status, with 55% in classes 1 and 2, compared to 41% and 48% in respectively the centre and south (including the islands). However, these results come from a different number of stations in the three macro-regions and no data of Basilicata, Campania, Calabria and Sardinia regions for the south and island group are included.

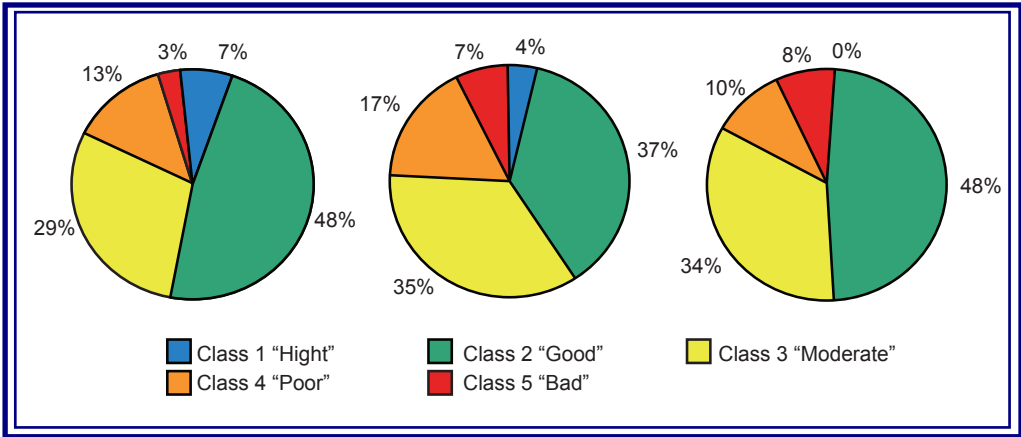


Figure 2: Percentage distribution of Ecological Status Watercourses index quality classes by macro-regions. (ISPRA, 2009).

The available data for the assessment of the water quality of lakes (expressed as Ecological Status of Lakes – ESL) are not homogeneously spread over the national scale. In 2007, 73% of the stations representative of the 134 lakes (most of which are in North Italy, where 85% of Italian lakes are located) fall into the classes 'sufficient' to 'optimal' (fig. 3).

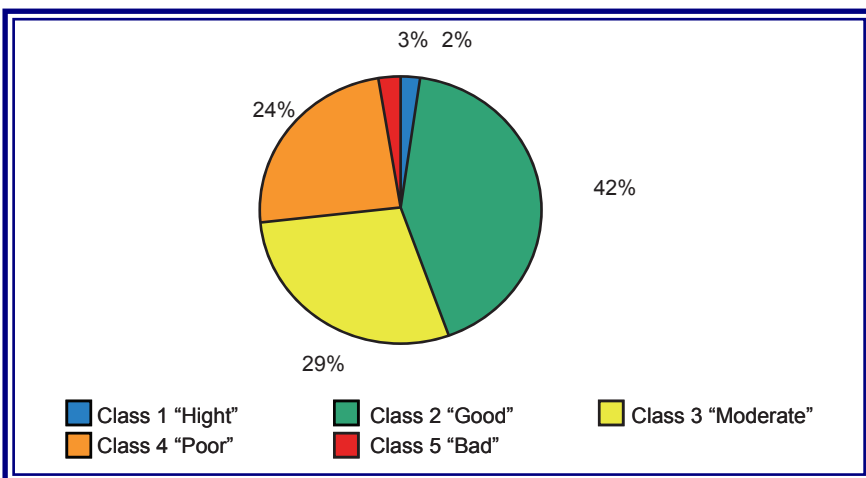


Figure 3: Percentage distribution of the Ecological Status of Lakes index quality classes, 2007.

Another indicator of the quality of a water body is the presence and abundance of fish. The data of 2007 (based on 14 regions) indicated that more than 90% of the watercourses comply with the values of both physical and chemical parameters reported in Table 1/B - Annex 2 – Part III of decree 152/06. Actually, only 3.8% of the flows are under the threshold values. Instead, the lakes show a full conformity at 100%.

