Analysis of Turkish groundwater legislation and policy regarding international principles and conventions
Osman Devrim Elvan and Y. Ozhan Turker

ABSTRACT
Water resources have shaped the destinies of societies and affected settlement choice of civilizations for centuries. Demand for them is constantly increasing and this surge has become an important threat for water resources due to those excessive demands and variety of usage types; at the same time, balancing the protection and use of ground and surface waters has become more difficult. The progress in legal and corporate structures for water management has been too slow for a long time. In this study, principles of international conventions on groundwater are compared with the relevant Turkish groundwater legislation, which is in the process of harmonization with European Union (EU) acquis under the scope of Turkey's nomination for EU membership. The purpose of this study is to measure the compliance of Turkish legislation on groundwater with the relevant international principles and conventions, and also to analyze legal loopholes in Turkish legislation in accordance with the international principles and conventions to be determined.

Key words | groundwater, international conventions, international principles, legislation, Turkey

INTRODUCTION
Insufficiency of water resources against the need for water is a significant problem for future generations. In solving these issues, international legal arrangements focus on surface water (Krishna & Salman 1999) rather than on dealing with water resources as a whole (Rowland 2005). Despite the social, economic, environmental, and political importance of groundwater, international law has paid relatively little attention to it. While surface water treaties abound, groundwater is either nominally included in the scope of legal instruments, mainly if it is 'related' to surface waters, or it is not mentioned at all (FAO 2005).

The Helsinki Rules on the Uses of the Waters of International Rivers, adopted in 1966, is the first and a significant step to include groundwater-related provisions in international rules. Following on from this pioneering document are:

- Multilateral instruments
  - the Mar del Plata Action Plan (1977);
  - the Seoul Rules on International Groundwaters (1986);
  - the Charter on Groundwater Management (1989);
  - the Dublin Statement (1992);

- the United Nations Convention to Combat Desertification (1994);
- the UN Watercourses Convention (1997);
- the Protocol on Water and Health (1999);
- the Protocol on Shared Watercourses (2000);
- the World Summit on Sustainable Development (2002);
- Regional instruments
  - the Association of Southeast Asian Nations (ASEAN), Agreement on the Conservation of Nature and Natural Resources (1985);
  - Convention on the Protection and Sustainable Development of the Carpathians (2003);

In addition to these multilateral and regional instruments that include local or international rules, the European Council has issued several directives on this matter: the 2000/60/EC water framework directive (WFD) and the 2006/118/EC directive on the protection of groundwater against pollution and deterioration.

In December 2009, Turkey started environment negotiations, which are expected to be tough, as part of the
process to obtain European Union (EU) membership. During this process, compliance with the EU acquis on water resources is specifically important for the country. Turkey’s current water potential is 1,519 m³, which means Turkey will suffer from water shortages unless a rational and scientific method for water management is implemented (Turkish population (people) – 73,722,988; area (km²) – 814,578; amount of water per person (m³) – 1,519; number of people per km² – 90). A country achieves water sufficiency when it has access to more than 1,700 cubic meters of water per person per year. There is water stress if the access is between 1,000 cubic meters and 1,700 cubic meters. When a country has access to <1,000 cubic meters per person per year, it suffers from water scarcity (Karadag 2008; Kibaroglu 2008)). In this study, instruments of international law on groundwater have been examined and the common principles they include have been identified. Then, a summary of Turkish laws related to groundwater is presented and used in the analysis made in the last part of the paper. At this stage, we underwent detailed negotiations with the experts and carried out a survey study in connection with the level of compliance of the Turkish legal arrangements on groundwater regarding international principles. In accordance with the data obtained, an analysis on legal loopholes has been performed. As a result of this analysis, compliance of Turkish groundwater law with the international law has been assessed and negative aspects and the principles that need enhancement have been revealed.

