



REGULATORY IMPACT ASSESSMENT OF DRAFT LAW ON WATER MANAGEMENT

FINAL REPORT

USAID GOVERNING FOR GROWTH (G4G) IN GEORGIA

5TH JULY 2017

This publication was produced for review by the United States Agency for International Development. It was prepared by Deloitte Consulting LLP. The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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INTERIM REPORT

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DATA

Reviewed by:

Project Component:

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Key Words:

ACRONYMS

AA	Association Agreement
ADB	Asian Development Bank
СВА	Cost Benefit Analysis
EIA	Environmental Impact Assessment
GDP	Gross Domestic Product
GeoStat	National Statistics Office of Georgia
GA	Georgian Amelioration
GoG	Government of Georgia
G4G	Governing for Growth in Georgia
GWP	Georgian Water and Power
DES	Department of Environmental Supervision
EPIRB	Environmental Protection of International River Basins
EU	European Union
EU WFD	European Union Water Framework Directive
FAO	Food and Agricultural Organization of the United Nations
FSU	Former Soviet Union
GNERC	Georgian National Energy and Water Supply Regulatory Commission
HPP	Hydro Power Plants
ICWE	International Conference on Water and the Environment
IFI	International Financial Institution
IHS	Integrated Household Survey
IMF	International Monetary Fund
IRBM	Integrated River Basin Management
IRBMP	Integrated River Basin Management Plan
ISET-PI	ISET Policy Institute
LG	Local Government
MAC	Maximum Allowed Concentration

USAID | GOVERNING FOR GROWTH (G4G) IN GEORGIA REGULATORY IMPACT ASSESSMENT OF THE draft law on water management

MDF	Municipal Development Fund
MENRP	Ministry of Environment and Natural Resource Protection
МоА	Ministry of Agriculture
MoESD	Ministry of Economy and Sustainable Development
МоЕ	Ministry of Energy
MoF	Ministry of Finance
MoLHSA	The Ministry of Labor, Health and Social Affairs
MRDI	Ministry of Regional Development and Infrastructure
NALAG	National Association of Local Authorities of Georgia
NBG	National Bank of Georgia
NCDC	National Centre for Disease Control and Public Health
NEA	National Environmental Agency
NFA	National Food Agency
NPV	Net Present Value
OECD	Organization for Economic Cooperation and Development
RBO	River Basin Organization
RBC	River Basin Council
RIA	Regulatory Impact Assessment
TAIEX	Technical Assistance and Information Exchange instrument of the European Commission
TEV	Total Economic Value
UN	United Nations
UNECE	United Nations Economic Commission for Europe
USAID	United States Agency for International Development
UWSCG	United Water Supply Company of Georgia
WTP	Willingness To Pay
WFD	Water Framework Directive
WMD	Water Management Division

WWTP

CONTENTS

I.	EXECUTIVE SUMMARY	7
II.	PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES	10
III.	PROBLEM DEFINITION	15
IV.	OBJECTIVES	32
V.	POLICY OPTIONS	
VI.	ANALYSIS OF IMPACTS	44
VII.	COMPARING THE OPTIONS	56
VIII.	. MONITORING AND EVALUATION PLAN	58
REF	FERENCES	60
APF	PENDICES	62

I. EXECUTIVE SUMMARY

Georgia has a number of laws and regulations governing water resources, dating back to the late nineties and partially amended after 2003. Changes, however, have not always followed a clear and coherent strategy. As a result, in the words of the United Nations Economic Commission for Europe (UNECE), the current legislation is an "unworkable and fragmented system". The Government of Georgia (GoG) has started changing the Georgian water management legislation to meet the obligations deriving from the Association Agreement (AA) signed with European Union (EU) in June 2014. The implementation of the principles of the EU Water Framework Directive (EU WFD), is seen as a possible solution for the pressing challenges characterizing Georgia's water management sector, the main ones being water pollution and the inefficient use of water resources.

The reform is going to affect a large number of parties, that – for simplicity – can be grouped into two main groups, private sector (including civil society) and government. During our Regulatory Impact Assessment (RIA) exercise, we have identified and approached a large number of stakeholders from both groups (Table 1.1), whose opinions were carefully taken into account during development of the report. A summary of the procedural issues and of the positions of different stakeholders is in section II of the report, while the extended version is in Appendix 1.

INFLUENCE / INTEREST	LOW INFLUENCE	HIGH INFLUENCE
Low Interest	National Association of Local Governments (NALAG) Local Municipalities	Ministry of Economy and Sustainable Development (MoESD) Ministry of Finance (MoF) Local Municipalities The Ministry of Labor, Health and Social Affairs (MoLHSA) The Parliament
High Interest	Industrial Water Users Hydro Power Developers Thermal Power Plants Georgian Water and Power (GWP) Local Water Suppliers Environmental Protection of International River Basins Project Non-Governmental Organizations (NGOS)	Department of Environmental Supervision (DES) Georgian National Energy and Water Supply Regulatory Commission (GNERC) Ministry of Environment and Natural Resource Protection (MENRP) Ministry of Agriculture (MoA) Ministry of Agriculture (MoA) Ministry of Regional Development and Infrastructure (MRDI) National Environmental Agency (NEA) United Water Supply Company of Georgia (UWSCG) - State owned Company Ltd. Georgian Amelioration (GA)- State owned Company National Food Agency (NFA) Ministry of Energy (MoE)

Table1.1: Influence-Interest Matrix

In its current state, the **Georgian Water Management System** is inadequate to *ensure the sustainable and efficient management of water resources by society*. The problematic issues that have been identified as most relevant in the Georgian context have their roots in:

- Distorted economic incentives;
- Existence of strategic, legal and institutional gaps;
- Lack of adequate financial resources for the proper management of the water resources.

The importance of having a proper Water Management System in place is not yet felt as a burning issue, thanks to the abundance of water resources and the limited level of economic development of the country. However, the existing trends (increasing water consumption – in presence of substantial water losses - accompanied by the reduction in water bodies' quality), suggest that the issues of water quality and water availability are likely to emerge in the near future as crucial ones for the sustainable development of the country, putting pressure on firms and households alike.

Due to the nature of water, discussed in section III, which makes it impossible to rely exclusively on markets to ensure its efficient and socially acceptable management, government intervention is crucial. The main task of the government is to put in place a coherent framework ensuring a transparent and fair access to water resources to all economic agents, proper economic incentives, and reduced uncertainty, while ensuring a proper management of the existing resources.

The general objectives of the government's intervention that emerged from our analysis are:

- 1. Ensure the convergence of all water bodies toward a good quality status;
- 2. Ensure the continued availability of drinking water and access to sanitation to the population¹;
- 3. Ensure the access to water to all potential users;
- 4. Ensure the efficient allocation of water resources across alternative uses;
- 5. Ensure compliance with the EU WFD.

A number of specific and operational objectives could be associated with the general objectives listed above. In our analysis, due to the time and resources constraints, we have been focusing on the economic and social implications (in terms of the above mentioned general objectives) of specific (high-interest) aspects of the reform:

- A. The introduction of a Basin Management System;
- B. The introduction of new economic instruments for water management;
- C. The changes in the permit system;
- D. The changes in monitoring practices and procedures.

This Regulatory Impact Assessment (RIA) compares the three following policy options:

- The do nothing or no policy change option;
- Full implementation of the proposed regulations in presence of an effective data exchange service and donor support for the realization of the remaining two River Basin Water Management Plans (RBWMP)²;

¹ This objective is consistent with the pursuit of the 6th Sustainable Development Goal: "Clean Water and Sanitation". For the purpose of this RIA we will be focusing on the incremental investments associated with the adoption of the EU WFD which might have significant economic impacts, particularly associated with Wastewater Treatment.

² Currently one RBWMP (for the Chorokhi-Adjaristskali basin) has been completed (will need to be updated before implementation) and two more are under way (for the Alazani – Iori and Khrami-Debeda basins). These two are entirely financed by donors. No donor funding has so far been promised for the funding of the RBWMP for the Mtkvari and Enguri-Rioni Basins,

• Full implementation of the proposed regulations in absence of an effective data exchange service and donor support for the realization of the remaining two RBWMPs.

The results of the Multi-Criteria Analysis (of which Cost-Benefit Analysis is a crucial component) that has been performed are summarized in Table 1.2, below:

EVALUATION CRITERIA	OPTION 0	OPTION 1	OPTION 2
Incremental Benefits – Incremental costs (NPV)	-	114.7	110.6
Effectiveness 1 – Good Quality Status	-	+++	+++
Effectiveness 2 – Access to Drinkable Water and Sanitation	+	+	+
Effectiveness 3 – Access to Water to All Potential Users	0	++	++
Effectiveness 4 – Efficient Allocation Across Alternative Uses	-	+++	+++
Effectiveness 5 – Ensure Compliance With the EU WFD		++	++
Feasibility / Ease to comply	0	+++	++
Minimization of Potential Risks		+++	++
Maximization of Potential Benefits		+++	++

Figure 1.2. Comparison of options using multi-criteria analysis

As shown in table 1.2, Option 1 dominates clearly all other options. Therefore, we recommend it both with respect to the status quo and to Option 2.

II. PROCEDURAL ISSUES AND CONSULTATION OF INTERESTED PARTIES

A. ORGANISATION AND TIMING

The RIA on Law on Water Resource Management was implemented during the period between 13th of January, 2017 and 30th of June, 2017. A detailed discussion of the steps performed and of the timing of this RIA can be found in Appendix 1.

Throughout the work, the decision-making approach adopted by the team was collegial, coordinated by the team leader.

B. CONSULTATION AND EXPERTISE

Consultations with various stakeholders and data collection started on the 23rd of February and is still ongoing. First of all, the main stakeholders were identified and categorized in the influence-interest matrix format. The matrix has been updated whenever new stakeholders have been identified and/or more precise information about their interest and/or influence has been collected.

INFLUENCE / INTEREST	LOW INFLUENCE	HIGH INFLUENCE
Low Interest	NALAG Local Municipalities	MoESD MoF Local Municipalities MoLHSA The Parliament
High Interest	Private Citizens Industrial Water Users Hydro Power Developers Thermal Power Plants GWP Local Water Suppliers Environmental Protection of International River Basins Project NGOs	DES GNERC MENRP MoA MRDI NEA UWSCG - State owned Company GA - State owned Company NFA Ministry of Energy

Table2.2: Influence-Interest Matrix

In order to develop a comprehensive overview about the current situation of water resource management in Georgia, national policy, existing problems and possible impacts of proposed regulations, the RIA team opted for a multiplicity of methods (Table 2.2), including but not limited to: desk research, literature review, assessments by experts, request of official data, telephone interviews, in-depth interviews of the identified stakeholders, informal and formal.

Consultations and information gathering were split into two main phases. The goal of the first phase of the consultation was to identify major stakeholders and all institutional links composing the water management system; define problems, their nature and causes, identify major objectives of new legislation. As for the second, complementary phase of consultations, the team received feedback on the draft law by all identified stakeholders in order to understand their major concerns.

