

Water Governance and Its Effectiveness

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Abstract – Water governance refers to the political, social, economic and administrative systems in place that influence water’s use and management. Essentially, who gets what water, when and how, and who has the right to water and related services, and their benefits. It determines the equity and efficiency in water resource and services allocation and distribution, and balances water use between socio-economic activities and ecosystems. Governing water includes the formulation, establishment and implementation of water policies, legislation and institutions, and clarification of the roles and responsibilities of government, civil society and the private sector in relation water resources and services. The outcomes depend on how the stakeholders act in relation to the rules and roles that have been taken or assigned to them. The water sector is a part of broader social, political and economic developments and is thus also affected by decisions by actors outside of the water sector. New forms of governance focusing on process-oriented societal co-steering through, for example, formal and informal networks, partnerships and dialogue, have emerged within the water sector. The governance transformation is intrinsically linked to the increasing focus on the complexity of water management and the multifunctional character of water and the search for alternative forms of organisation.

Keywords: Dialogue; Governance; Integrated Water Management; Participation

I. INTRODUCTION

The restoration and preservation of freshwater ecosystems is a worldwide multifaceted challenge, but, as well as the complexities of the water systems and the behavior of natural life within those systems, there are also multiple societal and institutional drivers that add to this complexity (e.g., [5, 15]). As water is such an important carrier of planetary life, the restoration and preservation of freshwater ecosystems is one of the *United Nations Sustainable Development Goals*, which aim to protect and restore water-related ecosystems by 2020 (referring to SDG 6, available at www.un.org/sustainabledevelopment/.)

In Europe, the ecological ambitions for water were set out in the *European Water Framework Directive* (WFD, 2000/60/EC), which referred to water as ‘a

heritage which must be protected, defended and treated as such’ (2000/60/EC, recital 1). Member States were told to achieve a “*good ecological and chemical status*” for all their waters by 2015, focusing on specific elements like the integrated river basin approach, the role of stakeholders and the importance of balancing the costs and benefits of water services.

These objectives are in line with SDG 6 although with a different timeframe. If the WFD objectives could not be met by 2015, the WFD sets out a strict set of conditions for exemptions running until 2027: technically unfeasible within the timescale, disproportionately expensive, or natural conditions do not allow timely improvement (2000/60/EC, Article 4, sub 4) [21].

Unbalanced costs and benefits of water services, however, would only be accepted as an exemption if the WFD objectives had already been met [22]. To date, it can be concluded that most member states are struggling to realize the ecological ambitions of the WFD (Article 4) [1, 2, 4, 6, 15, 16, 17] and thus SDG 6. The European Commission (EC) reports that “*in one third of the member states more than 50% of all natural surface water bodies have good or high ecological status and in 20% of the member states less than 20% of water bodies have a good ecological status*” [9]. Scholars offer different explanations for this result. For instance, there is a lack of comparable data on both ecological status and the effect of measures at both the national and EU level, which hampers the formulation of effective measures [1].

Policy-makers demonstrate limited ambitions because of uncertainties about the implications [4, 19] and member states interpret their legal obligations in different ways, which results in different levels of water quality [10]. These issues can be identified all over Europe and beyond [10, 13, 24].

Yet, where does that leave the policy-maker and the water manager who must decide how to respond to the stagnating ecological ambitions? Governance approaches, with the involvement of multiple actors at multiple levels, are often regarded to be more effective in dealing with complex water issues,

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compared to conventional legal frameworks with top-down central steering mechanisms [11, 20, 25].

In this context, governance is defined as a process of interaction between public and/or private actors ultimately aiming at the realization of collective goals [18]. The challenges set by these multi-actor, multi-level governance approaches have been described extensively in literature (e.g., [3, 7, 9, 13, 24]).

Furthermore, governance addresses linkages and processes between and within organizations and social groups involved in decision-making, both horizontally across sectors and between urban and rural areas, and vertically from local to international [23]. Governance is not limited to “government” but also includes the private sector and civil society. The character of relationships (and the formal and informal rules and regulations guiding such relationships) between different social actors and organizations is an important feature of governance.