RESULTS

The common principles detected on the basis of the international legal documents are given in Table 1. The first legal instrument regarding this matter is the Helsinki

<table>
<thead>
<tr>
<th>Principles/Instruments</th>
<th>Equitable and reasonable utilization</th>
<th>Exchange of data and information</th>
<th>Cooperation</th>
<th>Monitoring</th>
<th>Planning and assessment</th>
<th>Best Technology</th>
<th>Participation</th>
<th>Sustainable management</th>
<th>Prevention of pollution</th>
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<tbody>
<tr>
<td>Helsinki Rules</td>
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<td>The Charter on Groundwater Management</td>
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<td>Dublin Conference</td>
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<td>Agenda 21</td>
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<td>UN Convention to Combat Desertification</td>
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<td>UN Watercourses Convention</td>
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<td>Protocol on Water and Health</td>
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<td>Protocol on Shared Watercourses</td>
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<tr>
<td>Convention on the Protection and Use of Transboundary Watercourses and International Lakes</td>
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<tr>
<td>ASEAN Agreement on the Conservation of Nature and Natural Resources</td>
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<tr>
<td>Convention on the Protection and Sustainable Development of the Carpathians</td>
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</table>
Rules, which regulate authorities relating to water resources law (Chenoweth 2008), adopted in 1966 (Eckstein 1998). The Helsinki Rules refer to a water system which ‘includes surface and ground waters flowing’ under the definition of ‘international drainage basin’, and thereby, the connection between surface and groundwaters has been clearly emphasized (Hayton 1982; Krishna & Salman 1999). ‘Equitable and reasonable utilization’ is the first and basic principle of the Helsinki Rules (Karadag 2008; Kibaroglu 2008). It has also been specified that the said principle, which has been set forth in the 1958 New York Resolution (Salman 2007) and is still applicable, should be dealt with under the scope of ‘beneficial use’. Another principle attracting attention is ‘substantial injury’, which emphasizes that the needs of a basin state may be satisfied without causing substantial injury to a co-basin state. In addition to these basic principles, ‘pollution’, which is defined as ‘any detrimental change that results from human conduct in the natural composition of water’ in the Helsinki Rules, is given particular importance. It is emphasized that all States must prevent any kind of water pollution in the basin in their boundaries.

Briefly, the Helsinki Rules, which set forth the connection between surface and groundwaters for the first time (Matsumoto 2002), is of the utmost importance as its basic principles are applicable today.

An action plan forming the basis of the current water policies was adopted during the United Nations water conference held in Mar del Plata, Argentina in 1977 (Biswas 2004). In this plan, surface and groundwaters are handled together. Insufficiency of studies and data relating to groundwater, the need to develop a database and to make periodic assessments of surface and groundwater resources, establishment or strengthening of observational networks for recording quantitative and qualitative characteristics of groundwater resources, conjunctive use of surface and groundwater, pollution of surface and groundwater, and application of appropriate land-use planning as a tool for preventing water pollution are the topics dealt with within the scope of the said action plan. Also, it is noted in many parts of the plan that management of water resources should be improved. The action plan, which includes very detailed regulations, sets forth basic principles, which can be outlined as assessment of groundwater resources, monitoring, water use and efficiency, technology, pollution control, public information, and international cooperation.

The Seoul Rules adopted in 1986 focuses on expanding the Helsinki Rules (Matsumoto 2002). In the Seoul Rules, a groundwater basin is defined and principles of protecting groundwater are set out, ‘pollution’ is dealt with, and the basin states are required to take measures to abate or prevent pollution in accordance with the international law. ‘Cooperation’ of basin states in ‘exchange of information and data’ in order to protect waters is set forth as a basic principle in the Seoul Rules. Also, it is stated that the basin states should adopt an ‘integrated approach’ to management of waters.

The Charter on Groundwater Management gives broad support to governments in their common endeavors to protect groundwater (Benvenisti 1994). The Charter sets out the topics under groundwater legislation as follows: potential impacts on groundwater resources should be recognized; definitions of groundwater characteristics, use and protection should be formulated; groundwater protection planning should be incorporated into general environmental planning; the institutional framework should be clearly defined and measures to prevent pollution should be taken; monitoring programs for groundwater protection should be set up and applied; and education, information and international cooperation should be promoted at all levels. The ‘equitable utilization’ principle is emphasized under the heading ‘International cooperation’. It is set forth that ‘active participation of the public’ in use and management of waters should be encouraged. ‘Best technology’ and ‘monitoring’ principles are mentioned under the heading ‘Pollution-control permits’.