The monitoring (based on 7 out of 15 coastal regions) of both marine and salty areas, suitable to molluscs, is performed in 66 sample sites, 45 marine and 21 salty areas. According to the values of Table 1/C – Annex 2 – Part III decree 152/2006, 47 waters are classified as standard quality of which 36 sea and 11 salty waters. The environmental quality of groundwater is determined by both the ‘quantitative’ and the ‘chemical’ states. While data on quantity are not available, the ‘chemical’ state can be described by the Chemical State of Groundwater index (CSGW). Analytical testing carried out in 2007 in 11 regions and 2 autonomous provinces involving 2,890 sampling stations shows the qualitative state of water bodies ranging from 49% in classes 1 and 3 (quality from good to sufficient), 24% in class 4 (poor quality due anthropogenic causes), and 27% in class zero with no or negligible anthropogenic impact (ISPRA, 2009).

Nitrates are among the pollutants of anthropogenic origin. A limit for nitrates is set at 50 mg/l (limit of drinkable water). As this limit is often transgressed, they are responsible for many analyzed regions to fall into class 4 (fig. 4).

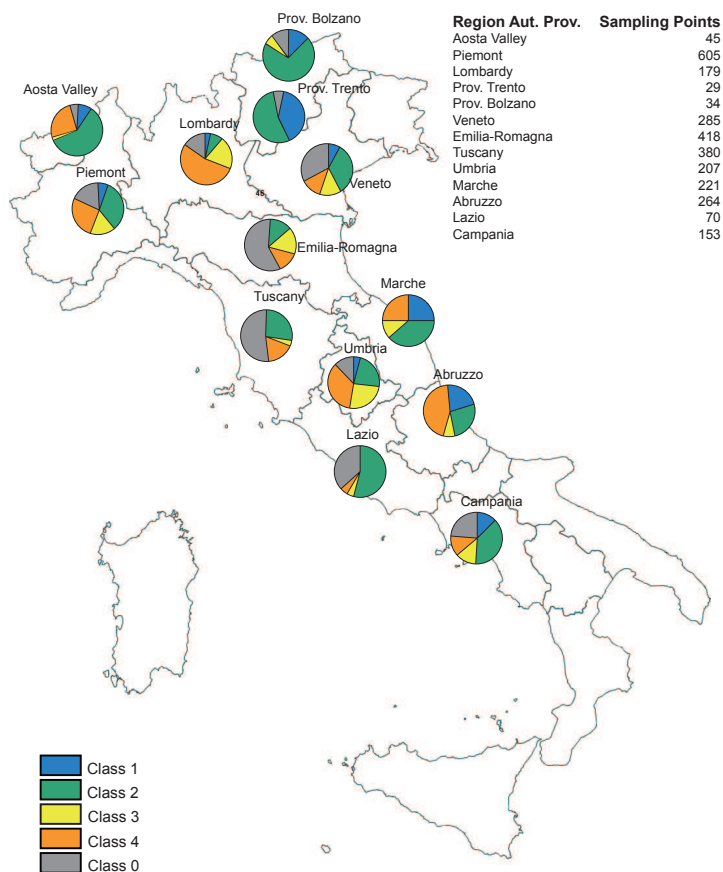


Figure 4: The quality status of underground water bodies on the regional level (11 regions and 2 autonomous provinces). (ISPRA, 2009).

The European directive 2006/118/EC on groundwater protection has been transposed within the national legislation through legislative decree no. 30/2009. It requires to set threshold values for pollutants, pollutant groups and pollution indicators, which have been identified as factors contributing to placing groundwater bodies at risk of not reaching the 'healthy state' level. The directive indicates a minimum list of 10 parameters and requires that the member States, on the basis of existing monitoring data, set further limits for pollutants present in the country.

Tests performed on 7,372 km of seacoast in 2007 show that more than 67% of coastal waters are suitable for bathing, 15% are not tested due to inaccessibility, 12% are permanently off-limits for bathing due to pollution, 3% are off-limits for bathing for reasons other than pollution and the remaining 3% are temporarily unsuitable for bathing due to pollution.

In 2006, through the regional Monitoring Programs for recovering the sites unsuitable for bathing, an increase of the number of bathing sites has been registered. Furthermore, in the same year, Programs and data presented by regions decreased, mainly due to the long time needed for the implementation of the measures. With respect to 2006, the total percentage of bathing coast is increased, due to the realization of improvement programs (Ministry of environment, 2009).

IV – The adoption and the implementation of the WFD in Italy (decree 152/2006)

As previously stated, the transposition of the WFD in Italy has been carried out on 2006, with the legislative decree no. 152 with three years of delay with respect to the directive. This decree enabled the establishment of River basin districts and assigned to the District Authority the competence of the development of the River Basin Management Plan. As showed in the figure 5, eight territorial districts were formed by aggregating territories previously belonging to existing authorities (the former River Basin Authorities).

