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RESEARCH ARTICLE

Water laws of Georgia, Moldova and Ukraine: current problems and integration with EU legislation

Yuliya Vystavna [a,b], Maryna Cherkashyna [c] and Michael R. van der Valk[d]

[a]Biology Centre CAS, Institute of Hydrobiology, České Budějovice, Czech Republic; [b]Department of Environmental Engineering and Management, O.M. Beketov National University of Urban Economy in Kharkiv, Ukraine; [c]Environmental Law Department, Yaroslav Mudryi National Law University, Kharkiv, Ukraine; [d]Hydrology.nl – Institute for International Hydrology and Water Resources, Amsterdam, the Netherlands

ABSTRACT

The water laws of Georgia, Moldova and Ukraine are reviewed and compared with the Water Framework Directive of the European Union with a focus on water quality, water pollution and water management. Theoretical aspects and the implementation of the laws are discussed in terms of integration with European water legislation. Discrepancies are identified that should be addressed in future national legislation.

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Introduction

In countries with a so-called transitional economy, such as post-Soviet non–European Union members, water-intensive economic activity is often combined with weak water management and pollution control, leading to a significant anthropogenic impacts on water resources (Cherkashina & Vystavna, 2009; Hagemann, Klauer, Moynihan, Leidel, & Scheifhacken, 2014; Leidel, Niemann, & Hagemann, 2012; Organization for Economic Cooperation and Development [OECD], 2011; Opopol, 2006). In recent decades, the water quality in Georgia, Moldova and Ukraine has deteriorated (OECD, 2011; World Bank, 2003), while an observed reduction in river discharges has compounded shortages in drinking water supplies (Vystavna & Diadin, 2015). In Georgia, Moldova and Ukraine, more than 70% of drinking water is derived from surface water, mostly from altered river basins where water quality has a 'polluted' or 'highly polluted' status. Water quality improvement and better access to drinking water can be attained through appropriate water monitoring, water quality and quantity assessments, identification of pollution sources, and pollution prevention. However, the implementation of these measures requires the updating of environmental legislation, and water laws in particular (Hagemann et al., 2014; OECD, 2007, 2011; United Nations Development Programme, 2013).

A driving force of water legislation development in Georgia, Moldova and Ukraine is adaptation to the water legislation of the European Union (EU) according to signed association agreements (European Commission, 2014a, 2014b, 2014c). This article

CONTACT Yuliya Vystavna vystavna@yahoo.com

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reviews and compares the water laws of these three countries with the Water Framework Directive (WFD) 2000 of the EU to outline current problems associated with practical implementation of these laws and their integration with EU legislation.

General overview of water legislation in Georgia, Moldova and Ukraine

During the Soviet period, water legislation in Georgia, Moldova and Ukraine was based on the general law Fundamentals of Water Legislation of the USSR and Union Republics, introduced in 1971 (OECD, 2007, 2011). In that period, national water laws in the form of water acts were focused on the interests of principal water users, mainly economic sectors (Leidel et al., 2012; Opopol, 2006). After the collapse of the Soviet Union, each independent republic developed and initiated water laws taking into account specificities of local water resources (mainly regional water balance) and water use (mainly regional economic structure) (Law of Georgia on Water, 1997; Law of the Republic of Moldova on Water, 2011; Water Code of Ukraine, 1995). However, these newly developed water laws contained only minor changes from Soviet water law.

Current water laws in Georgia, Moldova and Ukraine include only general legislative provisions, without direct measures and implementation. For their execution, numerous regulations and instructions were developed, including governmental regulations, standards, building codes, norms, rules of water use and other regulatory documents. Payment (fees and charges) for water extraction and wastewater discharge was applied in the form of taxes (e.g., Tax Code of Ukraine (2014).