The principles of water resource management were created with the Dublin Conference in 1992. Thereafter, water that has both a social and economic value started to be considered a ‘complementary’ part of ecosystems as well as a vital resource. Also, the outcome of the conference, named the Dublin Principles, is accepted as a crucial step in equitable and efficient utilization of water management. The principles are: Principle 1 – fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; Principle 2 – water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels; Principle 3 – women play a central part in the provision, management and safeguarding of water; Principle 4 – water has an economic value in all its competing uses and should be recognized as an economic good (Rahaman & Varis 2005). The ‘planning’ principle is represented in this instrument through the following sentence: ‘the most appropriate geographical entity for the planning and management of water resources is the river basin, including surface and groundwater’. Furthermore, basic principles are set forth as follows: ‘the Conference participants call for fundamental new approaches to the assessment, development and
management of freshwater resources and involvement from the highest levels of government to the smallest communities. Commitment will need to be backed by substantial and immediate investments, public awareness campaigns, legislative and institutional changes, technology development, and capacity building programs.’

Agenda 21 is another legal instrument, in which pollution of surface and groundwaters are considered as a significant danger. The ‘protection of groundwater’ is shown as an essential element of water-resource management under the ‘Targets’ section in the Agenda 21 program (Robinson 1993). It also states that all parties to Agenda 21 shall develop programs to enable protection and rational use of groundwater, and a number of measures for protection are created. Furthermore, the parties to the program shall exchange any applicable technology and information in preparation of water management and development framework programs. Monitoring, cooperation, best technology, sustainable management, planning, and database development are the primary principles for attainment of the goal of the said instrument.

Adopted in 1994 in order to abate drought effects and combat desertification in the states suffering from a serious drought and desertification, the UN Convention to Combat Desertification is not about groundwater. The Convention, which prescribes development of long-term integrated strategies, emphasizes sustainable management of water resources in the areas affected by desertification. Furthermore, technical and scientific cooperation is adopted as a principle for the success of the Convention (Stringer 2008). The Convention includes the ‘planning’ principle in use of natural resources, and encourages use and transfer of applicable technology. The ‘public participation’ principle is also mentioned in the Convention, and achieving local participation at the highest possible level has been set as a goal under the definition of strategic planning for sustainable development.

The UN Watercourses Convention was adopted in 1997 (Tanzi 1997) as a result of long negotiations (Wolf 1999; Beaumont 2000; Dellapenna 2000; McCaffrey 2001). In the Convention, the ‘watercourse’ concept is defined as a system formed by ground and surface waters, and, in particular, protection and maintenance of watercourse ecosystems are emphasized (McIntyre 2004). Furthermore, a number of principles are set out in the Convention. The first principle emphasizes the ‘equitable and reasonable utilization’ (Giordano & Wolf 2001; Chenoweth 2008) from water resources. The ‘participation principle’, which enables the parties to be recognized in connection with watercourses, and ‘avoiding from causing significant harm’ principle are also emphasized. As in the other Conventions, the present Convention includes international ‘exchange of information’ and ‘cooperation’ in protection of and utilization of watercourses. ‘Prevention of pollution’ principle, which means prevention of any change resulting from human conduct in the quality and contents of waters, has also been included in the Convention, and monitoring of international watercourses is prescribed in order to fulfill this principle. Moreover, management, particularly ‘planning the sustainable development of an international watercourse and providing for the implementation of any plans adopted’ are specified under the heading of management.