As a result of the two consecutive phases of consultations and information gathering, the following data and information were collected.

Table 2.2: Data and information	o collected d	uring two phases
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DATA AND INFORMATION	METHODS USED / SOURCE
Choroxi-Adjaristskali river basin action plan, budget	Desk research
Economic activity by sectors within the basins (production, emolument, turnover and etc.)	National Statistics Office of Georgia (GeoStat)
Information about water management cost	Different ministries and government agencies, State Budget MoF
Household's monthly expenditures on water; Basic water supply source of households	Integrated Household Survey (IHS) (2004- 2015). GeoStat
Pesticides types and quantity used by agricultural holdings	Sample Survey of Agricultural Holdings, GeoStat (2015)
Statistics on water use by sectors and Black/Caspian Sea Basins	MENRP
Data on polluting substances in surface waters by Black/Caspian Sea Basins	Monthly Bulletin, NEA

STAKEHOLDER / STAKEHOLDER GROUP	METHOD OF CONSULTATION	SUMMARY OF RESPONSES ³
MENRP and its subsidiarie s	Interviews: • 24 th of February NEA Office; • 4 th of May Office of DES. • 8 th & 9 th of June Office of NEA; • 9 th of June DES.	 Several Meetings have been held with NEA. On the first meeting, RIA team met with heads of all departments and the director of NEA. The meeting addressed general issues related to the water management in the country and the agency's involvement in the preparation of the draft law. Major challenges addressed during the meeting were: Lack of data on wastewater discharge points and volumes of discharge; Lack of wastewater treatment plants being major source of surface water contamination; High risk of contamination of underground waters whenever non-commercial (household) use of underground is not registered and monitored; Challenges in the classification and characterization of water bodies; Need of additional resources in case of reform to upgrade laboratory infrastructure and hire additional staff. Other Meetings with NEA were held with heads of environmental pollution monitoring department, hydro meteorological department and geology department. Their specific infrastructure and staffing needs in case of reform. The RIA team has also met twice with the Chief State Inspector of DES. The main topics of the first meeting were the involvement of the department in the preparation. From the point of view of the responsibilities of DES, the chief inspector does not see any changes. However, the introduction of a new premitting system for surface water abstraction and discharge will substantially increase the amount of additional resources), on infrastructure needs, staffing needs, financing needs, possible ways to create additional sources of funding for the department. The discussed on the second meeting were discussed and approximated. The RIA team has approximated. The RIA team also discussed possible effect on businesses, on the department (in terms of required additional resources), on infrastructure needs, staffing needs, financing needs, possible ways to create additional sources of funding for the department.
State	Interviews:	One of the first meetings the RIA team held was with GNERC . The

Remember that RIA does not have to contain an outline of all comments received nor all answers to each issue or concern raised

Regulators and Sectoral Ministries	 23rdof February GNERC Office 9th of March National Food Agency 16th of March Office of the MRDI 11th of April Office of the Ministry of Energy 	representatives of Electricity and Water Departments attended the meeting. The discussion with electricity department has shown that one of the important critical interest points for the department was the regulation of river flows under the proposed reform. Furthermore, the electricity department drew the attention of the RIA team on the fact that water use charges are still paid by hydro and thermal power plants. The discussion with the water department was mainly related to the challenges characterizing the water sector in terms of water supply and wastewater treatment. The water department underlined that the lack of wastewater treatment plants is one of the bottlenecks. It also underlined that one of the key issues for the sector is the presence of information asymmetry and lack of coordination between different regulators of water resources, such as NFA and DES. GNERC was not involved in preparation of the draft law.
		A joint meeting was held with representatives of NFA and MoA. The stakeholders were involved in the preparation of the draft law. They have reviewed the final draft and primarily had comments related to definition of their responsibilities and to a few provisions of the law. We also discussed the process of drinking water quality checks. The reform will not require an increase in drinking water monitoring.
		The RIA team met with the MRDI and UWSCG . These stakeholders have voiced their concerns regarding the draft law with an official letter (Appendix 2). The topics discussed during the meeting were related to provisions requiring water suppliers to build wastewater treatment plants by a certain date and the responsibilities of local governments related to the proposed reform.
		The topic of discussion with the Ministry of Energy was primarily related to clarity some provisions of the law, their ambiguity and possible space for alternative interpretations.
Water Utilities	Interview: • 6 th of April Office of GWP	The meeting with GWP - one of the largest water suppliers in the country - underlined a few important topics related to the implementation of the law such as the definition and the regulation of sanitary zones and protected areas around water bodies. GWP representatives stated that this is one of the most important challenges they are facing. They also underlined another problematic issue: the discharge of industrial wastewater in the sewage networks, causing frequent breakdowns. Furthermore, the stakeholder said that not having technical rules of wastewater discharge in water bodies is another problematic issue for them as they use the regulation of Soviet Union that is out of date.
	• 6 th of May ISET Policy Institute with Advisor to the director of GA.	The topics of discussion with the advisor to the director of GA have covered wide range of issues. The company was not involved in the consultations process, although their managing Ministry was participating. The advisor does not see a problem in introduction of the new permits. Furthermore, the company has started working on designing the new services for farmers related to the wastewater discharge. As it was discussed during the meeting, the new regulation can be helpful in terms of ensuring that water quality is supplied to the farmers. Irrigation with contaminated water is frequently problematic for the proper use of fertilizers on the crops. Furthermore, issues related to the supply of water to the Hydro Power Plants (HPP) connected to the irrigation system has also been discussed. The last topic of discussion was the possible need for building WWTP for cleaning water discharged from agricultural sector.
Private Sector	Interviews:	The meeting with representatives of Rich Metals Group (RMG) was informative regarding their current practice of water abstraction and

Organizatio ns	 15th of May Office of the Rich Metals Group 	discharge. The representatives of RMG have shared their questions regarding the different provisions of the draft law. They think that with introduction of the new law it will be important to have highly qualified inspectors for the proper supervision of the large industrial water users. The representatives of the company do not think that the new law will impose any significant financial burden on them.
	Interviews:	The Environmental Protection of International River Basins Project has developed the Chorokhi-Adjaristsqali pilot river basin management plan. The RIA team met its project coordinator Mr. Zurab Jincharadze . The main topic of the meeting was to discuss the process of preparation of RBMPs. Mr. Jincharadze briefed the RIA team about the potential costs, data gathering and other challenges during preparation of RBMPs.
NGOs and Internation al Donor Projects	 24thof February ISET-PI Office meeting with project coordinator of the Environmental Protection of International River Basins Project. 27th of February NALAG Office 19th of April Green Movement of Georgia 	In order to better understand the role of local governments in the reform implementation RIA team met with NALAG . The meeting aimed better understanding of the capacity of local governments to perform the duties under the draft law. The representatives of NALAG think that capacity to perform the duties can be built, however there are number of legislative and practical reasons for not managing to properly decentralize the system. Especially in terms of drinking water supply in rural areas. Some of the main concerns regarding the reform was that it is not an organic law thus provisions in other laws can overrule the regulation presented in the draft. Another concern is funding of the local governments to comply with the responsibilities. On meeting with the Green Movement of Georgia , some of the concerns raised were: (i) licensing of abstraction from underground waters has to be put under the regulation of the same law on water resource management; (ii) River Basin Organizations and councils have to be independent and decentralized authorities; (iii) Supervision, monitoring and prevention of pollution has to be done by river basin organizations; (iv) The principals set out in the economic instruments section of the law are very general and create space for interpretation. On the positive side, the chairwomen of the law will be substantially positive due to infrastructure development.

The full summary of the consultations process is provided in the appendix 1 of the report. The consultation process revealed that, while the current draft legislation sets the principles that will be guiding government actions and the relevant regulation, most of the complementary legislation is still missing. Without a clear and detailed picture of the legislative framework and without all the required information about the number, type and characteristics of regulatory and non-regulatory instruments that will be utilized, the quantification of impacts is bound to be partial. Non-quantifiable impacts will be discussed in the qualitative analysis.

III. PROBLEM DEFINITION

A. POLICY CONTEXT

Georgia has a number of laws and regulations governing water resources dating back to the late nineties. The main law currently defining the main objectives and principles of water policy, including protection and rational use, priority to the supply of drinking water, and the prevention and control of harmful impacts is the Water Law of 1997. Other – related – laws regulate specifically Groundwater (1996 Law on Mineral Resources) and Coastal Waters (Marine Code,1997 and Law on Marine Space, 1998). Several provisions contained in these laws have been modified during the years. In particular, several regulatory mechanisms – deemed an obstacle to the economic development of the country – were modified and/or eliminated after 2003⁴. While this step enabled the country to address problems of corruption, excessive bureaucracy and other constraints that were limiting economic development during the transition period, the gaps left in the legislation are now perceived as increasingly problematic, from a long term sustainable development⁵ perspective.

The UNECE Environmental Performance Review of 2016 characterizes the current legislation as an "unworkable and fragmented system, because of [the] questionable legal validity of most of its provisions". The existence of legal gaps between different legislative acts causes ambiguity and inefficiency in management of major aspects characterizing the water sector, such as surface and underground water use and pollution emission in water bodies.

The GoG has started to change the Georgian water management legislation to meet the obligations deriving from the AA signed with EU in June 2014. The implementation of principles of EU WFD, is seen as a part of solution for pressing challenges of Georgia's water management sector, the main ones being water pollution and the inefficient use of water resources. Thus, the realization and implementation of a comprehensive, flexible and incentive-based water management regulation is of prime importance. Integrated river basin management principles – at the core of EU WFD - are perceived as a viable solution to Georgia's challenges in water resource management.

The main purposes of the water framework directive are:

(i) Prevent deterioration and sustain a good status of the ecosystems of different water bodies;

(ii) Promote sustainability in water usage;

(iii) Progressive reduction of discharge, emission and losses of priority substances in surface and groundwater bodies;

(iv) Mitigate floods and droughts, thus contributing to use of water resources in sustainable manner.

B. PROBLEM DEFINITION

Problems in Georgia's water resource management are complex and multidisciplinary in nature, covering a broad range of sectors, stakeholders and industries.

Some of the most problematic issues to be dealt with are:

- Lack of access (or insufficient access) to good quality water;
- Unsustainable use of surface and groundwater resources;
- Water pollution caused by untreated discharge of municipal and industrial wastewater.

Currently, the extent and the consequences of such issues are mitigated by the relative abundance of water resources and by a relatively low level of economic activity. However, it is clear that – as the country economy develops and water demand increases – such issues will become more difficult (and important) to tackle, in order to ensure the sustainable development of the country.

THE NATURE OF WATER

⁴ For example, charges for environmental pollution, including water pollution charges, together with the licensing system for surface water abstraction and for wastewater discharges were abolished. In addition, the number of activities requiring special environmental permits to be issued by the environmental authorities was reduced.

⁵ Sustainable development has many dimensions, the main ones being: economic, social and environmental.

The water management challenges in Georgia have their roots, first of all, in the special nature of water. This special nature is widely recognized by the existing literature on the topic. Therefore, before delving deeper into the Georgian-specific challenges, we are going to start with a brief overview of the social, physical and economic features that make water special.