Though the water sector has lagged in explicitly addressing water challenges in a governance framework, “fixing” various water related challenges, such as dwindling water resources, insufficient services and pollution, is now increasingly seen in terms of getting the “right” governance system in place. The question of “getting it right” will mean different things in different countries.

The water sector has traditionally been, and still is to a great extent, driven by investments in technological innovations and development of infrastructure to increase water supply. In many instances this has allowed many people to benefit more in terms of access to water. However, there have also been many instances where infrastructure did not operate in an effective manner, or where the benefits of appropriate technology were not fully realized [12].

The way societies govern their water affairs has profound impacts on livelihoods, yet governance has not received the same attention, within the water sector, as technical and infrastructure developments have. Any water governance system must be able to allocate water to ensure food and urban security, but also be able to assess for whom and for what purposes water is provided. In practice, tough trade-offs must be made and allocation of benefits and costs have to be clarified. Governance is essentially about such processes of making choices, decisions and trade-offs.

II. A DEBATE ON THE NOTION OF WATER GOVERNANCE

Water governance refers to the range of political, social, economic and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society [8].

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resources, and the delivery of water services, at different levels of society” [23].

The notion of governance for water includes the ability to design public policies and institutional frameworks that are socially accepted and mobilize social resources in support of them. Water policy and the process for its formulation must have as its goal the sustainable development of water resources, and to make its implementation effective, the key actors/stakeholders must be involved in the process. Governance aspects overlap with technical and economic aspects of water, but governance points us to the political and administrative elements of solving a problem or exploiting an opportunity. Governance of water is a subset of the more general issue of the creation of a nation’s physical and institutional infrastructure and of the still more general issue of social cooperation.

Water governance is concerned with those political, social and economic organizations and institutions (and their relationships), which are important for water development and management.

Water governance is concerned with the functions, balances and structures internal to the water sector (internal governance). It includes the framing of social agreements on property rights and the structure to administer and enforce them known as the law. Influences also come from civil society and from the “current” government and these are considered parts of the external governance of water, which will be discussed later. Effective governance of water resources and water service delivery will require the combined commitment of government and various groups in civil society, particularly at local/community levels, as well as the private sector.

2.1. Achieving Effective Water Governance

Today, we know a lot more about what constitutes bad government than we do about achieving good government [14].

We are talking today more and more about that the governance of water resources and water services functions more effectively with an open social structure which enables broader participation by civil society, private enterprises and the media, all networking to support and influence government [14]. It is acknowledged that development in poorer countries is dependent on infrastructure and innovative technological development. Establishing effective water governance is complementary to this and provides the environment to ensure that the equally important investment in physical works is appropriate, long-lasting and effective. It is also recognized that governance requires change, which is often resisted, and by its nature it involves political debate.

There is no single model of effective water governance. Indeed, to be effective governance systems must fit the social, economic and cultural particularities of each country.

2.2. Principles for Effective Water Governance

There are some basic principles or attributes that are considered essential for effective water governance [23]:

- Open and transparent: Institutions should work in an open manner. They should use language that is accessible and understandable for the general public to increase confidence in complex institutions. Good governance requires that all policy decisions are transparent so that both insiders and outsiders can easily follow the steps taken in the policy formulation
- Inclusive and communicative: The quality, relevance and effectiveness of government policies depend on ensuring wide participation throughout the policy chain – from conception to implementation
- Broad participation is built on social mobilization and freedom of association and speech, as well as capacities to participate constructively. Transparency and accountability are built on the free flow of information.
- Coherent and integrative: Policies and action must be coherent. The need for harmony and coherence in governance is increasing as the range of tasks has grown and become more diverse. For ensure a consistent approach within a complex system, coherence requires political leadership and a strong responsibility on the part of the institutions at different levels.
- Equitable and ethical: All men and women should have opportunities to improve or maintain their well-being. Water governance must be strongly based upon the ethical principles of the society in which it functions and based on the rule of law. Equity between and among the various interest groups, stakeholders, and consumer-voters needs to be carefully monitored throughout the process of policy development and implementation

The role of governance mechanisms outside the water sector is critical to the success of water governance within the sector. To achieve more effective water governance, it is necessary to create an enabling environment which facilitates efficient private and public sector initiatives.