The goal of the Protocol on Water and Health, adopted in 1999, is to protect human health and well-being. Groundwater is defined similarly to that in the previous conventions, and a number of principles and measures are set forth in this Protocol. The first principle is the ‘precautionary principle’ aiming to predict and prevent possible impacts of pollution. Also, punishment of those who cause pollution is prescribed under the ‘polluter-pays’ principle (Bosnjakovic 2000). The sustainable management principle is emphasized and sustainable development and improvement of water management are set as goals of the Protocol. Furthermore, creation of a legal and corporate framework for implementation standards for fresh water quality is aimed at, and ‘monitoring’ is emphasized for achievement of this aim. The Protocol also includes the principles of the previous conventions, such as fair and equitable utilization, public participation in the decision-making process, easy access to and exchange of information.

The Revised Protocol adopted in 2000 also includes the concept ‘watercourses’, and states that this system covers both surface and groundwater. It is set forth in the Goals section of the Protocol that shared watercourses should be subject to equitable and reasonable utilization (Ashton 2003). The Protocol emphasizes implementation of suitable technologies, exchange of information, improvement of research and technology development, promotion of the harmonization and monitoring of legislation, and policies for planning, development, conservation, and protection of shared watercourses. It is stated among the general principles that Watercourse States must cooperate in prevention and reduction of pollution, and protection and improvement of the sources.

The Plan of Implementation of the World Summit on Sustainable Development affirmed UN commitment to full implementation of Agenda 21. Provisions relating to groundwater are included in this Plan. ‘Pollution’ is considered as
the main problem, and monitoring, integrated planning, and efficient water infrastructure are set as the basic principles in the Plan (Wapner 2003).

The ASEAN Agreement, in 1985, relating to natural resources takes into account the role of water in the natural ecosystem and includes the measures for conservation of surface and groundwaters as well as the ‘prevention of pollution’ principle (Lian & Robinson 2002). The necessity of establishing national environmental quality monitoring programs and of cooperation in such programs in order to control pollution are emphasized in the Agreement. Furthermore, the Agreement states that the contracting parties shall attach importance to participation of the public in the planning of water-resource development projects and cooperate to support scientific and technical programs.

The Carpathian Convention adopted in 2003 by the states within the Carpathian region of Europe includes provisions about the management of sustainable and integrated water/river basins. The Convention adopted resolutions to develop policies for ‘sustainable management’ of water resources and to achieve equitable utilization of water (Elbakidze & Angelstam 2007). The Convention also prescribed determination of policies for protection of groundwater resources. Importance of cooperation and public participation for achievement of the Convention’s goal are emphasized. The Convention states that suitable monitoring and assessment systems of the contracting parties should be developed or improved.


The WFD, which constitutes a framework for integrated water management throughout Europe, took effect in 2000 (Kallioras et al. 2006). The directive deals with ground and surface waters as a whole, and defines groundwater as ‘all water which is below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil’. The main principles of the directive are ‘pollution prevention’ and improvement of the waters. It is stated in the directive that groundwater is a depletable resource and needs stable long-term planning. In addition to ‘prevention of pollution’ principle, the directive includes planning, monitoring, ‘equitable and reasonable utilization’, ‘exchange of information and cooperation’ and ‘participation’ principles.

The Directive on Protection of Groundwater against Pollution is another important legal instrument. The directive was adopted for the first time in 1979, and a new directive on pollution took effect in the light of the WFD in 2006. The first clause of this new directive includes ‘prevention of pollution’ as the main principle. Also, the references in the directive clearly indicate that the principles set out in the WFD are applicable to this new directive.

GROUNDWATER IN TURKISH LEGISLATION

A new legal structure of environmental protection and water management has emerged over the past two decades in Turkey. This has been driven by the expansion of activity in bilateral and multilateral agreements, and the nation’s efforts to meet EU criteria for accession to full membership. The power of the legislation to orientate the implementation regarding groundwater is still up for debate despite the increasing importance of water resources management, the presence of political will, and all the efforts of responsible organizations. Before proceeding with this discussion, it is necessary to explain a characteristic of Turkish law on groundwater.