Social and Physical Nature of Water

Water is essential to life. Because of this, in all societies across the globe, water is perceived and treated quite differently from all other commodities. The international community recognizes officially the **access to water as a basic human right** since 1992, when the participants to the International Conference on Water and the Environment (ICWE) asserted that, even though water has an economic value in all its competing uses and should be recognized as an economic good (Principle No. 4) "...it is vital to recognize first the **basic right of all human beings to have access to clean water** and sanitation **at an affordable price**"⁶.

The physical nature of water contributes to further complicate management efforts. Water value per unit of weight tends to be relatively low (placing water among the commodities that are termed "**bulky**") and the costs of transporting and storing water are generally high relative to its economic value at the point of use. To make things more complicated, water is also difficult to identify and measure because it is "**mobile**": it flows, evaporates, seeps and transpires. This means that exclusive property rights, which are the basis of a market economy, are hard to establish and enforce. Finally, water sources (especially groundwater contained in acquifers) can be sometimes characterized by relatively slow recovery times. This type of resources requires a particularly careful management as they are at risk of depletion if the rate of extraction exceeds their regeneration rate for a long enough period of time. Costs of unsustainable abstraction may be significant and last for long periods. In the case of aquifers overdrafting, effects may go from an increase in pumping costs, to the intrusion of poorer-quality water into the deposit, to salt water intrusion, subsidence of overlying land (with damages to buildings, roads, railroads, etc.) and even the interruption of flows in neighboring wetlands and streams and the drying up of wells. Unfortunately, as we will see below, the economic attributes of water use also pose particular challenges in this respect.

Economic Attributes of Water Use

Water provides four main types of important economic benefits (Food and Agricultural Organization of the United Nations (FAO), 1993):

- Commodity benefits (water used for drinking, cooking, sanitation, and in productive activities);
- Waste assimilation benefits (water bodies have the capacity to process, dilute and carry away a finite quantity of – wastes);
- Aesthetic and recreational benefits;
- Fish and wildlife habitats.

While the commodity benefits provided by water share – with the above-mentioned caveats about overdrafting of acquifers – the characteristics of private goods (rivalry and excludability in consumption)⁷ the remaining three categories of benefits are closer to being public goods (goods whose use is potentially non-rival and hardly excludable – at reasonable costs, at least). According to economic theory, while it is legitimate to expect markets to lead to an efficient outcome in presence of private goods, this becomes more problematic in presence of public goods, of externalities or of natural monopolies.

In presence of public goods, individuals, knowing that cannot be excluded from accessing the resource, have fewer incentives to contribute to their management costs. This leads to a phenomenon called as free riding, characterized by the presence of individuals who benefit from the public good without contributing. Free riding

⁶ This basic principle has been recently enshrined in the 6th Sustainable Goal of agenda 2030:

http://www.un.org/sustainabledevelopment/sustainable-development-goals/

⁷1) the use by one agent precludes or prevents its use by others; 2) it is possible to exclude from accessing the good agents who are unwilling to contribute for using it.

problems are a well-known cause for under provision of public goods. If pervasive enough, free riding can even lead to the loss of the public good.

In presence of externalities, instead, individuals choose how much to consume and how to use the resource without taking adequately into account the costs (or the benefits) to the rest of society resulting from their actions. This is what happens, for example, whenever individuals dump their untreated wastewater (or other types of waste) in water bodies, worsening the overall quality of the water and contributing to reach the waste assimilation limit of the water body, potentially threatening its assimilation capacity. Something similar can happen in the case of aquifers, if more parties have the right of extraction and the existing institutions do not support the full internalization of the costs of overdrafting. In this case, individual attempts to maximize private gains might lead to permanent damages to the acquifer (made worse by the anticipation of such effect and by the attempt of "outrunning" the "competitors") with negative consequences for all parties involved and for the society as a whole. This is a well-known effect called "tragedy of the commons", characterizing shared-resources systems where individuals act independently according to their own self-interest.

Natural Monopolies are another common example of potential market failure in the water sector. FAO (1993) mentions urban water supply systems, hydropower plants and canal irrigation projects as examples of projects subject to this type of market failure. A natural monopoly can be described as a situation in which a firm can easily dominate the entire market thanks to the fact that it faces decreasing costs throughout its range of production and, therefore, can always underprice new entrants. Unregulated monopolies tend to restrain production and charge excessive prices. In addition, they have little incentive to innovate.

Finally, water (or lack of it) can also cause relevant economic costs, associated with catastrophic events such as floods (or draughts). The extent of these economic costs can in some cases – for example in the case of excessive (or insufficient) precipitations, potentially leading to floods (or draughts) – be reduced by proper water management. However, as most of the additional services provided also share some public good characteristics, collecting the necessary resources for their provision might be challenging.

THE GEORGIAN CHALLENGE: ECONOMIC PERSPECTIVE

Guaranteeing Access to clean water and the sustainable use of water resources

At the aggregate level, Georgian water resources are sufficient to satisfy current water demand. However, currently, a relatively large number of Georgian citizens do not have full access to clean water. The reasons for this state of things are multiple, but among the main ones one can cite the lack of well-functioning infrastructures to collect and transfer water resources where needed. Most of the country's water systems have been constructed in 1950s. Since then, and especially during the 1990s, the lack of regular maintenance has led to their progressive deterioration. Around 19% of total water abstracted from water bodies is lost during transportation to the final user. The distribution of drinking water is characterized by the highest inefficiencies, with losses amounting to 42% of the water initially introduced in the system (MENRP 2015). High transportation losses imply that the quantity of water required to satisfy a given (final) demand is much higher than it would have been otherwise. This can lead to unnecessary ecological pressure on water bodies and to shortages even in presence of sufficient water resources. The situation is worsened by additional wastes occurring at the point of delivery. Households typically pay flat tariffs for water consumption, and even those whose consumption is metered are currently paying relatively low tariffs, well below cost-recovery levels. This is true also for farmers using water for irrigation and, possibly, for some industries (even though the cost of water for non-residential purposes, is substantially higher). This does not encourage the efficient use of water and further increase both water demand and water transportation and distribution losses.

The situation is complicated by the fact that, as documented in recent reports (EPIRB/OECD, 2016) "certain regions and water bodies are exposed to the risk of over-abstraction due to unsustainable management practices". If private individuals and companies abstract excessive amounts of surface water and groundwater, they not only reduce the current availability of water for other purposes but – as mentioned in the discussion about shared resources – may even lead to a reduction in the long-term availability of clean water for all. In this case, the main problem is associated with the absence of adequate incentives to ensure water is allocated and utilized efficiently. Currently, no payments are collected for the abstraction of surface water, and even the tariffs for the abstraction of groundwater are judged too low.

Ensuring that all individuals residing in Georgia have access to clean water and that water use follows a sustainable path will require significant investments to renovate, replace and expand the existing infrastructure

and the re-alignment of individual incentives with those of the society. While some support can be expected from international donors, the realization and maintenance of the water infrastructure will definitely require the generation of internal resources. The increase of the tariffs for water use to guarantee cost recovery, accompanied by metering, together with the increase of tariffs for water abstraction (and their more effective enforcement) could help both generating additional resources and limiting water demand and water losses, reducing the risk of water shortages.

Water pollution

Pollution from discharge of untreated municipal and industrial wastewater is a pressing issue, both for inland and trans-boundary water bodies.

The discharge of untreated municipal wastewater from municipal centers is a major issue in Georgia. While roughly 70% of urban population is connected to sewage networks, only 26% of the wastewater is currently treated (UNECE 2016). While around the country 41 urban centers have wastewater treatment plant (WWTP), only 3 of them are operational. Among working WWTPs the largest has only mechanical pre-treatment, while the rest provide biological treatment as well. It is estimated that urban wastewater discharge is responsible for roughly 60% of polluting organic load in water bodies in Georgia (UNECE 2016). The treatment system is in bad need of expansion but this requires additional investments, like many other parts of the water management system. On the other hand, neither the tariffs for the treatment of wastewaters paid by users nor the public budget can – currently - provide the necessary resources.

Currently, the contribution of economic activities to water pollution is still somewhat limited, compared to what it was during Soviet times (among the most notable – current - causes of water pollution from economic activities are associated with mining: manganese (in Chiatura), copper, gold (in Bolnisi) and coal (in Tkibuli)). However, it is clear that with growing economic activity and industrialization in the country pressure from industrial wastewater discharge will continue to increase and require more stringent regulation of treatment. Agriculture is another activity that is contributing (and is likely to increasingly contribute) to water pollution. Problems related to agricultural use of land such erosion, runoff of chemicals and salinization (not only soils but also water) are already affecting the water quality. To achieve higher yields (higher than today), it is expected (and somehow hoped) that use of irrigation and use of fertilizers will increase in the near future. Additional land might also be cultivated and will potentially contribute to erosion. The unchecked expansion of these trends is going to increase the pressure on natural resources and – in particular – on water quality.

There are very limited mechanisms in place to make sure private incentives are aligned with those of the society. The current legislation does not include pollution taxes (or fees and charges similar to ones applied to use of mineral resources). Polluters can be fined for non-compliance with regulations concerning water resources, but fines are typically too low to constitute an appropriate disincentive. The disincentive effect could be strengthened somewhat by the existence of a liability payment system in the form of environmental damage compensation. However, the way in which the environmental damages are currently estimated and –more importantly – the environmental damage compensations are set by courts, do not currently ensure that the amounts reflect the true cost of the damage to the society and – therefore – limit the potentially "efficiency enhancing effect" of this tool.

Also in this case, probably, a combination of increased tariffs (for the user of water treatment services generating municipal wastewater) and the introduction of stronger (and efficiency enhancing) penalties for pollution, might help both generating greater revenues to be reinvested in the much-needed investment and encourage more environmentally friendly production practices.

THE GEORGIAN CHALLENGE: LEGAL AND INSTITUTIONAL PERSPECTIVE⁸

Existing Georgian legislation on water resources is not in line with modern approaches and adequate to existing challenges. It is worth to re-emphasize that the current Law on Water was adopted in 1997, with little attention paid to some of the best practices in water management (including the use of economic instruments to align private and general interests) and since then, no major amendments have been implemented in it. On

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⁸ This subsection is based on two more extensive technical reports about existing legal and institutional gaps. See Appendices 3 and 4.

the other hand, the EU water framework directive, while adopted only three years later - in 2000 – has been designed on the basis of the internationally recognized best practices.

Therefore, the existing water legislation could be called as "outdated", because it does not reflect modern necessities.

It is possible to identify several gaps in the existing legislation, which needs urgent updating in order to support the reduction of water pollution and, more generally, of the negative impacts associated with different human activities on water bodies. Closing these gaps can also be expected to support improvements in water quality, increased efficiency in water allocation among alternative uses and increased access to drinking water.