The way societies govern their water affairs has profound impacts on livelihoods, yet governance has not received the same attention, within the water sector, as technical and infrastructure developments have. Any water governance system must be able to allocate water to ensure food and urban security, but also be able to assess for whom and for what purposes water is provided. In practice, tough trade-offs have to be made and allocation of benefits and costs have to be clarified. Governance is essentially about such processes of making choices, decisions and trade-offs.

III. RESULTS OF WATER GOVERNANCE IN ROMANIA

3.1. Ensure availability and sustainable management of water and sanitation for all

On July 28, 2010, the UN General Assembly declared clean and safe drinking water as well as sanitation a human right, essential to the full respect for the human right to life and all of its other rights. The UN General Assembly expressed their deep concern that approximately 900 million people in the world (figure suggested by WHO/UNICEF in the joint monitoring program) do not have safe drinking water. Subsequently, at the fifteenth session of the United Nations Human Rights Council, in September 2010, there has been stipulated that the right to water and sanitation is derived from human right to an adequate standard of living, so "for the UN, the right to water and sanitation is included in the existing treaties on human rights and is therefore legally binding". Even if we are still facing many of the traditional water supply challenges, sewerage and water quality protection, new challenges such as adaptation to climate change, rising food and energy prices, obsolete and insufficient infrastructure are now increasing, which also increases the complexity and financial burden of the water management. From an economic and pragmatic point of view, Romania's capacity to provide efficient infrastructure and services in the field of environmental protection, both at national and local level, is also an important factor in the development of the private sector. At the same time, public capital investments have a particularly important role in the market economy, because some public infrastructure facilities are inputs for private sector activity and contribute to increasing the marginal productivity of private capital. With the transition to a market economy and a democratic political system, after more than four decades of centralized management, Romania decided to return to the principle of autonomy through decentralization and the transfer of major and concrete responsibilities to local public administrations. The Law on public administration, No. 215/2001 republished, refers to the obligation of local governments to organize their operations effectively and adequately, in order to provide public services. Under this law, local governments have the right to associate with the goal of developing efficient public services for the common/regional interest. The need to reform, modernize, develop and restructure the water sector has become even more stringent and obvious once Romania became a member of the EU, having to comply with the European Directives 98/83/EC on drinking water quality (by 2015) and 91/271/EC on wastewater treatment (by the end of 2018). For the above reason, Romania is constantly pursuing the achievement of those investments needed in order to comply with the water quality indicators imposed by the European Union. Besides that, by the end of 2015,

263 urban agglomerations with more than 10,000 population equivalent (p.e.) should have met the wastewater collection and treatment targets and by the end of 2018, 2,346 agglomerations between 2,000 to 10,000 population equivalent (p.e.). In order to achieve these ambitious targets, Romania implemented pre-accession programmes (PHARE, ISPA), the Sectoral Operational Programme Environment (SOP Environment) 2007-2013 and the Large Infrastructure Operational Programme (LIOP) 2014-2020.

The Sectoral Operational Programme Environment (Environment SOP) 2007-2013 took into consideration the strategic objectives for the financing of the environmental infrastructure, being fully in line with the strategic national objectives set up through the National Development Plan for 2007-2013 (NDP) and the National Framework Strategic Plan (NFSP) that take into account the objectives, principles and practice of the European Union. One of the specific objectives of SOP Environment was to improve the quality and access to drinking water and wastewater collection and treatment infrastructure, providing drinking water and wastewater collection and treatment services in line with EU policies and practice, in a most of the urban areas by end of 2015 and to develop regional structures to manage the drinking water and wastewater collection and treatment services. The implementation of the Large Infrastructure Operational Programme (LIOP) 2014-2020 is ongoing. LIOP includes the Priority Axis 3 – Development of environmental infrastructure based on an efficient management of resources, with an allocated amount of EUR 2.892.443.785,00, and is focusing on the programme area 3.2 Improving the level of wastewater collection and treatment in urban areas, as well as improving the level of population access to drinking water services. The investments provided by this programme area aim to ensure the progress towards the compliance with the environmental acquis and, implicitly, to reduce the disparities between Romania and the other Member States in this particular area. Likewise, the Governance Programme 2016-2020 provides for 5,000 new investments for drinking water, wastewater collection and treatment infrastructure, financed from the state budget, through engagement credits, and European funds. Also, establishing the regional operators (RO) and delegating the management of water and sanitation services to them is an essential process to ensure compliance with the deadlines and, at the same time, for building the absorption capacity of the EU structural funds and to implement the future investment projects. The association of a number of territorial-administrative units in order to conjunctively delegate their water and sanitation services management has also to respond to the need of reducing the development disparities between the territorial-administrative units and is an application of the solidarity principle as one of the fundamental values of the European Union, with positive effects