Turkish law does not have concrete clauses on integration of surface and groundwater management. The Turkish Constitution, dated 1982, evaluates both the ground and surface waters as natural resources without a difference. Yet, Turkish civil law (TCL) considers surface and groundwaters as general waters (Yazman 1970; Erturk 2005; Gurlek 2008). Since some laws handle the two resources separately, integration is still missing. For instance, the Law about Groundwater (adopted date: 16 December 1960) does not consider integrated surface and ground waters and the Law about Water (adopted date: 10 May 1926) concentrates only on surface resources. All other regulations related to water are about surface waters in general. In this section, as per the resources hierarchy in Turkish law, a legal gap analysis will be conducted using the Turkish Constitution as a starting point.

Article 166 of the Turkish Constitution deals with the planning of natural sources and states that ‘the planning of the efficient use of natural resources on the basis of detailed analysis and establishment of the necessary organization for this purpose are the duties of the State’. Article 168 regulates natural resources and even when it does not include a clear provision about groundwater, it states that water resources are subject to discretion and disposal of the State, and the State is entitled to the rights of exploration and management of a resource. This constitutional article includes a general provision about all waters without separating ground and surface waters, and only deals with the possession, exploration, and management of the resource.
Similar to the Turkish Constitution, TCL does not have a specific regulation on groundwater, and only states that groundwater is under the scope of the general waters. In parallel with the Constitution, TCL stipulates that groundwater is public property; therefore landowners do not own groundwater. However, the TCL does not mention any provision about the utilization or protection of groundwater. It nevertheless indirectly includes a neighborhood right on groundwater use (Article 737), thereby abiding with the ‘equitable and reasonable utilization’ principle, as well as with the ‘prevention of pollution’ principle (Article 757).

The Turkish Environmental Law, another general regulation on this matter, directly includes a provision on groundwater. It stipulates that groundwater resources shall be utilized under control and protected from pollution. As a sanction to achieve this, an administrative fine is prescribed for those who pollute groundwater feeding the source in the protected areas of fresh and potable waters. In this way, the polluter-pays principle, one of the basic premises of Turkish environmental law, is observed. The law also stipulates that ‘everybody is entitled to access information about the environment’ (Turkish Law on the Right to Information, Law No: 4982, adopted date: 2003).

‘Cooperation’ is another principle included in the Turkish Environmental Law. It prescribes that the Ministry and local administrations may cooperate with the relevant institutions about environment protection when necessary. The law also includes the principle of ‘monitoring’ as it mentions the creation of a network for measuring and monitoring the quality of air, water, and soil. The law provides that the ‘right to participation in environmental policies’ is fundamental, and emphasizes that relevant administrations are obliged to create the participatory environment in which the sharing parties can exercise their environmental right. Furthermore, ‘sustainable management’, ‘planning’ and ‘best technology’ principles are also part of the law, although they do not directly refer to groundwater.

The Turkish legislation, the Constitution, the civil law and the Environmental Law provide an initial and general framework for groundwater management. On the other hand, there are many special arrangements addressing those resources, of which the Law about Groundwater adopted in 1960 is the country’s first regulation directly related to those issues. With its half-a-century history, the Law is an indicator of the importance attached, at least theoretically, to groundwater in Turkey; however, it has shortcomings such as not including pollution protection provisions. It stipulates that groundwater is subject to the discretion and is at the disposal of the Government. The law appointed the General Directorate of State Hydraulic Works (SHW) and the Ministry of Forestry and Water Affairs (MoFWA) as the competent authorities. The law set forth the principles of groundwater utilization, and stated as a guiding principle that its use shall be limited to the user’s ‘favorable need’.

Despite the many principles guiding the Groundwater Law, it does not cover groundwater protection from pollution nor does it set principles to utilize the resources (Apaydın 2011). The law prescribes that the corporate entity located in the water source shall be given a reasonable share of the value obtained in the case of leasing. Considering the year of adoption, the law includes very important principles such as ‘favorable need’ and ‘equity’, but fails to provide any sanctions for the protection of groundwater from pollution. SHW was established by Law 6200 in 1953; the law also specified that the SHW is the competent authority to regulate matters related to groundwater. However, the goal to ‘prevent harm to groundwater and utilize it in various aspects’ is far from being compatible with the current water policies, which aim at water protection and improvement.