These gaps may be separated in several groups, namely:

- 1. Institutional/Governance Gaps⁹ water cuts across administrative boundaries and this raises the question of the relevant scale at which water resources and services should be managed. Currently, the allocation of responsibilities between central and local governments is unclear. There are different administrative bodies responsible for various aspects or water resource management, but their roles are not clearly defined by the existing regulatory framework and as a result, their actions are not coordinated and result in a less effective management of water resources. Finally, the structure of governance at the local level and at the national level does not yet include, next to administrative (public bodies) representatives of academia and of the public.
- Strategic Gap there is currently no clear unified strategy for water resources management. Therefore, the existing legislation does not allow beneficiaries to build clear expectations about how the main principles regulating water resources allocation in the long term. This hampers long-term planning efforts of economic agents.
- 3. Legislation Gap there is a gap in the regulation of water resources management. Legislation on water basins and water status is lacking. Nor does not the current legislation regulate how the quality of water should be improved, or how the resources should be allocated properly and rationally in practice. This, together with the existing Strategic Gap adds uncertainty to the activity of economic agents.
- 4. Information Gap / Gap in Measurements Existing legislation does not set specific requirements for measurements of water quantity and water quality. The number of water bodies monitored during the year is limited, as well as the number of monitoring exercises; the quantity of water used is also not measured accurately. This makes it hard to set baselines, as well as qualitative and quantitative targets and goals relative to different water bodies. This also explains why data that are necessary to assess accurately the current use and state of water resources at the river basin level, are still largely missing. Limited data availability makes it impossible to estimate precisely the expected impact of any reform attempt and makes policy-making much harder.
- 5. Capacity and Knowledge Gap the capacity of local and central governments to successfully handle the responsibilities associated with the implementation of a comprehensive water management strategy (even in case it is defined) is heterogeneous and characterized (especially at the local level) by a shortage of well trained and informed professionals. This gap, if not filled, can prevent the success of any attempt to implement a comprehensive water management strategy.
- 6. **Funding Gap** increasing access to drinking water and sanitation and meeting more stringent environmental regulations requires financial resources. The financial resources currently assigned to the institutions in charge of water management are still insufficient to allow them to perform their duty effectively. Additional funding could either come from the central budget or from the revenues generated by the introduction of new economic instruments associated with water consumption.
- 7. Permitting Gap abstraction permits are currently required only for abstraction of underground water; no permit is required for abstraction of surface water. Also, no permit is required for the discharge of waste water, unless the capacity of waste-water treatment plant requires to conduct Environmental Impact Assessment and obtain Environmental Impact Permit¹⁰. This translates in a gap in regulating fees for water use, with current fees not being enforced, with the exclusion of

⁹ For a picture of the Old (and New) Institutional Setup of Water Sector, see Appendix 3.

¹⁰ Activities subject to environmental impact permits are all industrial and mining activities having impact on environment including: hydropower and thermal power plants with installed capacity above 2MW and 10 MW correspondingly, the reservoirs above 10,000 cubic meters, wastewater treatment plants with capacity above 1,000 cubic meters and building of sewage networks. The Law of Georgia on Environmental Impact Permit, December 14, 2007, # 5602 – rs

underground water abstraction tariffs. The full reactivation of the permitting system is a crucial precondition to the successful introduction of any reform of the water management system.

8. Lack of Transboundary Agreements – at this stage Georgia does not have transboundary river basin agreements with its neighbors. Transboundary agreement with the republic of Azerbaijan is being negotiated in the scope of OSECE since 2010. No transboundary agreement has been prepared or negotiated with upstream country Turkey, or other downstream countries: Armenia and Russia. Georgia, Turkey, Armenia and Russia are not a party to Convention on the Protection and Use of Transboundary Water Courses and International Lakes.

To summarize, the existing legislation on water resources is quite far from modern standards and requires major changes to start filling gaps in almost all dimensions.

SUMMARY

A fairly broad definition of the goals of a proper **Water Management System** could be to ensure the sustainable and efficient management of water resources by society.

More specifically a good Water Management System should:

- Ensure the basic right of all human beings to have access to clean water and sanitation at an affordable price;
- Ensure the efficient allocation of water among the possible users;
- Promote the sustainability in water usage;
- Prevent the deterioration and sustain the status of ecosystems of different water bodies;
- Mitigate water-related catastrophic events (such as floods and droughts).

A successful Water Management System however, should also generate/collect sufficient resources ensuring its own capacity to pursuit its goals in a sustainable way.

As we have seen, currently, the Georgian Water Management System is clearly inadequate to achieve these goals and the challenges it will have to face are on the rise.

The problematic issues that have been identified as most relevant in the Georgian context have their roots in:

- Distorted economic incentives;
- Lack of adequate financial resources for the proper management of the water resources.

We have suggested that introducing new economic instruments and/or re-designing the existing ones can help addressing simultaneously the two issues. This, however requires a well-functioning institutional setting capable of handling effectively the complete set of tools at the government's disposal (regulation economic incentives, etc.).

This takes us to another problematic issue, the institutional and legal gaps currently characterizing the water management system that have been highlighted in the previous subsection (including the lack of coordination and lack of capacity among relevant actors, and unclear legal responsibilities).

Finally, to this should be added the lack of international cooperation and coordination in the management of trans-boundary river basins, which has to be fully integrated in a properly functioning Water Management System.

C. BACKGROUND TO THE BASELINE SCENARIO

WATER ENDOWMENT AND WATER USE

According to the 2016 EPIRB/OECD report, Georgia is well endowed with water resources - some 3,144 m³ per capita per year - and has no overall water scarcity. By Likhi Range, Georgia can be divided into two river basins. Rivers from west side of Likhi Range belong to the Black Sea basin, while rivers located at its east belong to the Caspian basin. The Black Sea basin is significantly richer in water resources than Caspian basin. It covers about 75% of renewable surface waters, 42.6 billion m³ versus 14.4 billion m³ in the Caspian basin. Georgia is annually generating 820,000 m³ of water per km². The same figure for western Georgia is 1,340 thousand m³ per km², while for eastern Georgia is 370 thousand m³ per km².

According to MENRP data (Table 3.1), water use is currently well below the theoretical water availability. Overall, water extraction has been growing on average by 1.6% a year (from 29.2 to 30.6 billion m³) over a four-year period under consideration¹¹, HPPs "using" more than 90% of the water extracted.

	2012	2013	2014	2015
Water extraction from natural water bodies, total*	29209.5	28632.1	32080.8	30615.9
of which from ground water bodies	367.8	403.2	399.0	498.5
Water use, total*	28570.9	27436.8	30407.8	29831.5
of which for the following needs				
Household	330.2	448.2	434.4	381.5
Industrial	362.5	324.6	1924	354.8
Irrigation, agricultural and other*	27878.2	26664.0	28049.5	29095.2
of which just irrigation (for available years)		155.642	226.047	425.18
Waste water discharge into surface water bodies, total*	27235.1	27144.0	30090.6	29202.4
of which polluted*	475.3	438.2	477.7	93.4
Losses on water transportation	445.1	395.5	486.9	725.9
Cycling and secondary water supply	224.0	309.0	316.0	226.8
* including the water used by Hydro Power Plants (HPPs)				

Source: Geostat: http://geostat.ge/cms/site_images/_files/english/agriculture/Environment_2015.pdf p. 47

While the current picture is quite rosy, there are a few trends that look potentially worrisome. The extraction of water from underground water bodies is on the rise. The average growth rate of water extracted from underground water bodies was more than 10% in the period 2012-2015. Obviously, if this trend continued, it could lead to the exploitation of underground water bodies and/or negatively impact the quality of the underground waters. The low level of groundwater abstraction fees has been identified by the EPIRB/OECD report (2016) as one of the main causes for potentially excessive abstraction. Increasing the groundwater abstraction fees and ensuring consumption is carefully metered might help addressing the issue.

Another aspect worth monitoring is the water demand coming from the agricultural sector, with the quantity of water used for irrigation almost tripling between 2013 and 2015. As the agricultural area reached by irrigation increases, water demand by the agricultural sector is expected to grow. Currently the irrigation fees farmers pay to Georgian Amelioration are insufficient to cover even the cost of delivery and of maintenance of the system (which, in turn, risks having a negative impact on the future quality of the service provided and on water losses). Introducing higher (closer to cost-recovering) irrigation fees would potentially allow both an increase in efficiency of water usage in the agricultural sector and prevent longer term problems associated with the irrigation infrastructure.

Finally, another major source of concern is represented by the increase in losses associated with water transportation that, in 2015, were almost as large as the combined water demand coming from households and from the industrial sector. As the existing infrastructure (built mostly in the 1950's) deteriorates, transportation losses are bound to increase, thereby multiplying the pressures on the existing water resources to satisfy growing water demand. For this reason, the renovation of the existing infrastructure (to be recovered at least in part with an increase in water use tariffs) should be among the top priorities for the water sector management.

Even if, currently, water availability does not appear to be concern, this is not true for the country as a whole. According to the EPIRB/OECD report, shortages do occur in the eastern regions of the country and there is unsustainable abstraction of groundwater and surface water in a number of localities¹². In the next section we will explore the evidence available about access to water in Georgia.

¹¹ After observing the disaggregated data, we concluded that 2014 was clearly an outlier. In that year, there was a spike of more than 1.5 bln cubic meter on reported water use by the fishing industry. Reported use before and after 2014 for the fishing industry was (and after 2014 reverted to) negligible.

¹²EPIRB/OECD (2016): Facilitating the reform of economic instruments for water management in Georgia. Revised Final Report, pg. 21

ACCESS TO DRINKABLE WATER

Access to drinkable water is far from guaranteed in Georgia.

According to data from the IHS data, represented in Figure 3.1, only about 50% of the households reported water supply system installed in the dwelling as main source providing potable and sanitary-hygienic water. The percentage increases to slightly more than 70% including households reporting as source a water system tap in the yard or vicinity. While increased since 2009, these percentages are, however hardly encouraging. Moreover, these aggregated figures hide important differences between urban and rural areas (Figures 3.2 and 3.3).

In urban areas (Figure 3.2), the percentage of households with water supply system installed in the dwelling was already above 80% and kept growing to more than 90% in 2015. In 2015 less than 5% of households in urban areas reported to get their potable and sanitary-hygienic water from wells and/or other sources.

In rural areas (Figure 3.3), instead, the share of households that reported getting their potable and sanitaryhygienic water from wells and/or other sources (in 2015) exceeded 40%. Only 22% of the households in rural areas reported receiving water from the water supply system installed in the dwelling (twice as many compared to 2009).





Source: IHS, Geostat





Source: IHS



Figure 3.3 Shares of basic supply sources providing potable and sanitary-hygienic water (rural areas)

Source: IHS

Even being connected to the water system, however, gives no guarantee of being able to access water when desired. According to data from UWSCG in 2017, citizens of all regions with the exception of Tbilisi region and of Racha-Lechkhumi and Kvemo Svaneti connected to the water supply system, had (sometimes substantially) less than 24 hours water availability per day. In many cases water was available for less than 10 hours and, sometimes, once every two days.