for the users. Currently, the regionalization process of water services, which aims to overcome the excessive fragmentation of the sector and achieve economies of scale, is almost over. The above-mentioned programmes, namely the pre-accession programmes (ISPA, PHARE), the SOP Environment 2007-2013 and the LIOP 2014-2020 are co-financed by the state budget and cover all 42 counties in Romania, so that at present there are 42 regional water companies (in general, at county level) and the water company of Bucharest Municipality.

3.2. The analysis of the current state of development and of the recent evolution of the Romanian water sector

The costs for alignment of drinking water supply and wastewater collection, treatment and disposal to the standards required by the EU environmental acquis were estimated at approximately 15 billion euros, by the end of 2018. Those costs are, first of all, investment costs for the development of infrastructure for drinking water distribution networks, wastewater collection systems and wastewater treatment plants.

Public Drinking Water Supply Network - As regards the supply of drinking water, a national report established that only 65% of Romania's population is connected to the public drinking water network, out of which 98% is urban population and only 33% rural population (3.4 million inhabitants).

Romania is in a rather unfavorable position compared to the rest of Europe, where 96-100% of the population is connected to the drinking water distribution network, 100% in urban areas and 87% in rural areas. According to this report, there were only 4 countries in Europe reporting that they did not have full coverage of drinking water and sanitation services, Romania being the least developed from this point of view. However, drinking water distribution networks have expanded continuously, especially as major cities have developed, so that the network's length (about 50,000 km) was 55% higher in 2009 compared to 2001. At present, 86% of the population resident in 256 urban localities (11,551,096 inhabitants) benefit from running water through public networks. 55 urban localities have 100% population connected to the public drinking water distribution network.

Relevant statistical data are presented in Table 1 and Figure 1, provided by the Romania's Statistical Yearbook 2018.

Table 1. Drinking water supply network and volume. (according to the Romania's Statistical Yearbook 2018)

a. Public sewerage

Localities with public sewerage installations (number) / of which at Municipalities and towns:

2011	2012	2013
861 / 309	926 / 310	982 / 310
2014	2015	2016
1071 / 311	1122 / 313	1184 / 313

Total simple length of public sewerage pipes (km)

2011	2012	2013
23137,2	24789,8	26559,6
2014	2015	2016
28659,5	31702,6	34353,4

b. Drinking water supply network and volume

Number of localities¹⁾ with installations (end of year) / of which at municipalities and towns:

2011	2012	2013
2304 / 317	2328 / 317	2367 / 317
2014	2015	2016
2447 / 317	2474 / 317	2506 / 317

Simple total length of drinking water supply network (km) / of which at municipalities and towns:

2011	2012	2013
65900,9 / 27474,3	68299,3 / 27680,2	71513,7 / 27828,7
2014	2015	2016
74263,2 / 28321,9	76945,0 / 28778,7	79677,6 / 29476,7

Drinking water supplied to the users (million m³) / of which: for household use

2011	2012	2013
1002 / 677	1035 / 695	1014 / 690
2014	2015	2016
995 / 684	744 / 561	741 / 563