Despite these deficiencies, SHW carries out successful works through the regulations on protection of and utilization of waters. SHW is an affiliate of MoFWA. MoFWA is the primary competent authority for groundwater and duties of MoFWA are specified by the relevant law. These duties include determination of goals, principles, pollution factors, and suitable technology, and developing rapid reaction plans and developing and implementing procedures and principles for elimination and control of pollution in order to prevent pollution of groundwater. In addition, the law includes the principle ‘use of natural resources in a rational way and in accordance with the purpose of balanced and constant development and by allowing economic and ecological decisions to be taken into consideration together’ (the Decree Law of Ministry of Forestry and Water Affairs Organization and Duties, Number 645, 29 June 2011. Article 2), and international cooperation procedures, planning, information, education, and public relations. Furthermore, determining the suitable technologies in order to protect the environment and prevent pollution of ground and surface waters, and performing any kind of ‘monitoring’ and control are listed among the duties of the Ministry.

Another special law relating to this matter is Turkish Law about Water adopted in 1926, which regulates management of waters without separating ground and surface waters. Although the law mentioned prevention of water
pollution, it mostly focused on cleaning the polluted water. However, it is noteworthy that ‘participation’, ‘cooperation’, and ‘equitable and reasonable utilization’ principles are included in the law, in which principles of utilization of waters are limited.

Other than the foregoing legal arrangements directly connected to groundwater, there are also different regulations that include indirect provisions. One of the articles of the General Hygiene Act, issued in the early years of the Turkish Republic, mandated the creation of a protection area, and its boundaries marked by experts. It is noteworthy that a law adopted approximately 80 years ago prescribed such a high protection for groundwater.

The law on Fresh Waters in Villages, which took effect in 1960, stipulated that the need of villages for fresh and potable waters shall be met by SHW. The priority of utilization of these waters was determined according to criteria such as level of need, population, and public cooperation. The law, which had significant provisions according to the time of its adoption, is also important for its inclusion of the ‘equitable and reasonable utilization’ principle.

The most recent law is the Law on Geothermal Resources and Natural Mineral Waters, passed in 2007. The goals of this law are to explore, do research on, develop, produce, protect, and use water resources effectively, and to utilize them economically and in compatibility with the environment. Although the law is not fully compatible with the principles set out in the international conventions, ‘monitoring’, ‘prevention of pollution’ and ‘protection of the resource’ principles are given priority.

As is clear, many laws have some provisions concerning the framework of this matter under Turkish law. However, many regulations on groundwater have been issued in order to demonstrate implementation of these laws, which can set out only the general principles. Regulations are below the Constitution, laws and rules within the framework of hierarchy of norms in Turkish law, and constitute the concrete rules of law amended frequently. They are not contrary to laws. Therefore, only laws are explained in this study without mentioning regulations, of which there are many. However, we must mention the regulation on water pollution because of its direct relation with this matter. This regulation aims at setting out the legal and technical principles required for protecting and using water resources in the best way possible and in accordance with the sustainable development purposes. The regulation includes classification of water environment quality and use of water environments, principles of planning for protection, principles of wastewater drainage, and principles of monitoring, control and sanctions to be implemented for prevention of water pollution.

Similar to regulations, national development plans are the general regulative operations of the administration in Turkish law. In the hierarchy of norms, they have a place after the top-to-bottom chain of constitution, law, and regulations. The analysis of these plans in respect to groundwater is given below (Table 2).

**DISCUSSION**

The principles regulating groundwater have been set out through the analysis of international law in the ‘Results’ section and shown in Table 1. In this section, an analysis of Turkish law versus the said principles will be made in order to reveal the level of compliance with the principles. For this purpose, existence of a principle in Turkish law has been questioned in the first stage. In the second stage, existence level of such a principle in Turkish law is analyzed. Evaluation criteria have been defined for this analysis, and the following variables have been numbered from zero to three:

- **0** = the law evaluated herein does not include any arrangement relating to the subject matter
- **1** = the law evaluated herein includes an indirect arrangement relating to the subject matter
- **2** = the law evaluated herein includes a direct but insufficient arrangement relating to the subject matter
- **3** = the law evaluated herein includes a direct and sufficient arrangement relating to the subject matter

For this purpose, a survey that explains the principles detected and includes the evaluation method has been prepared. This study has been performed by face-to-face interviews with the experts from the competent authorities in groundwater and by completing survey sheets. (The survey has been performed by interviews with 30 experts employed at MoFWA, SHW, Istanbul Water and Sewerage Administration, Istanbul Provincial Directorate of Environment and Forestry, and Istanbul University.) The results are evaluated in Table 3.