Finally, as mentioned in a recent report by UNECE (2016), even when households receive water from the water supply system, the quality of the water they receive is often non-compliant with the mandatory quality standards. UNECE reports data from the National Centre for Disease Control and Public Health (NCDC) of the MoLHSA according to which a large share of water samples (49% in 2014) contain bacteria, with some recent samples containing also traces of pesticides.

Systems managed by GWP perform significantly better, both in terms of reliability and of quality of water, with no non-compliance cases recorded.

Closing the existing gaps and converging to the desired standards on a sustainable basis is going to be extremely costly. Even in the case of Tbilisi, where now all the population enjoys constant water supply, the full rehabilitation of the distribution network is estimated to cost around US\$ 400 million.

HPPs

HPPs deserve a special mention, due to the relevant - and increasing – role they play in Georgian economy. HPPs are non-consumptive users, as they need water "just" to flow through their turbines in order to generate electricity. However, in most cases, they do have an impact on river flow, as they typically divert and/or inpound water (UNECE, 2016). As shown in Table 3.1, the quantity of water utilized by HPPs is on the rise and the trend is expected to continue. One particularly challenging aspect of the planned expansion of hydropower generation in Georgia (from the environmental point of view) is constituted by the expected negative impacts on the dynamic environmental flows of rivers, in particular on riverine ecosystems and water biodiversity. Currently, the Georgian legislation does not define the methodology for calculating the environmental flow and, while it includes some provisions to minimize the negative environmental impacts of HPPs on fish migration, according to the UNECE report, "there is no record as evidence of any checking, supervision and regulation being done".

ENVIRONMENTAL TRENDS CHARACTERIZING WATER RESOURCES

Availability of and access to good quality water are crucial. So far, we have been discussing the availability of water and access to water in Georgia. In this subsection, we will be discussing issues related with the quality of water resources.

WASTEWATER DISPOSAL

All the water utilized by households has to be – later on – discharged in the environment. The impact on the quality of water resources of wastewater depends crucially on the way in which this water is discharged.

We explored data Geostat data from the IHS to assess the potential impact of water discharged by households.





Source: IHS

At the country level, less than 40% of households report using toilets connected to the sewerage system (Figure 3.4). This percentage is much higher in urban areas (Figure 3.5) than in rural areas (Figure 3.6).



Figure 3.5 Toilet waste disposal (urban areas)

Source: IHS

According to the IHS data, in 2015 almost 90% of households in urban areas utilized toilets connected to the sewerage system (up from about 80% in 2009), with just the remaining 10% in flush latrines directly connected to water bodies or to pit latrines. In rural areas, instead, the picture is reversed, with less than 10% of households using toilets connected to the sewerage system and more than 90% of households using pit latrines not connected to the sewerage system. Clearly, the situation in the countryside is potentially problematic, as pit latrines - especially if not well constructed and periodically cleaned – and flush latrines directly connected to water bodies can lead to dangerous spills and contamination of water bodies and constitute a threat both to health and to the environment. Still, rural sanitation issues are currently (mostly) neglected, because of lack of resources. At present, "no efforts to increase access to hygienic sanitation in rural areas, villages and small towns are under way or planned" (UNECE, 2016).

The condition of the urban areas, however, is not rosy either. Despite the high percentage of households connected to the sewerage system, because of the lack of functioning treatments centers, according to a recent report (UNECE 2016) only 26% of wastewater is treated. According to the same report "the major cause of surface water pollution in rivers and the Black Sea, is untreated urban wastewater"¹³. Around the country 41 urban centers have wastewater treatment plant (WWTP), but only 3 are currently operational. Among working WWTPs the largest one (in Gardabani) has only mechanical pre-treatment, while the others provide biological treatment as well. It is estimated that urban wastewater discharge is responsible for roughly 60% of polluting organic load in water bodies in Georgia (UNECE 2016).

Given the potential increase in water use due to increasing household access to water and to growing economic activity, the need for substantial investments in water supply and sanitation in both rural and urban areas (including in the realization and activation of wastewater treatment facilities) is clear. However, the estimated costs of such expansion are substantial.



Figure 3.6 Toilet waste disposal (rural areas)

Shared flush toilet connected to the sewerage system;

Own flush toilet connected to the sewerage system;

Source: IHS

WATER QUALITY MONITORING

A crucial aspect of a water management system is the capacity to monitor constantly water quality, in order to spot potentially problematic trends as soon as they emerge. This requires the availability of human, physical

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¹³ According to the same source, this form of pollution is responsible for 60 percent of the polluting organic load in water bodies in Georgia.

and financial resources, running a sufficiently large network of monitoring stations and performing regular analyses of the most important quality indicators.

Unfortunately, from the years following the fall of the Soviet Union (when between 140-160 hydrological stations were operational and tenth of thousands tests were performed annually), until 2012, the scale and scope of water quality monitoring shrunk dramatically. The situation, as showed in Figure 3.7 has been improving since 2012.



Figure 3.7 Evolution of water quality monitoring: 2011-2016

Source: National Environmental Agency (NEA) Annual Report 2016

ENVIRONMENTAL INDICATORS

Even though the water monitoring structure is dramatically undersized, the MENRP still collects and releases information about a number of analyses performed by the NEA.

While not dramatic, the state of Georgian waters requires attention. As shown in Figures 3.8, 3.9, 3.10 and 3.11 below, the concentration of ammonium nitrogen and phosphates in both the Black Sea and the Caspian Sea basins often exceeded the allowed concentration in the last three years. Over the period 2015-2016, instead, the concentration of nitrites and nitrates, rarely exceed the allowed concentration. The situation, however, seems to have worsened – relative to nitrates – in the Caspian Sea basin, during the last year. Unfortunately, the information available about additional pollutants (even the particularly dangerous ones such as pesticides and polyaromatics) is not systematically collected. This is regrettable and does not allow monitoring the evolution of the concentrations of these substances (with potentially severe health consequences) in Georgian water.



Figure 3.8 Concentration of Amonium Nitrogen in Black and Caspian Sea Basins: 2014-2016¹⁴

Source: NEA monthly bulletin





Source: NEA monthly bulletin

¹⁴ MAC is an acronym for Maximum Allowed Concentration



Figure 3.10 Concentration of Nitrates in Black and Caspian Sea Basins: 2015-2016

Source: NEA monthly bulletin



Figure 3.11 Concentration of Nitrites in Black and Caspian Sea Basins: 2015-2016

Source: NEA monthly bulletin

YEAR	WATER POLLUTION				WATER ABSTRACTION		
	Facts of administrative offense	Facts of Criminal offense	Imposed fine, GEL	Amount of environmental damage, GEL	Facts of administrative offense	Imposed fine, GEL	
2013	12	-	38,500.0	163,732.9	9	3,000.0	
2014	334	2	143,800.0	34,913,824.7	91	23,450.0	
2015	246	1	293,500.0	139,201.9	33	10,500.0	
2016	134	-	215,100.0	207,799.5	39	19,500.0	
2017	46	-	18,500.0	11,050.5	26	13,000.0	
Total	772	3	709,400.0	35,435,609.6	198	69,450.0	

Table 3.2 Water pollution cases and illegal abstraction (administrative and criminal) - 2013-2017

Source: DES

The potential severity of water pollution is testified by the available data about water pollution and illegal abstraction cases for the period 2013-2017 (Table 3.2). The amount of environmental damage identified and quantified over the 4 and half year period – very likely underestimating the amount of water pollution damages at the national level, as it includes only damages quantified on the basis of identified violations - is more than 35 million GEL.

IRRIGATION

According to official data, the Georgian government has been undertaking substantial efforts in order to increase the area of irrigated land (Table 3.3). While this is a crucial step for stimulating development in rural areas, from the point of view of water management the expansion of irrigated land is increasing pressure on water resources, both because of direct consumption and because of transportation losses¹⁵. Moreover, given the scarcity of capital and the great need for investments in infrastructure, it is important to assess correctly the opportunity cost of investing in irrigation infrastructure resources that could be invested in other segments of the water management system. Data from Table 3.3 show that the expansion of the irrigated land seems to have slowed down, despite a significant increase in rehabilitation expenses. This trend in the effectiveness of investment in rehabilitation of the irrigation infrastructure should be monitored carefully and the opportunity of additional investment carefully assessed.

Table 3.3 Trends in irrigated land, rehabilitation expenses and effectiveness/cost ratio: 2012-2016

	2012	2013	2014	2015	2016
Irrigated land (ha)	45000	64000	88000	100000	104000
Rehabilitation expenses (thousands of GEL)	72943	71470	106945	137475	163710
Effectiveness/Cost Ratio (ha/ thousands GEL)		0.266	0.224	0.087	0.024

Source: Georgian Amelioration data and authors' calculations

SUMMARY

USAID | GOVERNING FOR GROWTH (G4G) IN GEORGIA REGULATORY IMPACT ASSESSMENT OF THE draft law on water management

¹⁵ currently all irrigation channels are opened, which causes a significant fraction of the transported water to evaporate

Most of the problematic trends identified in this section are related to the poor condition of water supply and sanitation infrastructure (including facilities for the treatment of wastewater) which, is frequently subject to breakdown. As we have seen, additional problems come from the scarcity of resources allocated to monitor and evaluate properly the state of water bodies, as well as from the distorted incentives faced by consumers and polluters. Given the scarcity of financial resources in the public budget it is of paramount importance that initiatives are put in place to increase the revenue-raising capacity of the water management system and that the resources collected are invested according to a well-thought plan prioritizing the investments with the highest expected returns for the society. An additional contribution can be expected to come from the adoption of revenue-raising strategies based on efficiency-enhancing economic instruments, designed to provide consumers and polluters the correct incentives to engage in virtuous behaviors.

IV. OBJECTIVES

A. GENERAL OBJECTIVES

The general objectives of the government's intervention are:

- 1. Ensure the convergence of all water bodies toward a good quality status;
- 2. Ensure the continued availability of drinking water and access to sanitation to the population¹⁶;
- 3. Ensure the access to water to all potential users;
- 4. Ensure the efficient allocation of water resources across alternative uses;
- 5. Ensure compliance with the EU WFD.

B. SPECIFIC AND OPERATIONAL OBJECTIVES

A number of specific and operational objectives could be associated with the general objectives listed above. As agreed with representatives of the MENRP, due to the time and resources constraints, our analysis will be focusing on the implications (in terms of the above mentioned general objectives) of specific (high-interest) aspects of the reform:

A. The introduction of a Basin Management System;

- B. The introduction of new economic instruments for water management;
- C. The changes in the permit system;

D. The changes in Monitoring practices and procedures.

We have developed the following list of specific and operational objectives accordingly.