Water governance

According to the water laws presently in place, water governance in Georgia, Moldova and Ukraine is provided by state authorities, environmental ministries and agencies (Law of Georgia on Water, 1997; Law of the Republic of Moldova, 1993; Law of Ukraine, 1991; Resolution of the Cabinet of Ministers of Ukraine, 1996a, 1998a, 2014a, 2015; Resolution of the Government of Moldova, 2009) (Table 1). Some of these institutions have overlapping responsibilities. Studies (Hagemann et al., 2014; Nazarov, Cook, & Woodgate, 2000) suggest that a system which distributes functions over multiple institutions reduces the efficiency of water management and regulation in the country.

Also, in line with their respective environmental laws (Law of the Republic of Moldova, 1993; Law of Ukraine, 1991), Ukraine and Moldova have special committees that focus on the development of regional water protection programmes, in particular transboundary water basins (Resolution of the Cabinet of Ministers of Ukraine, 2014a; Resolution of the Government of Moldova, 2009). Activities of these committees are regulated by state environmental agencies, which are a part of national environmental ministries (Table 1). State environmental agencies are also responsible for permissions on water withdrawal and wastewater discharges.

At the moment, Georgia is reforming its national environmental legislation and water protection sector. However, responsibilities are still highly fragmented between water authorities (Table 1). For instance, the Ministry of Environment Protection and Natural Resources carries out water management and provides general environmental control, together with the development of regular environmental monitoring. This

Table 1. Water governance institutions in Georgia, Moldova and Ukraine.

Country	Water monitoring	Water quality control	Water quantity control	Water management
Georgia	Ministry of Environment Protection and Natural Resources and its agencies	Ministry of Environment Protection and Natural Resources; Ministry of Labour, Health Protection and Social Security; Ministry of Agriculture; Ministry of Regional Development and Infrastructure	Ecological inspection by the Ministry of Energy and Natural Resources; Ministry of Environment Protection and Natural Resources	Ministry of Environment Protection and Natural Resources; Ministry of Labour, Health Protection and Social Security; Ministry of Agriculture; Ministry of Energy and Natural Resources
Republic of Moldova	Ministry of the Environment; Ministry of Health Protection; Agency of Geology and Mineral Resources	Ministry of the Environment; Ministry of Health Protection; State Ecological Inspection	State Ecological Inspection; Agency of Geology and Mineral Resources	Ministry of the Environment; Agency of Geology and Mineral Resources; Ministry of Health Protection; State Ecological Inspection; Agency 'Apele Moldovei'; regional basin committees
Ukraine	Ministry of Ecology and Natural Resources; Public Service of Geology and Mineral resources; State Agency of Water Resources; State Sanitary and Epidemic Service, Ministry of Regional Development, Building and Municipal Economy; State Emergency Service.	Ministry of Ecology and Natural Resources; State Agency of Water Resources; State Sanitary and Epidemic Service; Ministry of Regional Development, Building and Municipal Economy	State Ecological Inspection; Public Service of Geology and Mineral Resources.	Cabinet of Ministries of Ukraine; Ministry of Ecology and Natural Resources; State Agency of Water Resources; Public Service of Geology and Mineral Resources; State Ecological Inspection; State Sanitary and Epidemic Service; Ministry of Regional Development, Building and Municipal Economy; State Emergency Service

ministry regulates water policy and controls, sets thresholds for contaminants in wastewater, reforms environmental law and develops the water registry that includes the main hydrological parameters of national water resources. The National Environmental Agency, which is a part of the Ministry of Environmental Protection and Natural Resources, is responsible for surface water monitoring. The Ministry of Energy and Natural Resources is responsible for permissions on groundwater extraction and development of water supply and sewage works, together with the Ministry of Regional Development and Infrastructure. Drinking water quality is regulated by the Ministry of Labour, Health Protection and Social Security. Similar problems of fragmentation of responsibilities are observed in Moldova and Ukraine.

Consequently, there is no comprehensive database or understanding of the linkages between existing multilevel legal institutions in the three countries. Water governance in Georgia, Moldova and Ukraine is fragmented and needs significant structural changes.