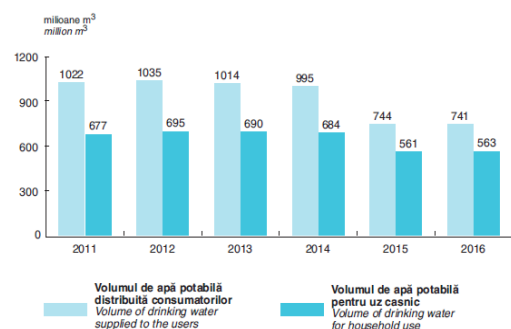


Fig. 2. Volume of drinking water supplied to the users (according to the Romania's Statistical Yearbook 2018)

An interesting fact is the year-on-year decrease in the total volume of drinking water distributed to consumers across the country (1,064.8 million m³ in 2009, over 50% less than in 1995), at the same time with the increase in the share of drinking water consumed for household use (57% in 2005, 64% in 2009), due to the reduction and restructuring of the industrial activity in the last 10 years, the economic crisis in 2009 (when the quantity of water distributed decreased by 1% compared to 2008) as well as consumption, the metering of the consumption and education of the citizens on reducing consumption/eradication of waste. The 2009 reference year is taken into account in the context of the economic crisis. In 2014, 62.4% of the country's population was a beneficiary of the public water supply system.

Romania has also undertaken other actions in order to improve water quality and access to water supply infrastructure, during 2009 - 2017, so 317 cities and municipalities out of 320 and 2189 villages out of a total of 2861, at the end of 2016, were connected to the public drinking water network. However, only 65.4% of Romania's population was connected to the public drinking water system in 2016, so that Romania was the least developed country in this respect. Romania's situation is comparable to other EU countries in terms of connection rate within urban areas (99% in Romania and 96-100% in the other EU States). Instead, in the rural area the connection rate to water supply infrastructure is below the EU average. In 2016, qualitatively 66.14 % of water bodies which have been taken stock of achieved a good or a very good ecological status (2002 waterbodies), 33.33% which means (1009 waterbodies) with a moderate condition, and (2 waterbodies) in a poor state, and (8 waterbodies) in a bad condition, all represents under 1%. 6 water bodies were not been taken stock of.

Role of the Protocol on Water and Health in achieving the 2030 Agenda - Successful cooperation between stakeholders involved in achieving the 2030 Agenda, through the Inter-ministerial Committee for the Coordination of the Integration of Environmental Protection into Sectoral Policies and Strategies at National Level led by the Minister of Environment. During the sessions of the Open Ended Working Group (OEWG) for drafting Romania's VNR under the Inter-ministerial Committee, there has been strong cooperation between Protocol on Water and Health, in Romania, led by the Ministry of Environment, Ministry of Health and the Ministry of Waters and Forests, to fill the SDGs Matrix (including MEAs), all 169 targets - mapping the main processes and actions by each target. The links between the Matrix of SDGs and Template of PoW Report, and how the connected data has been used in preparing the Voluntary National Review Romania 2018, support of the High Level Political Forum 2018, New York.

In Romania, targets have been set and approved under the Protocol, and now, this kind of work is useful to setting national targets for SDG 6 and others in Voluntary National Review Romania 2018. At the same time, the Voluntary National Review Romania 2018 offers the opportunity to review Protocol targets to check their relevance, comprehensiveness and appropriateness and to update priorities in the context of SDGs and other relevant global and regional commitments. Romania ratified the Protocol Water and Health (PoW) by Ordinance No. 95/29 August 2000, approved by Law No. 228/30.11.2000. The Protocol is the first international legal instrument that promotes at national and international levels the protection of human health and well-being in the framework of sustainable development, by improving the water management, including protecting the aquatic ecosystems, and by preventing, controlling and reducing water-related diseases. At the same time,

the Protocol introduces a social component in the cooperation on water management. Water resource management must link the social and economic development of society and the protection of natural ecosystems. Moreover, the improvement of water supply and sanitation is the decisive factor in interrupting the vicious cycle of poverty. For more than 17 years, the Protocol on Water and Health has proven its effectiveness as an enabler for sustainable development, for improving the water supply, sanitation and public health in Romania.