Table 4.1. Summary of objectives

OBJECTIVE	INDICATOR	RESPONSIBILITY	TIMING
	-		

Ensure the convergence of all water bodies toward a good quality status

Expand Water Monitoring	% of water bodies with complete and fully functioning monitoring system in place	MENRP: River Basin Organizations, NEA	X ¹⁷ % of water bodies with complete and fully functioning monitoring system in place by: 2025.
Efficiency enhancing environmental (discharge related) charges/fees in place with transparent methodology and/or pollution market developed in each river basin	% of river basins with properly calculated environmental (pollution related) charges/fees in place and/or pollution market developed in place	MENRP; Water Management Department, River Basin Organizations, MOESD,	X ¹⁸ % of river basins with properly calculated environmental (pollution related) charges/fees in place and/or pollution market developed in place by 2025.
Penalties for offences to environmental legislations (pollution) are commensurate to the environmental damages caused	% of instances in which penalties determined on the basis of standardized	MENRP; DES.	In 100% of instances penalties are determined on the basis of standardized

¹⁶ This objective is consistent with the pursuit of the 6th Sustainable Development Goal: "Clean Water and Sanitation". For the purpose of this RIA we will be focusing on the incremental investments associated with the adoption of the EU WFD which might have significant economic impacts, particularly associated with Wastewater Treatment.

¹⁷ The government should set a quantitative target, monitor progresses and – if necessary – implement corrective measures.

¹⁸ The government should set a quantitative target, monitor progresses and – if necessary – implement corrective measures.

	methodology reflecting environmental damages caused		methodology reflecting environmental damages caused, starting from when the Environmental Liability Law will be adopted and will enter into force (2018-2019).	
Water use tariffs include a charge to finance realization and operation of water treatment infrastructure	% of recovered costs related to the realization and operation of water treatment infrastructure	MENRP; GNERC; Local Governments and Local water suppliers	X ¹⁹ % of costs related to the realization and operation of water treatment infrastructure are recovered through tariffs by 2025.	
Progressive improvement of water quality	% of water bodies with quality status below good (according to last assessment) with improved environmental indicators	MENRP, River Basin Organization. NEA	At least X ²⁰ % of water bodies whose quality status is below good should show improvements in environmental indicators, with water quality ideally improving with the passing of time, until the achievement of good quality status (status should be updated over 6- year planning periods).	
Increased number of water bodies achieving good status	% of water bodies achieving good status	MENRP, River Basin Organization, NEA	X ²¹ % of water bodies should achieve good status by 2025 ²² .	
Ensure the continued availability of drinking water and access to sanitation to the population				
At all points in time the allocation of water resources (outstanding permits) guarantees the continued availability of drinking water to the population	Quantity of "reserved" drinking water available per capita sufficient to meet minimum identified needs ²³ .	Local Governments, Local Water Suppliers, MRDI, River Basin Organizations.	In 100% of river basins the allocation of water resources guarantees sufficient "reserves" of drinkable water	

by:Y²⁴.

¹⁹ The government should set a quantitative target, monitor progresses and – if necessary – implement corrective measures.

²⁰ The government should set a quantitative target, monitor progresses and – if necessary – implement corrective measures.

²¹ The government should set a quantitative target, monitor progresses and – if necessary – implement corrective measures.

²² This date is just suggestive.

²³ This requires defining what is the minimum amount of drinkable water that should be guaranteed per day per person.

²⁴ The date should be defined by MRDI and local authorities.

Sanitation network fully developed in each river basin	% of river basins with fully developed sanitation network	Local Governments, Local Water Suppliers, MRDI, River Basin Organizations.	100 % of river basins with fully developed sanitation network by: Y ²⁵ .	
Ensure the access to water to a	III potential users			
All individuals or firms requesting to use water and willing to pay the required tariff/fee and to respect the corresponding regulation have the possibility to do so (i.e. if they are connected to the water supply networks, should receive the water; if they are planning to abstract directly the water and respect the existing regulations/requirements, should be able to do so).	% of individuals and/or firms requesting to use water and willing to pay the required tariff/fee and to respect the corresponding regulation have the possibility to do so	MENRP, GNERC, Local Government, MENRP, Local Water Suppliers	100% of individuals and/or firms requesting to use water and willing to pay the required tariff/fee and to respect the corresponding regulation have the possibility to do so, $by^{26} Y^{27}$.	
Average time for obtaining access to water (or obtaining the relevant permits) from the moment a demand is issued should not exceed a certain maximum time (e.g. 3 months)	Average time for obtaining access to water from the moment a demand is issued	MENRP, GNERC, Local Government Local Water Suppliers	Average time for obtaining access to water and/or the relevant permit from the moment a demand is issued. It should not exceed the set maximum time (e.g. 3 months)	
Ensure the efficient allocation of water resources across alternative uses				
All tariffs for water use and water abstraction (when relevant) are calculated according to transparent efficiency-based methodology	% of tariffs for water use and water abstraction calculated according to efficiency-based methodology	MENRP; River Basin Organizations; GNERC	100% of tariffs for water use and water abstraction are calculated according to efficiency-based methodology by: 2022.	

Water consumption by major water users (set consumption threshold) and private households is accurately measured	% of households with water meter at the point of delivery; % of major water users with water meter at the point of delivery;
--	---

100% of

. Z²⁹.

MENRP; River

Organizations;

GNERC, Local

Water Suppliers

Government Local

Basin

households with

water meter at the

point of delivery by:

Y²⁸; 100% of major

water meter at the

point of delivery by:

water users with

 $^{^{\}rm 25}$ The date should be defined by MRDI and local authorities.

²⁶ This indicator has been included to highlight potential tensions in the water market..

²⁷ This date should be defined by MENRP.

 $^{^{\}mbox{\tiny 28}}$ This date should be defined by GNERC

²⁹ This date should be defined by GNERC

Water abstraction by major water users (set consumption threshold) and private households is accurately measured	% of households with water meter at the point of abstraction; % of major water users with water meter at the point of abstraction;	MENRP; River Basin Organizations; GNERC, Local Government, Local Water Suppliers	100 % of households with water meter at the point of abstraction by: Y ³⁰ ; 100% of major water users with water meter at the point of abstraction by: Z ³¹ ;		
Basin-level markets for water resources are used for the allocation of non-essential water resources (water abstraction) when (if) total abstraction quantities are fixed.	% of river basins in which total abstraction quantities are fixed who have a basin- level market for water abstraction.	MENRP; River Basin Organizations; , Local Government, water user association, NEA, GNERC	X ³² % of river basins in which total abstraction quantities are fixed will have a basin- level market for water abstraction by Z ³³ .		
Ensure compliance with the EU WFD					
Basin organizations are created, fully staffed and equipped	Number of active river basin organizations	MENRP, GoG	5 (6) River Basin Organizations created, fully staffed and equipped.by 2024.		
River Basin Management plans are approved	Number of updated Integrated river basin management plans (IRBMP)	MENRP; River Basin Organizations, River Basin Council, GoG	5 (6) Integrated river basin management plans are approved by 2024.		
River Basin council is created to ensure involvement of all stakeholders in creating river basin management plan.	Number of categories of stakeholders involved in consultation process of IRBMP	MENRP; River Basin Organizations, GoG	All categories of stakeholders are represented in the river basin council by 2024.		
Agreements for transboundary river basin management	Transboundary agreements with Azerbaijan, Turkey, Russia and Armenia are signed.	MENRP, GoG, Ministry of Foreign Affairs	Although, EU WFD does not set any deadline for signing transboundary river basin agreements the government of Georgia might set its own deadlines ³⁴ .		

³⁰ This date should be defined by MENRP.

³¹ This date should be defined by MENRP.

³² The government should set a quantitative target, monitor progresses and – if necessary – implement corrective measures.

³³ This date should be defined by MENRP.

³⁴ Reaching an agreement with Russia – at this stage – seems more problematic than with the other neighboring countries.
V. POLICY OPTIONS

After a careful review of the current and proposed regulatory frameworks of water resources management in Georgia, accompanied by a review of international practices and stakeholder consultations, the RIA team agreed with the representatives of the MENRP and of G4G to focus this RIA on the comparison between the three following policy options:

- 1. The do nothing or no policy change option;
- 2. Full implementation of the proposed regulations in presence of an effective data exchange service and donor support for the realization of the remaining two RBWMPs;
- 3. Full implementation of the proposed regulations in absence of an effective data exchange service and donor support for the realization of the remaining two RBWMPs.

The number of policy options to be assessed is limited due to the current state of the proposed reform, which provides a set of principles to be followed when designing the water management rules for the country (like, for example, the reference to an integrated river basin management approach, based on the EU water framework directive). At this stage, however many specific regulations (for example those defining the characteristics of the economic instruments to be used for achieving goals set in the law), as well as several practical implementation steps, are still being developed and might be subject to further amendments in the sublegislation.

Therefore, in parallel to the attempt to quantify as many impacts as possible, we will be devoting substantial efforts to the identification and the discussion of the main expected qualitative impacts of the reform and of the risks and opportunities associated with it, without necessarily comparing more radically different options (which at the current stage could not be identified).

Policy options are described in greater detail below.

Before describing the assumptions that are specific to each of the three options, however, it is important to mention those that are common to all of them. All the variables mentioned below are exogenous (i.e. they are not affected by changes in the model output and/or by the reform option chosen).

Macroeconomic assumptions

The values of the main macroeconomic variables, their sources and the assumptions about their development are displayed in Table 5.1

VARIABLES	INITIAL VALUES IN 2018	FINAL VALUES IN 2040	SOURCE
GDP Growth (Real)	4%	2%	Based on the International Monetary Fund (IMF) World Economic Outlook projection for 2018. 2% Based on the average real growth rate in the United States since 1968
Inflation	3.00%	3.00%	Based on the National Bank of Georgia (NBG) inflation target
US Inflation	2.00%	2.00%	Based on Fed Inflation target.
EU Inflation	2.00%	2.00%	Based on European Central Bank Inflation target
Discount Rate	7.4%	7.4%	Real interest rate on 10-years government bonds

Table 5.1: Macroeconomic variables, sources and assumptions

Evolution of water demand

In all scenarios, water demand will be assumed to grow at the same speed of GDP.

Demographic assumptions

In all scenarios, the population will be assumed to grow as predicted by the United Nations (UN) population estimates and projections for Georgia.³⁵ This data has key demographic indicator forecasts for Georgia within 2015-2100 that were updated using the 2014 population census. For the purpose of this RIA, forecasts only till 2031 are considered.

Initial Water quality by River Basin

A crucial variable for the estimation of the Total Economic Value (TEV) of the environmental services provided by water bodies at the river basin level is the initial water quality. The concept of TEV is explained in greater detail in Box 5.1.

Box 5.1. Total Economic Value of Environmental Services

In this exercise, we are interested in estimating the expected TEV of the change in the status of Georgian River Basins as a consequence of the implementation of the EU WFD. TEV refers to the maximum amount of goods or service – or money income that an individual is willing to forego (willingness to pay or WTP) in order to obtain some outcome that increases his/her welfare.

These sums of money reflect individuals" attitudes towards the change. WTP is constrained by individuals" ability to pay.

WTP, aggregated across those who benefit from a good or service and hence who will be affected by any change in their provision level, provides an indicator of their TEV.

The aim of economic valuation is to ensure an efficient water resource allocation by providing the same level of value information that would normally be afforded by prices for a market good.