Water use and water users

In the water laws of Georgia, Moldova and Ukraine (Law of Georgia on Water, 1997; Law of the Republic of Moldova on Water, 2011; Water Code of Ukraine, 1995), two major water-use categories are identified: 'general' and 'special'. The 'general' category includes all uses which satisfy basic needs of the population, including bathing, swimming, water withdrawal (without pumping or additional equipment), recreational boating and fishing, and water for livestock. In Moldova and Ukraine, water for general use can be supplied from surface water and shallow aquifers (e.g., wells, springs). In Georgia, water for general use can be supplied from surface water and shallow and deep aquifers, if it is accessed without advanced facilities (i.e., pumps), avoiding effects on groundwater level and contamination. Otherwise, the water use falls into the 'special' category. In these three countries, general water use is free of charge, without the need to become a 'legal water user' or obtain special permissions for natural resource use. Local environmental authorities (Table 1) regulate and control general water use, and can limit it in some cases, e.g., disaster events (floods, pollution, etc.).

The 'special' water-use category represents the use of water resources through advanced water supply and discharge facilities. In the water laws of the three countries, wastewater discharge is always in the special category. Special water use requires permission from environmental authorities and entails payments. Permits for water use are given for periods from 3 to 25 years. Short-term permits, of 3–5 years, are mainly for wastewater discharge, while longer periods are for household supply.

In Georgia, Moldova and Ukraine, water supply from hydro-systems (such as channels and water reservoirs), water supply to water-scarce regions, and protection from water disaster (mainly flooding) are not considered special use. Also, in the three countries, waters with health benefits (mineral waters) can only be used for curative bathing purposes, with wastewater discharges being prohibited into these waters. Some particular differences are also observed in the regulation of water use between the three countries. For example, the Georgian water law considers water 'special' if its use influences depletion and/or pollution of water resources (§33). In the Moldavian water law, water supply for drinking is set as a priority among other types of water use (§24). Types of surface water use have the following priority order: agriculture; industrial, including mining; fishery; hydropower; sport and recreation. The priority for groundwater use is drinking water supply; food and beverage production; agriculture.

Therefore, in the water laws reviewed here, water-use categories and types are described in detail and have a certain hierarchy in terms of their priority, emphasizing the preservation of water quality and quantity for drinking purposes. However, inconsistencies in the description of water-use categories lead to the limitation of the 'general' category, mainly for bathing and swimming. Therefore, people have restricted access to 'general' use that contradicts the principal human right to use natural resources, as described in the Constitutions of Georgia (1995), Moldova (1994) and Ukraine (1996).

Property right to water resources

In the water laws of Georgia, Moldava and Ukraine, water property rights are key queries that identify directions of water management. There are minor differences between these

countries in the regulation of property rights on water bodies. For instance, according to Ukrainian water law (Constitution of Ukraine, 1996; Water Code of Ukraine, 1995), all water bodies are the property of the Ukrainian people and can only be rented. Yet, according to the land law (§59, Land Code of Ukraine, 2001), small confined reservoirs (less than 3 ha) can be owned, per appropriate decision of executive authorities or the local government. According to the Moldavian water law (Law of the Republic of Moldova on Water, 2011), water is a public good, but individuals or legal entities have the right to use water under a legislative framework. For example, the land under a water reservoir can be subject to both public and private ownership. An individual or legal entity can build an artificial lake on a plot of land they own under current legislation. The Georgian water law (Law of Georgia on Water, 1997) give exceptional public powers over water bodies in the territory of the country. Moreover, this act stipulates that property rights in land do not give rights to use surface water and groundwater on that land. These waters can be used only by the public (§23).

Therefore, the property rights on water are contradictory across different legislative acts in Georgia, Moldova and Ukraine. This presents a substantial problem for the practical implementation of water legislation and quite often leads to disputes between users of natural resources.