Also, Romania is a member of the Bureau of the Protocol on Water and Health, which is a coordinating mechanism for implementing measures in this field. The Protocol is the mechanism to advance and operationalize progress on the goals and targets related to water, sanitation, hygiene and health. In Romania, the responsibility for implementing the Protocol on Water and Health is shared between the Ministry of Waters and Forests, as main coordinating body, and the Ministry of Health. Romania participated to the reporting cycles in 2010, 2013 and 2016, but the process of setting targets according to the Protocol has started back in 2009. The reporting is based on the yearly reports elaborated by the National Administration "Romanian Waters", the competent authority for UWWTD Reporting to EU and RBMP 2015-2021, based on information provided by the water services operators. Regarding the information and public participation, the work under the Protocol have been published on the Ministry of Environment, Waters and Forests website: Public participation is an important tool in national, regional or local development activities, imparting quality in decision-making and strengthening the authority of decisions through public support in their implementation. Countries with democratic tradition use this instrument efficiently by always refining their legislative framework to expand public participation to the highest levels of decision-making or state policy formulation, aware of the benefits of public support. Current environmental policies promote an integrated approach in which the public is a key actor in achieving the objectives of any sectoral policy. This approach has been promoted in the overall process initiated by the United Nations, following the Rio de Janeiro Summit in 1992, where the States Parties signed the Declaration on Environment and Development, recognizing that "one of the main elements indispensable to the achievement sustainable development is public participation in decision making "(Chapter 23 of Agenda 21). In 1998, on 28 July in Aarhus, the European Union and other 39 countries adopted the UNECE Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Romania ratified the Convention by Law No.86/2000. The Romanian Constitution stipulates that the state is obliged to take measures in order to assure the hygiene and public health. Hence, the actions of the Romanian authorities are oriented to the

extension of the centralized drinking water supply and sanitation systems, including those within the disadvantaged areas. The specific legislation on water and sanitation require the access and participation of population to the decision-making process. For example, according to the provisions of the Drinking Water Quality Law, the authorities with attributes in the field of drinking water supply should ensure the adequate and updated information on the quality of water intended for human consumption. The access to information and to the decision-making process is also provided by the Water Law and is available for all the population groups. **The development of environment infrastructure** requires major investments for extending of water and wastewater networks, the construction and rehabilitation/upgrading of treatment plants, sewerage networks and wastewater treatment plants. Thus, on SO 3.2 from LIOP, 70 projects were submitted for a total amount of 1,500.9 million Euro (66 projects were contracted for a total amount of 1,474.3 million Euro), out of which: 35 technical assistance projects (32 contracted projects), 5 new integrated projects for developing water and wastewater infrastructure (all of them contracted) and 30 integrated phased projects for developing water and wastewater infrastructure (29 contracted projects).

Regarding the Environment Fund financing, through the Program of Water Resource Protection, Integrated Water Supply Systems, Treatment Plants, Sewerage and Wastewater Treatment Plants, 130 water and sewerage projects were finalized, with a financing value of 462.15 million Lei (41 projects finalized in 2017, with a funding value of 182.16 million Lei and one project finalized in 2018, with a funding value of 5.65 million Lei). At the national level, at the end of December 2017, 1,732 sewer networks were inventoried, out of which 1,052 were functional and 680 at different stages of execution. With regard to sewage treatment plants, in December 2017, there were 1,055 treatment plants, out of which 782 were functional and another 273 new treatment plants, completed, to which the population had not yet been connected or in technological trials/decommissioned. The degree of coverage with wastewater collection systems corresponds to a biological load of approx. 66.32% of equivalent inhabitants, and the degree of coverage with sewage treatment plants corresponds to a biological load of approx. 63.73% of equivalent inhabitants. The investments made during 2007 - 2017 for the wastewater infrastructure amount to approx. 5,708 million Euro, out of which 53.68% for the rehabilitation and extension of sewerage networks and 46.32% for the rehabilitation and construction of new wastewater treatment plants. Works to improve flood protection systems continue in a fast pace. By the end of 2017, the following facilities were achieved: shore consolidation on 28.13 km; dams on 11.26 km, 281 preparations of bottom sills and falls on the riverbed, a polder and 12 km of riverbed recalibration. Procurement of technical assistance services for