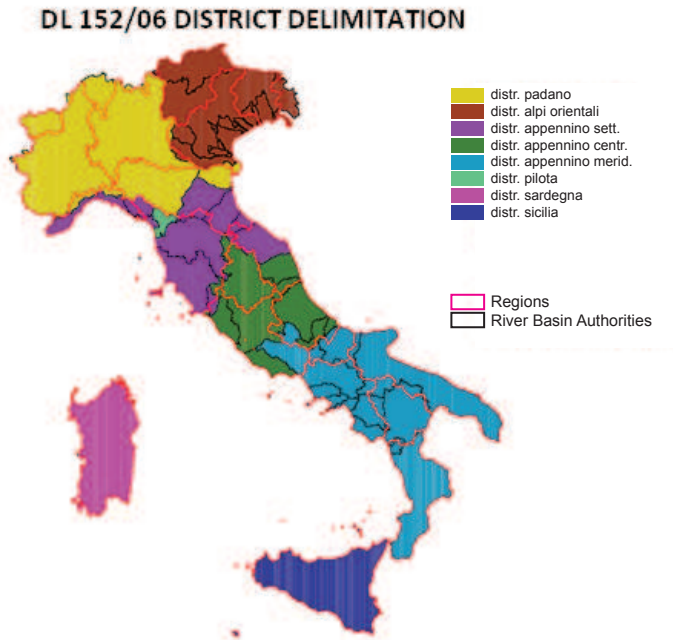


Figure 5: Regions (red borders), River Basin Authorities territory (black borders) and River Basin District territory (coloured). (Ministry of Environment, 2009).

After they were founded, the Italian River Basin District Authorities were not in force immediately due to the lack of both legislative arrangements and specific funds. So, in 2009 the law 13/2009 'Special measures on water resources and environment protection' was issued, to attribute the task to develop the RBMPs, to the River Basin Authorities at National level working together with the regional representatives.

The delay in the identification of the Districts and in the attribution of competences reduced the available time for developing the RBMPs with respect to the EC deadline: 22nd December 2009. This forced the Italian administration to introduce a specific administrative procedure, with strict time schedule, in order to respect the deadline: before the 30nd of June 2009. The Authorities, or the competent Regions, should be in charge of the contents and the objectives of the RBMPs, while the Ministry for the Environment should be in charge of the publication of specific guidelines for the editing of the plans.

After being published, the first version of the eight RBMPs was adopted by the end of July 2009 and at the same time they were submitted to the Strategic Environmental Evaluation (SEE) for a three months period, as required by the national legislation, and to public consultation for a six months period, as foreseen by the WFD.

Since the public participation period that should end by January 2010 contradicted the respect of the deadline (22 December 2009) for the adoption of most of the RBMPs, the Italian administration obtained from the European Commission the permission to shift the adoption date. This shift should also guarantee the proper and correct participation of the population and institutions to the RBMP development process.

The adoption of the Italian RBMPs occurred in different periods, the first RBMP (20 November 2009) was the one by the 'special statute' Sicily Region, six further plans were approved on 24 February 2010 while the last one was the plan for the 'special statute' Sardinia Region. While the initial approval of the final RBMP was the responsibility of the River Basin Authorities, the formal approval will be by a specific on-coming decree by the Presidency of the Council of Ministers. This decree will also contain the main outcomes from the SEE and the public participation, together with some prescriptions on the integration of the less thoroughly investigated aspects. In particular, it will contain some important observations from the Ministry for the Environment required for a rapid integration of the plans, in order to avoid in European Commission infraction procedures. For this reason, the above mentioned decree foresees an intermediate deadline for the revision and integration of the plans in one year starting from the approval date of the decree.

A special remark is necessary about the content and the needed measurement for the preparation of the Italian RBMPs. As mentioned in section 2, the Italian legislation already foresaw a planning at hydrographical basin scale with the establishment of the River Basin Authorities (law no. 183/1989), actually anticipating the WFD. Therefore, the background for the elaboration of the Plans exists and is part of already existing plans that are in force at the hydrographical basin level together with the integration and harmonization of the planning tools at the sub-district scale. The basin-wide 'Hydro-geological Risk Exposure Plan' constituted the knowledge base for the management of alluvial risk and the protection of river basins, for hydro-morphological characterization of the hydrographical net, for impacts on the lateral and longitudinal continuity of the rivers, for bed load transport and for channel dynamics. The Water Quality Protection Plans of the regional areas designed and developed the monitoring systems for both the surface and groundwater bodies, it also identified the interventions and the measures necessary to reach and maintain both the quality and the quantity objectives for the water system. These evaluations are based on the concepts of 'water balance' and 'compatible water uses' with respect to the use priority and both the quality and the quantity characteristics of the different uses.