Water quality and quantity standards

In Georgia, Moldova and Ukraine, water standards are important parts of environmental and water laws (Resolution of the Government of Moldova, 2009; Law of the Republic of Moldova, 1993; Law of the Republic of Moldova on Water, 2011; Law of Georgia on Water, 1997; Water Code of Ukraine, 1995). These standards were mainly developed for a certain type of water use. Environmental safety standards, water quality standards, permissible standards for water pollutant discharges, branch standards for water contaminants for economic sectors, and technical standards on water use are set out in the environmental laws of Georgia, Moldova and Ukraine. These standards were set for more than 1000 parameters in the 1980s and are generally based on maximum allowable concentrations (MAC) of contaminants established for drinking water supplies, household use, fisheries and other needs of the population. This number of parameters is significantly higher than defined in the WFD or the Environmental Quality Standards Directive (European Union, 2008). Practically, water quality monitoring is limited to about 80 parameters, with only about a third of them being similar to those in the WFD. A general problem is a lack of environmental monitoring tools (Nazarov et al., 2000; Hagemann et al., 2014; Vystavna & Diadin, 2015). Also, Georgian, Moldavian and Ukrainian water laws do not classify water bodies according to water quality or quantity. The water quality assessment is based on the assumption that if one of the parameters exceeds the MAC, the water body cannot be used for certain purposes (e.g., swimming, bathing and fishing). The discharge of water contaminants that have no MAC values is not allowed. However, temporary exceptions can be made with permission of control institutions and are valid for the period required to develop and approve new MAC values. All expenses for the development of new MAC values must be covered by the legal water user.

Reflecting the focus of the water policies in the three countries on the achievement of 'better water quality', a maximum allowable discharge (MAD) is set for wastewaters entering natural waters. The MAD is the mass load of a pollutant that may be discharged during a certain time period, measured as grammes per second or tonnes per year. The MAD is developed to achieve water quality standards. MACs of some hazardous compounds are different from the WFD (Table 2). For most water users, water quality standards are too strict, and high capital investments in sewage facilities are required to follow them. In most cases, water quality standards cannot be achieved, and water users pay higher taxes for wastewater discharge and water pollution. Generally, taxes provide less than the investment needed. Also, these water quality standards still refer to outdated economic activities and to chemical substances that are no longer in use in industries or households (Alan et al., 2006; Vystavna et al., 2012). Moreover, technical water quality standards were established for specific components that occur in particular technological processes and that can be discharged in water bodies or public sewerage. These standards are being developed by appropriate institutions with agreement of the Ministry of Environmental Protection and Natural Resources in Georgia, the Ministry of the Environment in Moldova or the Ministry of Ecology and Natural Resources in Ukraine. In these technical standards, discharge of wastewater which could be reused is prohibited.

In the water laws of Georgia, Moldova and Ukraine, control of wastewater discharge into water bodies is based on limits of wastewater discharge. These are calculated taking into account the wastewater volume and the concentration of contaminants measured by MAD, the discharge conditions (flow rate, type of equipment from which wastewater is discharged, etc.) and the water quality of the receiving water body. In the water laws of Georgia, Moldova and Ukraine, discharges of wastewater to shallow and deep aquifers, and on the soil surface, are prohibited except by special permission of the environmental authority. All industrial wastewater must be discharged into public sewerage after pre-treatment at an industrial facility to within established limits. Wastewater can be used for irrigation only with special permission from sanitary and veterinary authorities.

The water laws of the studied post-Soviet countries are mainly concerned with point sources of water pollution. In many cases, however, diffuse pollution has become a larger problem. This is observed in nutrient loading, where point sources contribute only 8–10% of the total nitrate contamination, in mainly rural areas that are not connected to sewerage and where wastewater leaks from septic tanks (Vystavna et al., 2017; Yakovlev, Vystavna, Diadin, & Vergeles, 2015). In Moldova, for example, about

Table 2. Comparison of maximum allowable concentrations (in mg/L) in the Water Code of Ukraine (1995) and the EU Water Framework Directive.