design continues to be funded by LIOP. Until the end of 2017, 164 municipalities and 2,166 administrative territorial units received various works to address the threat of flooding. Complementary, 13 simulation exercises on flood defenses were held in 108 settlements in Q2/2017. 22 roundtables/ seminars were organized at regional and local level, to put forward flood risk solutions and to exchange information on best practices for flood risk management. An important contribution to tackling climate change and improving the state of the Romanian infrastructure is also provided by sub-measure 7.2 of the 2014-2020 NRDP for projects concerning road and water/wastewater infrastructure projects. EAFRD 2014-2020 finances investment projects to modernize secondary irrigation infrastructure, buildings associated to the pumping stations and/ or connection to utilities, including modernization of collecting and storage tanks of irrigation water¹⁶⁵. The public non-reimbursable support is 100% of the total eligible expenditure and may not exceed 1 million Euro per project for irrigation systems for pressure pumping stations and access roads and 1.5 million Euro for irrigation systems related to pumping and re-pumping stations, as well as forest roads. At the same time, the investment projects for the development of the main irrigation infrastructure are supported through the national budget, within the National Programme for Rehabilitation of the Main Irrigation Infrastructure in Romania.

IV. CONCLUSIONS

Worldwide, countries face the multifaceted challenge of restoring and preserving aquatic ecosystems in accordance with one of the UN Sustainable Development Goals (SDG 6). Over the last few decades, governance approaches have often been used to realise these ambitions. So far, scholars have identified that it is difficult to relate governance approaches to water quality improvement and have offered several different explanations for this. As ecological, legal and social-economic scholars may hold different perspectives regarding the effectiveness of a governance approach, we have analysed these perspectives, how they interact and how these interactions affect water quality governance. To this end we built a conceptual framework to explain these interactions and carried out a systematic literature review to identify the current level of understanding of these interactions and identify any possible gaps. Ecological, legal and social-economic perspectives on the effectiveness of water quality governance have both similarities and differences. Potentially conflicting characteristics are: the difficulty of setting objectives (many unknowns) and adequate measures from the ecological perspective, the limited adaptive capacity of the legal framework once set in place and the focus on decision-making processes rather than

water quality improvement from the social-economic perspective. All three perspectives are relevant to the governance approach to water quality improvement and have to interact.

The presented analysis of the current state of development and of the recent evolution of the Romanian water sector has support the debate on the practical implementation of the theoretical issues that has been debated. The practical analysis has been based on the public data and analysis available at the Ministry of Environment and it shows that to ensure the availability and sustainable management of water and sanitation for all citizens there are needed a lot of investments in the infrastructure of the water sector in Romania.

REFERENCES

- [1] Baaner, L. (2011). Programmes of measures under the Water Framework Directive—a comparative case study.
- [2] Blackstock, K. L., Waylen, K. A., Dunglinson, J., & Marshall, K. M. (2012). Linking process to outcomes—internal and external criteria for a stakeholder involvement in river basin management planning. *Ecological Economics*, 77, 113-122.
- [3] Blackstock, K. L., Waylen, K. A., Marshall, K. M., & Dunglinson, J. (2014). Hybridity of representation: insights from river basin management planning in Scotland. *Environment and Planning C: Government and Policy*, 32(3), 549-566.
- [4] Boeuf, B., & Fritsch, O. (2016). Studying the implementation of the Water Framework Directive in Europe: a meta-analysis of 89 journal articles. *Ecology and Society*, 21(2).
- [5] Brack, W., Altenburger, R., Schüürmann, G., Krauss, M., Herráez, D. L., van Gils, J., ... & Schriks, M. (2015). The SOLUTIONS project: challenges and responses for present and future emerging pollutants in land and water resources management. *Science of the total environment*, 503, 22-31
- [6] Brack, W., Dulio, V., Ågerstrand, M., Allan, I., Altenburger, R., Brinkmann, M., ... & Hernández, F. J. (2017). Towards the review of the European Union Water Framework Directive: recommendations for more efficient assessment and management of chemical contamination in European surface water resources. *Science of the Total Environment*, 576, 720-737.
- [7] Bressers, N. (2016). *Water governance as connective capacity*. Routledge.
- [8] Global Water Partnership (2001). ToolBox for IWRM, GWP, December 2001.
- [9] Graversgaard, M., Jacobsen, B. H., Kjeldsen, C., & Dalgaard, T. (2017). Stakeholder engagement and knowledge co-creation in water planning: Can public participation increase cost-effectiveness?. *Water*, 9(3), 191.
- [10] Green, O. O., Garmestani, A. S., van Rijswijk, H. F., & Keessen, A. M. (2013). EU water governance: striking the right balance between regulatory flexibility and enforcement?. *Ecology and Society*, 18(2).
- [11] Guidance, W. C. E. (2009). Common implementation strategy for the Water Framework Directive (2000/60/EC). *Guidance document*, (23).
- [12] Hakan T. (2007). Water governance: trends and needs for new capacity development, *Water Policy* 9, Supplement 2 (2007) 19–30.
- [13] Hart, B. T. (2016). The Australian Murray-Darling Basin Plan: factors leading to its successful development. *Ecology & Hydrobiology*, 16(4), 229-241.