As shown in Table 3, Turkish law is not above average in a general evaluation of the principles in international law. This can be seen more clearly in Figure 1. Figure 2 shows
Table 2 | Groundwater in development plans

<table>
<thead>
<tr>
<th>Five-year development plans</th>
<th>Data relating to groundwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st SPO (1963–1967)</td>
<td>No groundwater data are available</td>
</tr>
<tr>
<td>2nd SPO (1968–1972)</td>
<td>Importance of groundwater use is emphasized in order to immediately start irrigation of new agricultural lands. A general deficiency of law regulation water rights is stated. Importance of groundwater use in making small-scale water investments is mentioned</td>
</tr>
<tr>
<td>3rd SPO (1973–1977)</td>
<td>Rational use of groundwater shall be ensured in accordance with the needs to be determined by finding out the capacities of groundwater resources, and coordination between institutions shall be achieved</td>
</tr>
<tr>
<td>4th SPO (1979–1983)</td>
<td>Reasons for groundwater pollution are revealed. It is prescribed that investments that will develop groundwater resources should be focused on, and a framework law on water rights should be issued</td>
</tr>
<tr>
<td>5th SPO (1985–1989)</td>
<td>It is prescribed that the development of groundwater resources should be accelerated</td>
</tr>
<tr>
<td>6th SPO (1990–1994)</td>
<td>It is prescribed that natural resources should be managed without harming the natural balance and without preventing economic development. Coordination and cooperation between the institutions responsible for environmental affairs are focused on, and prevention principle is emphasized. It is stated that there are deficiencies in protection, planning, and management of groundwater resources, and that uncontrolled structuring without development works has adverse effects on these resources</td>
</tr>
<tr>
<td>7th SPO (1996–2000)</td>
<td>It is stated that a general law of water is necessary. Rational use of groundwater resources is aimed at</td>
</tr>
<tr>
<td>8th SPO (2001–2005)</td>
<td>Prevention of groundwater pollution is aimed at. The law on groundwater is planned to be amended in order to protect groundwater by imposing deterrent provisions against illegal use</td>
</tr>
<tr>
<td>9th SPO (2007–2013)</td>
<td>Prevention of groundwater pollution and use of treated wastewaters in agriculture and industry were prescribed</td>
</tr>
</tbody>
</table>

SPO: State Planning Organization.

Table 3 | Evaluation of Turkish law in terms of the principles determined

<table>
<thead>
<tr>
<th>Legislation examined</th>
<th>Equitable and reasonable utilization</th>
<th>Exchange of data and information</th>
<th>Cooperation</th>
<th>Monitoring</th>
<th>Planning and assessment</th>
<th>Best technology</th>
<th>Participation</th>
<th>Sustainable management</th>
<th>Prevention of pollution</th>
<th>Ave. total</th>
</tr>
</thead>
<tbody>
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the inclusion levels of the said international principles in Turkish law.

CONCLUSION

Having started EU environment negotiations required for EU membership, Turkey continues its efforts for harmonization with the EU acquis. The process of harmonization with EU environmental acquis seems to be difficult due to the high cost of investment and the large number of topics to be negotiated. Among environmental issues, harmonization of the legislation on water resources plays a significant role alone. Therefore, comprehension of the principles predominant in the international law is extremely important during the harmonization process.