Compound	Ukraine	EU
Benzene	0.5	0.05
Benzo(a)pyrene	0.000005	0.0001
Cadmium and its compounds	0.0013	0.00045–0.0015
Hexachloro-benzene	0.05	0.00005
Hexachloro-butadiene	0.01	0.0006
Hexachloro-cyclohexane	0.004	0.00004
Mercury and its compounds	0.00053	0.00007
Pentochloro-phenol	0.01	0.001

70% of households are not connected to sewerage or wastewater treatment facilities, and therefore constitute a major source of organic and microbial pollution.

Current water quality standards need to be reformed and updated to comply with the EU standards. The legislative basis for water quality monitoring has no clearly defined parameters, no quality targets, no applied measurement and analysis methods, and no provision for harmonization between different water agencies. It also lacks a mechanism of regular and standardized internal quality management (Hagemann et al., 2014).

Adaptation to EU water legislation

According to the signed EU integration acts (European Commission, 2014a, 2014b, 2014c; Law of Ukraine, 2010; Decision, 2013; Resolution of the Parliament of Ukraine, 2014b), Georgia, Moldova and Ukraine should develop environmental legislation that more closely aligns with European legislation.

Moldova is actively taking measures to adapt its national legislation to the EU legislation. The evidence can be found in the Law of the Republic of Moldova on Water (2011), which is partially harmonized with EU legislation on urban wastewater treatment, the protection of water against nitrate pollution from agricultural sources, bathing waters, assessment and management of flood risks, and environmental quality standards in the field of water policy. Adaptation of the Moldavian water legislation to EU requirements resulted in better sewage control, protection of water resources from pollution, greater responsibilities of wastewater treatment plants, development of a basin approach and introduction of environmental risk assessment and management.

To adapt to EU water legislation, Georgia is also changing the Soviet standards and norms, developing research on conservation and sustainable use of water, and safe water use, as well as control and supervision of practical implementation of the legislation.

The goals and objectives of environmental policy in Ukraine and its transition towards the environmental standards of the EU are also stipulated in legislation. They point out the need to develop appropriate legal acts and to adapt to European environmental norms and standards.

The main principles of EU water management are participation of water users, central and local public authorities, civil society and other stakeholders in planning and decision making regarding use and protection of water resources (WFD, 2000; Leb, 2015; Voulvoulis, Arpon, & Giakoumis, 2017). The following principles are partly adopted in the legislation of Georgia, Moldova and Ukraine: the polluter-pays principle, according to which the costs of pollution prevention or elimination of the consequences of water pollution should be covered by the polluter; the precautionary principle, which is based on prevention measures; the principle of sustainable water use, which addresses the needs of present and future generations to use and protect water resources; and the principle of the economic value of water, which recognizes the economic value of water resources.

Taking into account that Ukraine and Moldova share transboundary river basins (the Danube and Dniester), and that Ukraine and Georgia share marine zones (Black Sea) with the EU, some of the principles of the WFD have been already included in the international conventions on water protection (e.g., Convention on the Territorial Sea and the Contiguous Zone, 1958; Convention on the Protection of the Black Sea against

Pollution, 1994; Law of Ukraine, 1995; Resolution of the Cabinet Ministers of Ukraine, 1996b).

In spite of current and past actions towards integration with EU legislation, important strides still need to be made to harmonize the legislation of Georgia, Moldova and Ukraine with EU law. These are mainly related to water resources management, which should be transformed to match the legislation.

Comparative analysis of the WFD and the water law of Ukraine

Another substantial obstacle to adaptation of the EU legislation in the three countries is discrepancies in the terminology that is used in laws, norms and standards. For example, 'pollution', 'pollutant' and 'water quality' are key legislative categories in both the WFD and the Water Code of Ukraine. But these categories are interpreted differently (Table 3) in a way that significantly complicates practical application of international conventions on transboundary water use and adaptation to the EU legislation. For instance, in the Ukraine water code, water is primarily considered as a natural resource for different types of human uses, such as swimming, fishing, or drinking. Therefore, preservation of water quality and quantity is based on the satisfaction of the needs of the population and economy. In

Table 3. Comparison of the terminology in the Water Code of Ukraine (1995) and the EU Water Framework Directive.