The last, relevant and most critical aspect of the development of the RBMP is represented by the economic analysis. This aspect, following the directive's indications, should support the decision

process in all phases, integrating with all other components. Actually Italy, as other Member States, is having difficulties to carry out a complete extensive economic analysis and to define the mechanism of water cost recovery. Now Italy has carried out only a preliminary economic analysis based upon the characterization of the productive-economical structure of the different basins, where available, and on the evaluation of the cost of the different water uses. However, a serious gap exists in the needed information. This gap will be filled by using data coming from the monitoring systems that have now been activated. When the economic analysis is integrated, the Italian RBMPs will be really effective to evaluate the efficiency of the costs linked to the different scenarios. This integration will be performed in the revision phase foreseen by the directive. The integration of prescriptions and observations issued by the Ministry for the Environment will, however, facilitate the integration of some important issues, such as these economics, within one year.

V – The case of the River Po District

The Po River is the largest basin of Italy with a hydrographical basin area of 74,700 km² which represents 23% of the Country. The Po basin is extended from the Alps to the Adriatic Sea and it includes the following regions: Valle d'Aosta, Piemonte, Lombardia, Liguria, Emilia Romagna, Veneto, Toscana and the Autonomous Province of Trento.

The size of this basin makes the territory very complex with respect to physical-environmental and social-economic aspects. The Po River basin is populated by around 17 millions inhabitants (in 2007), it represents the largest agricultural area with a production equal to around 35% of the National total, 37% of industries are concentrated in this area, with a profit equal to 40% of national GDP.

The Institutional Committee of the Po River Basin Authority has adopted the Po District Management Plan on February 24, 2010. The adopted plan must still be approved with the specific decree mentioned earlier (even so, it is now covered by decree no. 152/2006, art. 66). Directly after the deliberation about the adoption, both general and urgent measures came into force for a temporary transition period.

The Po River Basin Authority had already put a series of plans and programs into force related to soil preservation, biodiversity, land use and water management, in order to assure a sustainable use of water resources. All plans and programs have been reconsidered and this has assisted the preparation of management plans. These strategic plans are based on territory and sector, prescribing specific actions for the protection of the environment and water. For each plan the competent administrative organisation, the area of interest, the normative references and the principal objectives consistent with the RBMP were indentified. The Po River Basin Authority and the regions of the basin have actively participated in the programme developed by the Ministry for the Environment to implement the WFD in Italy. In many respects the basin authority has anticipated the legislation implementing the WFD, putting into effect a set of procedures complying with the Water Framework Directive. In fact, the Po River Basin Authority since 2003, before the transposition of the WFD at national level, has developed a plan for studying and monitoring activities with the aim of increasing knowledge on the water resources at basin scale according to the classification system provided by the WFD.

According to the classification system 'B' of the WFD (Annex II) the hydro-eco-regions have been defined, through the use of the obligatory and optional descriptors appropriately combined to ensure the reliable determination of reference conditions specific for each type of water body. These regions (Inner Alps East, Inner Alps South, Inner Alps Central, Southern Pre-Alps and Dolomites, Monferrato, Po Plain, Langhe Piemonte Apennines, Ligurian Alps, Apennines North) are areas characterized by limited variability for chemical, physical and biological variables,

following the approach developed by the Centre National du Machinisme Agricole, du Genie Rural, des Eaux et des Forêts (CEMAGREF) of France. In addition, the type of surface water bodies inside the hydro-eco-regions and criteria for the definition of reference conditions for each type were identified and defined.

The knowledge development phase, based upon data collected by the Basin Authority since 1992, have allowed to identify the most critical environmental issues (according to the model DPSIR), within sectors and to develop the process of planning and intervention on the area in order of priority, with efficient and effective results.

The main problems related to water management in the Po River district concern the following aspects: (i) water quality, (ii) water use, (iii) land degradation, (iv) flood defence, (v) environmental preservation and restoration, (vi) climate change, (vii) common water resources management. Many critical issues have already been addressed in the regional protection plans and various measures have been implemented. Now they being realized, both through the RBMP themselves, as well as in the context of the planning at lower level (Plan for the Hydro-geological Settlement, PAI).