However, it is difficult to note the existence of predominant and generally accepted principles relating to groundwater in international law. Although international law regulates protection and utilization of waters, the focus is always on surface waters, and groundwater always remains in the background. Where rivers and lakes constitute only 0.3% and groundwater constitutes 31% of the total fresh water in the world, it is hard to understand an approach that keeps groundwater in the background. However, the importance of groundwater has begun to be understood better due to the fact that the world’s need for water increases (Matsumoto 2002). As a result, arrangements on groundwater have been introduced in international law and EU legislation in attempts to set out generally accepted principles on use and protection of groundwater.

The results of the analysis of Turkish law versus the principles set out in the Helsinki Rules until now are not satisfactory. The data obtained indicate that Turkish law has not achieved full harmonization with this process. Although groundwater is frequently mentioned in the national plans, this approach remains a theory rather than being converted into binding legal instruments. Turkish law focused on procedures and principles of groundwater use, but rarely mentioned concepts such as public participation in decision-making processes, monitoring, sustainable management, best technology, planning, assessment, and equitable and reasonable utilization of water. As is clear from Tables 1 and 2, no Turkish laws, other than the Environmental Law, are fully compatible with international principles. The Environmental Law, which scores 2.8 points according to Table 3, is almost fully compatible with the international principles determined. This is because of the comprehensive amendments made to this law in 2006 through the influence of the EU membership process. As a result of these amendments, ‘equitable and reasonable utilization’, ‘exchange of data and information’, ‘cooperation’, ‘participation’, ‘monitoring’, and ‘best technology’ principles have been added to the law. The second highest score is achieved by the Law of the MoFWA, which sets out authorities and duties of MoFWA. This score indicates that the law includes international principles, but not at a sufficient level to achieve full compliance. The common feature of these two laws, which achieved relatively high scores, is that they marked out the general framework, rather than providing concrete principles regulating groundwater. In other words, these laws do not enlighten the way for implementation or directly perform implementation through concrete principles, because they set out only abstract principles. In fact, these laws cannot achieve even ‘1’ point against the international laws directly relating to groundwater. This means the said two laws include regulations relating to groundwater, but these are indirect and insufficient.
As to scoring of international principles, again the result is not satisfactory. Even ‘monitoring’ and ‘prevention of pollution’ principles, which achieved the highest rate of compatibility among other principles in the legislation, could achieve only ‘1.5’ points. The evaluation reveals that the relevant principles in Turkish legislation are not sufficient. The said two principles are followed by ‘equitable and reasonable utilization’ and ‘planning and assessment’ principles. ‘Sustainable management’ and ‘best technology’ principles are scarcely reflected in the legislation. The result reveals that there are not sufficient international principles relating to groundwater in Turkish legislation. Therefore, it is clear that nearly all principles must be supported in Turkish legislation. Furthermore, ‘exchange of data and information’, ‘cooperation’, ‘best technology’, ‘participation’, and ‘sustainable management’ principles, which do not exist in any law other than the Environmental Law and the Law of the MoFWA, must be focused on, particularly by the framework laws that scored below ‘1’ point.

Groundwater is a natural resource that is definitely as important as surface waters in many aspects, and should not be considered separate from them. Moreover, groundwater has strategic importance since it is relatively less affected by environmental deterioration and is available for use in the case of drought and natural disasters. In this respect, setting out principles for the protection and utilization of groundwater through binding legislation is extremely important. Recently, the excessive demand for groundwater use, and groundwater utilization contrary to science and techniques, caused a drop in groundwater levels (TMMOB 2009). Therefore, this matter should be handled with great care in accordance with its critical importance. Improvements regarding this matter should be initiated by the rules of law, which set out the relevant fundamental principles. This is definitely a difficult and long process. It is known that attempts to prepare a framework law on water date back to 1968 (SPO 2001). Although the need for such law was clearly stated in development plans and some works on this matter have been conducted, Turkey has not been able to prepare a framework law on water resources. In Turkey, which rapidly continues its economic development.

Groundwater law within Turkish legislation. Taking into account the basic principles about groundwater set out by the international law in preparation of such laws is of extreme importance for both continuance of the resource and Turkey’s success in the EU membership process. However, it must not be overlooked that compatibility with the international principles should be realized in accordance with the realities and policies of the relevant state.

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