Category	Water Code of Ukraine	Water Framework Directive
Pollution	'Pollution' is an entry of water pollutants into a receiving water body (§1).	**'**Pollution**'** means the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems, which result in damage to material property, or which impair or interfere with amenities and other legitimate uses of the environment (§33).
Pollutant	'Pollutant' is a substance that is introduced into a water body as a result of human activities (§1).	**'**Pollutant**'** means any substance liable to cause pollution, in particular those listed in the annexes of the WFD. 'Hazardous substances' means substances or groups of substances which are toxic, persistent and able to bio-accumulate, and other substances or groups of substances which give rise to an equivalent level of concern (§29). **'**Priority substances**'** means substances identified by the competent authorities and listed in the WFD. Among these substances there are **'**priority hazardous substances**'** which means substances identified by the competent authority and for which special prevention measures have to be taken (§31).
Water quality	'Water quality' is a characteristic of water composition and properties that defines its suitability for particular purposes of water use (§1). 'Category of water quality' is a measure of water pollution status that is set according to composition and properties of water, and is mandatory for a certain period.	**'**Environmental quality standard**'** means the concentration of a particular pollutant or group of pollutants in water, sediment or biota that should not be exceeded to protect human health and the environment (§35).

contrast, the WFD views water resources as a heritage (§1). At the same time, both legislations aim at reducing pollution and meeting appropriate water quality standards. The Water Code of Ukraine considers water sanitation and protection of public health as a priority. The WFD defines environmental performance and ecosystem preservation as the main targets of water protection.

In the Water Code of Ukraine, pollution is understood as the introduction of anthropogenic substances, 'pollutants', into surface water and groundwater. These pollutants make the natural waters unsuitable for a certain type of water use (drinking, swimming, bathing, fishing, etc.). The WFD is not primarily focused on water users, but considers water resources as aquatic and riparian ecosystems that should be protected and conserved (§33). The WFD considers water pollution more broadly than the Water Code of Ukraine, looking at both direct and indirect impacts on natural waters (Howarth, 2006; Voulvoulis et al., 2017). The indirect impact is associated with natural and human factors and takes into account the initial state of environmental media (air, soil and water). The river basin is treated as a holistic ecosystem.

As mentioned above, water protection in Ukraine is associated with human and economy needs only; the ecosystem approach, as a link between water bodies and other environmental components (soil, air, biota), is completely missing. In the WFD, water pollution is considered in relation to the natural state of the ecosystem.

According to both the WFD and the Water Code of Ukraine, the main causes of water pollution are wastewater discharge and economic activity. In Ukraine there are many cases where enterprises discharge wastewater into surface water without permission or beyond permitted limits (limits of wastewater discharge and MAD). These cases are considered unauthorized water use, constitute a violation of water legislation, and are subject to juridical responsibilities (e.g., Resolution of the Cabinet of Ministers of Ukraine, 1998a, 1999, 2002).

The differences in terminology between EU legislation and the legislation of Ukraine, Moldova and Georgia is an important barrier to the integration of the EU legislation and the practical implementation of water laws. Essential steps must be taken to shape the core terminology of water laws according to the EU legislation and national features.

Summary

Water legislation in Georgia, Moldova and Ukraine is under transformation from Soviet to EU environmental standards. This shift requires significant changes in the terminology, structure and content of water laws. At present, the main shortcomings of the water legislation of the three countries and its practical implementation are: (1) fragmentation of water legislation, which translates into poorly defined responsibilities; (2) significant discrepancies between different laws on property rights and the responsibilities of natural resource users; and (3) outdated water quality standards. General problems for integration with EU legislation are significant discrepancies not only in terminology but also in the overall concept of water resource protection. Future legislation in Georgia, Moldova and Ukraine should reflect new international practices and approaches in water protection. Effective mechanisms of practical implementation must also be introduced into various water sectors.

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ORCID

Yuliya Vystavna http://orcid.org/0000-0002-1366-0767
Maryna Cherkashyna http://orcid.org/0000-0002-8892-5440

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