- [14] Heinelt, H. (2018). *European Union Environment Policy and New Forms of Governance: A Study of the Implementation of the Environmental Impact Assessment Directive and the Eco-management and Audit Scheme Regulation in Three Member States: A Study of the Implementation of the Environmental Impact Assessment Directive and the Eco-management and Audit Scheme Regulation in Three Member States*. Routledge.
- [15] Hering, D., Borja, A., Carstensen, J., Carvalho, L., Elliott, M., Feld, C. K., ... & Solheim, A. L. (2010). The European Water Framework Directive at the age of 10: a critical review of the achievements with recommendations for the future. *Science of the total Environment*, 408(19), 4007-4019.
- [16] Kastens, B., & Newig, J. (2007). The Water Framework Directive and agricultural nitrate pollution: will great expectations in Brussels be dashed in Lower Saxony?. *European Environment*, 17(4), 231-246.
- [17] Keessen, A. M., van Kempen, J. J., van Rijswijk, M., Robbe, J., & Backes, C. W. (2010). European river basin districts: are they swimming in the same implementation pool?. *Journal of Environmental Law*, 22(2), 197-221.
- [18] Lange, P., Driessen, P. P., Sauer, A., Bornemann, B., & Burger, P. (2013). Governing towards sustainability—conceptualizing modes of governance. *Journal of environmental policy & planning*, 15(3), 403-425.
- [19] Le Bourhis, J. P. (2016). The politics of green knowledge: A comparative study of support for and resistance to sustainability and environmental indicators. *Journal of Comparative Policy Analysis: Research and Practice*, 18(4), 403-418.
- [20] Newig, J., & Fritsch, O. (2009). Environmental governance: participatory, multi-level—and effective?. *Environmental policy and governance*, 19(3), 197-214.
- [21] van Kempen, J. J. (2012). Countering the obscurity of obligations in European environmental law: an analysis of Article 4 of the European Water Framework Directive. *Journal of Environmental Law*, 24(3), 499-533.
- [22] Priest, S. J., Suykens, C., Van Rijswijk, H. F., Schellenberger, T., Goytia, S., Kundzewicz, Z. W., ... & Homewood, S. (2016). The European Union approach to flood risk management and improving societal resilience: lessons from the implementation of the Floods Directive in six European countries. *Ecology and Society*, 21(4).
- [23] Rogers, P. & Hall, A. (2003). *Effective Water Governance*. TEC Report No. 7, *Global Water Partnership*, Stockholm
- [24] Woodhouse, P., & Muller, M. (2017). Water governance—An historical perspective on current debates. *World Development*, 92, 225-241.
- [25] Wuijts, S., Driessen, P. P., & Van Rijswijk, H. F. (2018). Towards More Effective Water Quality Governance: A Review of Social-Economic, Legal and Ecological Perspectives and Their Interactions. *Sustainability*, 10(4), 914.