The estimation of the TEV can be conceptually summarized as follows:



³⁵ UN, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.

- 1. We evaluate an initial level of water quality (to which are associated a certain quality and quantity of water system goods and services);
- 2. We estimate the expected change in water quality;
- 3. We estimate the expected value of the change in economic terms (either through the direct elicitation from economic agents or by transferring adjusted values from other studies), achieving an estimate of the expected TEV.

In our study, the TEV is extrapolated starting from a meta-analysis of numerous studies estimating the WTP for improvements in water quality in a number of countries and utilizing the meta-analysis model to predict the WTP for improvement in water quality in each of the 5 River Basins under analysis. A more detailed discussion of the methodology can be found in Appendix 6.

Following the international literature, we have asked our Water Experts to attribute to each of the Georgian River Basins a score from 0 to 10, according to a Water Quality Ladder methodology discussed in Brower et al. (2009) (see Figure 5.1 below) which maps a collection of water quality parameters like nitrogen, phosphorus and dissolved oxygen onto an index of water quality levels³⁶. According to this scale, a higher number indicates better (e.g. drinkable) water quality and a lower number indicates poor (e.g. non-boatable) water quality.

Figure 5.1: Water Quality Ladder



Source: Vaughan, (1986) cited in Brower et al. (2009)

Based on the available evidence the initial average quality by basin has been defined as follows³⁷ (Table 5.2):

Table	5.2:	Initial	Water	Quality	Score	by	Basin
						~ ,	

Basin	Initial Values in 2018
Choroki	7.0
Alazani-Iori	7.0

³⁶ Source: Vaughan, 1986; Mitchell and Carson, 1989; Carson and Mitchell, 1993

³⁷ For a more detailed discussion of the methodology and of the current status of the Georgian river basins see Appendix 7.

Khrami-Debeda	5.0
Mtkvari	6.0
Enguri-Rioni	6.0

Other basin characteristics (used to estimate the TEV of water services)

The initial level of water quality in a given basin is only one of the characteristics affecting the WTP of the population and – therefore – the TEV of water services.

Other crucial variables have been identified in the literature. In particular, our estimation methodology³⁸ predicts the WTP for an increase in water quality (at the basin level) based on the following characteristics (identified as particularly relevant by a meta-analysis performed over 54 different studies assessing the WTP for water services of households in different countries³⁹):

- Use of water for irrigation purposes (we use the share of people classified as rural in the basin higher values lower the WTP);
- Average household income in the basin (we use the natural log of average household income higher values lead to higher WTP);
- Population (natural log of the population of the basin higher values lead to lower WTP);
- Lake size (natural log of the area in HA of lakes in the basin higher values lead to increases of WTP).

The information collected for each basin and the methodology used to convert it to the "basin level" is discussed in Appendix 6.

A. POLICY OPTION 0 (BASELINE SCENARIO)

This option assumes that the legislation related to Water Management is not changed and nothing is done to alter the current trends in consumption patterns, infrastructure development, water quality monitoring and in all other relevant areas.

Of particular interest for the purpose of this exercise is the baseline scenario evolution of water quality. Current trends can be assumed to continue with the existing patterns, highlighted in the Problem Definition section. On one hand stakeholders will continue paying low tariffs/fees (or nothing at all, in some cases) for the use of water services. On the other hand, however, the quality of environmental services will not improve (quite likely they may deteriorate).

To reflect the complexity of ecological/environmental relationships and the possibility of sudden deterioration in environmental conditions once certain critical thresholds are passed, we will reflect in our qualitative analysis the risk of increasing costs associated with environmental deterioration and overexploitation of existing water resources.

³⁸ See Appendix 6.

³⁹ Brouwer et al. (2009). Economic Valuation of Environmental and Resource Costs and Benefits in the Water Framework Directive: Technical Guidelines for Practitioners. Aqua Money.

B. POLICY OPTION 1: FULL IMPLEMENTATION OF PROPOSED REGULATIONS WITH DONOR SUPPORT AND DATA EXCHANGE

This option assumes the full implementation of the proposed draft law on water management that aims to implement an IRBM approach in compliance with the principles set in the EU WFD. Under this Option the government is supposed to set up a data exchange service facilitating the exchange of information and data between private and public actors and among the public actors (different ministries and institutional bodies), increasing the efficiency of the process and minimizing the need for additional staff. In this option we also assume that all the first Basin Management Plans will be financed by donors and not by the public budget. The main goal of the legislation is to gradually achieve a good quality status of water bodies on the basis of a comprehensive assessment of the current situation and of carefully planned steps to improve ecological and chemical conditions.

Under the proposed legislation three new institutional bodies will be created: (i) the government commission on water resources protection and use, (ii) river basin organizations and (iii) river basin council.

The government commission on water resource protection and use will be the state body responsible for the elaboration of a 10-year government strategy for water resource protection and use.

The most relevant characteristics of this reform option (for the analysis that will follow) are the following:

- The introduction of a Basin Management System;
- The introduction of new economic instruments for water management;
- The changes in the permit system;
- The changes in Monitoring practices and procedures.

River Basin Management System

The river basin organizations will be established for six river basins in the country: Alazani – Iori, Mtkvari, Khrami-Debeda, Enguri-Rioni, Chorokhi-Adjaristskali, Bzipi-Kodori⁴⁰ river basins. Each river basin will have its river basin organization, responsible for: (a) identification of water bodies and definition of their borders, (b) commissioning (and participating to) the elaboration of the IRBMP, (c) ensuring stakeholder involvement in the IRBMP, (d) issuing special water use permits, (e) surveying all types of water users in the basin, (f) monitoring of IRBMP, (g) informing the public about limitations to water usage in case of contamination. To facilitate stakeholder consultations in the process of elaborating IRBMPs, MENRP has the responsibility to create (and ensure the functioning of) river basin coordination-consultation councils that are consultation bodies for each river basin. Appendix 3 shows how the new institutions will be incorporated in current institutional setup of the water sector.

Introduction of new economic instruments for water management

Under the proposed legislation, the bases for defining the proper amounts for charges and/or fees are to be found in the **"user pays"** and **"polluter pays"** principles. The new legislation re-introduces charges for surface water abstraction⁴¹ and introduces fees/charges for water discharge. To the extent that tariffs/fees and charges are reflecting the true opportunity costs of resource use for the society, the new economic instruments have the potential to re-align private incentives to the collective interest and to increase the efficiency in water use.

Changes in the Permit System

Similarly to the current legislation, water use is grouped in two types: common water use and special water use. **The common water use** is intended for non-commercial purposes, to satisfy personal demand (drinking / household), with a simple infrastructure (max 10m shaft well, or 25 m borehole) and is not subject to any permits, and/or fees. **The special water use** is performed with such technical infrastructure that can have a

⁴⁰ This basin is in the occupied territories and, while it will be established *de-jure* after introduction of the law, *de-facto* the law will not be applicable there. For this reason, the expected impacts of the reform for the sixth basin are not estimated.

⁴¹ This charges will be defined under the "law on Fees for natural resource use"

substantial impact on the water body⁴². The special water use of underground water bodies will remain under the regulation of the law on mineral resources⁴³, while for the surface waters the proposed legislation requires one of three types of permits: (a) water abstraction, (b) water discharge, or (c) combined water use permit. Furthermore, activities that are subject to ecological expertise will be released from the requirement to provide water use permits upon provision of the environmental impact permit⁴⁴. To receive a water user permit the applicant should submit the required documents describing the technical and ecological characteristics of surface water abstraction/discharge. Permits for surface water use will be given for 5 years for industrial purposes, 10 years for irrigation, 30 years to HPPs and 30 years for water supply infrastructure. The holder of the permit will be liable to set-up the needed infrastructure for treatment of wastewater and ensure metering of water use and discharge with adequate technologies. Water users that are currently operating and that are going to be subject to the permit, will have 12 months under the proposed legislation to equip their facilities with needed technologies. As for operators of urban wastewater systems, they are theoretically liable to build needed waste water treatment plants by 2021, but this deadline might be extended due to the virtual impossibility of complying. Lastly, operators of amelioration (drainage) infrastructure have to comply with conditions of water discharge by 2025. The monitoring of compliance to the conditions set at the moment of the issuance of water users' permits for the protection of water bodies from pollution is under the responsibility of the **DES** at the MENRP.

The draft law on water resources management introduces a new classification of surface and underground water bodies that is similar to that contained in the EU water framework directive. The classification of surface water bodies is based on hydro-biological, hydro-morphological, and physio-chemical characteristics, while underground waters are clustered based on quantitative and chemical characteristics.

Changes in Monitoring practices and procedures

The goal of the legislation is to reach and sustain **good quality status** of water bodies that is defined as having **good chemical** and **good ecological status**. For artificial water bodies, or those that are highly modified, the aim is to reach a status of **good ecological potential** and **good chemical status**⁴⁵. The classification of water bodies takes place during the production of IRBMP, which is under the responsibility of river basin organizations and MENRP. The IRBMP has to be approved by the government. The proper management of water resources and the pursuit of good quality status of water bodies will require an expansion of monitoring and data collection activities, as well as a modification of current practices and procedures. This, in turn, will require additional financial resources. Monitoring and data collection of hydrochemical, hydro-biological, hydro-morphological conditions of river bodies will be kept as responsibility of **NEA**. Under the proposed new legislation, the major stakeholders affected are:

- i. State institutions creation of new entities (river basin organizations) can have a beneficial effect, ensuring better understanding of water conditions at the basin level. Furthermore, increased transparency and greater availability of relevant information can ensure efficient and improved decision making for both policy makers and the industry. As mentioned above, it is expected that monitoring costs of water bodies will increase (particularly because of increased equipment and operational costs for NEA and DES), as the elaboration of IRBMP requires analysis of detailed environmental data. As for already existing state regulators, some of the legal gaps causing inefficient functioning of the water management system will be eliminated. Increased responsibilities and the need to handle a larger number of requests for permits are also expected to increase operational costs of the MENRP Division of Water Management and Department of Environmental Impact Permits.
- ii. Water Users water users for commercial purposes will become subject to water user permits that will increase their costs for abstraction, discharge and monitoring equipment. The highest possible increase in costs is expected for water suppliers and operators of amelioration systems that will have to modernize and/or build new wastewater treatment plants. However, it should be noted that, for the purpose of this study, these are not incremental costs as they would have been incurred even without the introduction of this specific piece of legislation. Overall, public and commercial water users are likely to face an increase in tariffs for water use and in the cost of water-intensive products. On the positive side, however, they are likely to benefit from better monitoring and higher availability of data

⁴² Specifically, substantial impact is: (a) discharge of polluting substances, (ii) water abstraction of more than 20 cubic meters in a day.

⁴³ The law of Georgia on mineral resources, May 17, 1997, #242-IIS.

⁴⁴ Activities subject to environmental impact permits are all industrial and mining activities having impact on environment including: hydropower and thermal power plants with installed capacity above 2MW and 10 MW correspondingly, the reservoirs above 10,000 cubic meters, wastewater treatment plants with capacity above 1,000 cubic meters and building of sewage networks. The Law of Georgia on Environmental Impact Permit, December 14, 2007, # 5602 – RS.