Furthermore, a study (IEFE, 2004) was conducted to investigate the feasibility of integrated economic analysis at basin scale to support the measures of strategic planning for the implementation of a correct water policy. The analysis, for example, shows that simply implementing the protection plan would lead to very different rate values at different locations within the basin. Additional measures, aimed at restoring the good status, will have impacts on specific areas. In analogy with the tools adopted in other countries, it may be advisable to develop systems to share the cost at regional or basin level. These findings highlight some critical elements for the implementation of measures envisaged by the water management system. In particular, in the Po River Basin, as all over Italy, planning is performed at two levels: 1) basin plan and 2) regional protection plan (which the law considers as a 'brief excerpt' of the first one), while the management is shared among different services (civil services: reclamation-irrigation, soil conservation, etc). Another critical aspect is related to the very limited level of integration of the water policies. Some protection plans, for instance, provide mostly measures related to facilities, other measures have a compensatory nature (based upon public financing). Then, also redistributive mechanisms at the territorial level are needed, in order to recover areas with a poor status, caused, by excessive human impact on very restricted areas.

The Po River district still has many shortcomings: (i) the lack of assessment of the impact on the quality of water bodies, (ii) the risks of overlap between the activities of the different plans, (iii) the lack of consistency between design and planning, (iv) the inadequate economic analysis to explain the economic status of investments and the determination of the rates. Despite these weaknesses, the Po River district satisfies the administrative and normative requirements for implementing the European directives on environment and water. All the preliminary phases in environmental planning, following the principles of the recent national and European environmental policies, were completed. For this reason it represents a useful guidance for Italy on how to implement the WFD and to develop effective, efficient and integrated water policy.

VI – Conclusions

This paper presents a legislative national frame on water and environment. Italy has a long history of water legislation, but after the WFD 2000/60/EC came into force it was necessary to rapidly adapt its laws to the new disposition in order to reach the environmental objectives. In the last 20 years, important reforms have taken place, in particular: (i) the structure of water resources planning, (ii) the environmental regulation and water quality, (iii) the organization of public utilities in the water sector, this last stimulated by a trend towards privatization. Overall, the national

regulative frame is complex and fragmented making it often difficult to apply. In Italian legislation, the water and environmental protection consisted of laws that gave incentives to water use to increase productivity. The aim of recent Italian legislation has been the development of land-use planning policies corresponding to the physical and environmental characteristics of the land. The reference to these two aspects is one of the most innovative features of the new legislation, which adopts a systemic approach to the problem of hydro-geological balance, at the same time protecting both land and water resources.

The decree 152/06 has been defined as “unified code for environment”, abrogating all previous legislation regarding water policy. Despite the effort of getting together all environmental topics in one single law the fragmentations of interventions, competencies and processes is still not overcome. The implementation gap still represents a problem for Italy. The water sector is really an ensemble of sectors that are little integrated (on the hand, ATO for civil water use and supply, on the other hand, the Reclamation and Irrigation Board for water irrigation and agriculture). From a legal point of view, however, the decree is a new the law on water and environment, instead of adapting the existing regulations.

As far as the quality of water bodies is concerned, the actions foreseen by the European Directive and decree 152/06 have faced difficulties in being put into practice. The available information on water quality of the country, at the moment of the emanation of the decree, is insufficiently useful to define the reference conditions and quality classes of water bodies as foreseen by the Directive. This aspect was needed for the development of the Management Plan in each District, causing the coming into force to be delayed until 2009.

The last, relevant and most critical aspect on the development of the RBMP is represented by the economic analysis. This aspect, following the directive's indications, should support the decision process in all phases and should be integrated with all other components. Actually Italy, as is demonstrated by River Po Basin case, is having difficulties to carry out a profound complete economic analysis and to define the mechanism of water cost recovery.

Now, Italy has carried out only a preliminary economic analysis based upon the characterization of the productive-economical structure of the different basins, where available, and on the evaluation of the cost of the different water uses. However, a serious gap exists in the needed information. Such a gap will be filled when data will be available from the monitoring system that has been set up. When the economic analysis is integrated, the Italian Plans will be really effective to evaluate the efficiency of the costs linked to the different scenarios. This integration will be realised in the revision phase foreseen by the Directive.

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⁽¹⁾ The data utilized take into account the potential supply and the connected source. For determining the actual requirement, data from both remote sensing and field surveys was used.

⁽²⁾ APAT, Annual yearbook, 2007.