⁴⁵ Directive 2000/60/EC of the European Parliament and the Council, October 23, 2000 Annex 5.

on water resources, clearer and more transparent regulation and – last but not least – an increase in the quantity and quality of environmental services they will be able to derive from an increase in the quality of water bodies. This benefit is likely to be particularly relevant also for entrepreneurial activities (such as touristic activities) whose "commercial offers" gain value as environmental quality improves.

Risks

A major risk is that monitoring, evaluation and decision making remain concentrated at the central level, with the river basin organizations becoming only nominal bureaucratic entities created exclusively to formally satisfy EU directives, providing no real contribution to the quality of water management but increasing bureaucratic costs.

A second (related) risk is that under the premise that "harmonization to EU directives is necessary" some legislation – even some potentially harmful to the country – is introduced with limited discussion and without being really required from the EU directive⁴⁶.

A very specific risk, in this sense, is related to the proper design of economic instruments that reflect "**user pays**" and "**polluter pays**" principles. Mistakes in the design of the economic instruments can become a key obstacle to the achievement of the main goals of the IRBM and to the development of the country. This type of mistakes is more likely in case of "regulatory capture", when the regulator is influenced to follow objectives that diverge from the stated ones. Regulatory capture can result – for example – in:

- The choice of economic instruments that, while less efficient and effective, are preferred by strong pressure groups;
- The choice of economic instruments that give stronger pressure groups a competitive edge over competing groups, inducing distortions in the functioning of the economy;
- Ex-post adjustments to the selected economic instruments to make them less-binding and more acceptable (for example providing broad exemptions and/or offsetting provisions);
- Weak enforcement.

Furthermore, as suggested by several stakeholders during the consultation process, one of the features of the draft law is its formulation, that may create ambiguity and allow multiple interpretations or leave gaps preventing its most effective application and have a significant influence on the performance of the law. From the RIA perspective, this ambiguity may cause large variation of actual results in the future. Finally, insufficient availability of water data can be one of the obstacles during preparation of IRBMPs, as these documents require a detailed analysis of the characteristics of water bodies. All these risks could be minimized by a consistent effort to share the goals of the reform with the public and to maintain a high level of transparency both with regard to the process followed to characterist.

maintain a high level of transparency both with regard to the process followed to choose among different alternatives and to the future phases, providing full access to all available and relevant data to all relevant stakeholders (both at the local and at the national level) and to all interested citizens and organizations.

An additional and particularly delicate aspect of the reform is associated with the potentially adverse effects it may have on the weaker segments of the population and of the business community (small businesses). The government should actively monitor the impacts of the reform on these potentially more vulnerable groups, strive to include them in the decision making process and – if necessary – design appropriate support policies.

C. POLICY OPTION 2: FULL IMPLEMENTATION OF PROPOSED REGULATIONS WITHOUT DONOR SUPPORT AND DATA EXCHANGE

This option is fundamentally identical to Option 1, with the following exceptions. In this Option, the government is not setting up a data exchange service facilitating the exchange of information and data between private and public actors and among the public actors. This increases the cost of compliance for private companies and the administration costs for the public sector. Obviously, also the lack of external support for the realization of two of the five initial Basin Management Plans will increase initial implementation costs of the reform.

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⁴⁶ However, the analysis of the draft has not revealed any such instance.

Risks

In addition to the risks highlighted for Option 1, Option 2 is also subject to the risk that – in situations requiring a prompt reaction – the lack of an effective data exchange platform will increase response times and lead to greater damages with respect to Option 1 (even though lower than with respect to the status quo, thanks to more intense monitoring and supervision efforts).

All these risks could be minimized by encouraging a greater transparency and exchange of information among public and private actors even in absence of the data exchange.

VI. ANALYSIS OF IMPACTS

A. METHODOLOGICAL APPROACH

The methodology applied in the (efficiency-focused) analysis of the impacts is CBA, coupled with qualitative analysis for the components that were impossible to quantify given time and data constraints. The qualitative CBA will be complemented with Multi-Criteria Analysis to include in the comparative analysis other components in addition to efficiency considerations.

The planned reform is likely to affect a wide range of stakeholders, such as:

- Utility companies of the water, waste and energy sector;
- Water-using economic agents operating in other sectors (e.g. agriculture, industry and services);
- Bodies of the central and local government;
- Civil organizations and NGOs;
- Regular citizens.

For each of these stakeholder groups we investigate:

- The expected economic impacts (costs and benefits) of the reform;
- The expected behavioral impacts of the reform.
- In the analysis we used data from the following sources:
 - GeoStat;
 - information collected through interviews and stakeholder consultations;
 - MENRP of Georgia;
 - MoF of Georgia;
 - MoA of Georgia;
 - Statistical data from other countries and international organizations (including from existing reports about Georgia);
 - Other publicly accessible information.

The time horizon of the analysis will be 13 years, to allow for the full implementation of at least one River Basin Management Plan in all river basins (two in the Chorokhi-Adjaristskali basin).

The discount rate used is 7.37% (i.e. real return on 10-year government bonds). A Sensitivity analysis will be performed at 4.76% and 9.98%⁴⁷.

After quantifying the expected impacts in each area for each alternative we will determine the expected NPV of all alternatives.

In all the cases in which the quantification of costs and benefits will not be possible, a qualitative evaluation of the incremental costs and benefits of different options with respect to the baseline scenario will be prepared, in the attempt to test whether this affects the ranking of the options from an efficiency-focused point of view. Given the high degree of uncertainty characterizing the issues under analysis, we will test the robustness of the results and the different implications of a number of alternative scenarios.

Table 6.1. The ranges of the variables used in sensitivity analysis

Variable Name	Standard Deviation	-1.96 SD	Central Value	+1.96 SD
GDP Growth (real) - starting one	3.87%	-3.59%	3.98%	11.56%
Nominal Interest Rate 10 yrs bond (2017) - starting one	1.37%	7.90%	10.59%	13.28%
Final Water Quality byBasin		-1	Central Value	+1
Choroki		8	9	10

⁴⁷ Central value ± 1.96 Standard Deviations, corresponding to the boundaries of 95% confidence interval.

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Alazani-lori	8	9	10
Khrami-Debeda	6	7	8
Mtkvari	7	8	9
Enguri-Rioni	7	8	9

B. ANALYSIS OF IMPACTS

Table 6.2 Summary impact of selected options

	OPTION 1	OPTION 2
IMPACT		
Administrative	The administrative impact of this option can be considered to be moderate. The number of additional permits to be distributed, while high, will be handled effectively with a relatively small increase in dedicated personnel. The same is true with respect to the monitoring and supervision functions.	The administrative impact of this option is expected to be higher than for Option 1 due to the absence of the data exchange, increasing the number of employees necessary to handle the increased workload.
Economic ⁴⁸	 The economic impacts of the reform in this option can be considered quite significant. In general terms, the reform can be expected to: Reduce uncertainty about the availability of water (reduced entrepreneurial risk and need for – costly - coping mechanisms) Access to better quality of water for productive activities (reducing production costs and individual costs) Ensure a more efficient allocation of water resources among alternative uses (particular relevant in presence of scarcity) Reduce health-related public budget costs Lead to a better control of extreme events⁴⁹ Stimulate the growth of more environmentally friendly and more efficient businesses Increase the number and the value of goods and services provided by the water ecosystems. The positive effects of the reform will be more evident for sectors such as tourism and food processing, and for all the sectors that can be expected to benefit from improvements in water quality. Other potentially relevant gains are attributed to sectors requiring large investments (such as the energy sector) and characterized by substantial uncertainty. In particular, it is expected that the introduction of clearer and better designed water management rules (together with the collection and distribution of more reliable data) will facilitate investments in new <u>hydropower</u> plants and (indirectly) support the development of the Electricity 	Expected impacts are qualitatively similar to those discussed in Option 1. However, in this case the slower flow of information may make it more difficult to identify optimal choices.

⁴⁸ This is a summary of a more detailed discussion of the expected macroeconomic impacts of the reform, in Appendix 7.

⁴⁹ See expert opinion produced by G4G experts in Appendix 9.

	Trading Market (ETM) ⁵⁰ . Other positive effects are expected for the <u>Agricultural sector</u> , both because of the more stable quality of water provided (facilitating some agricultural practices – e.g. fertilization) and because of an increased transparency and (possibly) reliability of the service ⁵¹ . There are also negative economic impacts associated with the reform. Among them we can list the likely increase in costs. User fees, charges for pollution and restrictive standards to minimize the negative environmental impacts of economic activities are likely to increase costs and translate into higher tariffs and higher prices, especially for goods whose productive process has relatively high water content. A sector whose costs might increase is, for example, <u>the agricultural sector</u> , as the regulation to maintain/improve the quality of water, will force farmers to limit their use of pesticides and fertilizers. This might lead to a trade-off between reducing pollution and increasing agricultural output. Being still far from the intensive farming characterizing the most developed countries, these tradeoffs are likely to be more limited, but might exist nevertheless It has to be underlined, however, that an increase in water costs (as long as the increase does not exceed the true opportunity cost of water) and a tightening of environmental regulations (limiting negative externalities), can be is beneficial for the country as a whole, as it leads to a more efficient use of the existing water resources.	
	water resources. The final result will depend crucially from a thorough assessment of the existing tradeoffs and a careful optimization process. There are, however, good reasons to believe that in the long-run, when the re-optimization of economic activities will have taken place (also thanks to a more stable and predictable regulatory environment) the positive effects will dominate.	
Social	The expected social impacts of this reform are numerous and are potentially both positive and negative. On the negative side, the expected increase in costs associated with water consumption is likely to hit more heavily the poorer segments of the population, for whom water costs constitute a larger share of their disposable income. This will happen both in urban and in rural areas. In rural areas, the costs may be even higher as many poor families earn their living as self-employed in low- productivity agricultural activities and an increase in water tariffs there may reduce their net revenues substantially. On the positive side, the poorer segments of the population are also the more likely to benefit from the improvement in water quality, especially in terms of reduced health-related costs. While pricing resources correctly is a crucial aspect of this reform, the government might want to monitor closely the social impacts and devise strategies to minimize the negative impacts on the poorest segments of the population without eliminating the (useful) efficiency- enhancing effects of tariffs reflecting the true opportunity cost of water.	Expected impacts are qualitatively similar to those discussed in Option 1. However, in this case the slower flow of information may make it more difficult to design corrective measures.

⁵⁰ An expert opinion produced by G4G on the basis of previous reports illustrating the issue is available in Appendix 10.

⁵¹ For an expert opinion on the issue, see Appendix 11.

Environmental	 The expected environmental impacts of this reform are substantial. A proper implementation of the reform can lead to a significant improvement in the quality of water ecosystems on multiple dimensions: Ecological status (biological and physico-chemical characteristics) Chemical status (related to the compliance with standards for "priority hazardous substances" Successful moderation of extreme natural events. 	Expected impacts are qualitatively similar to those discussed in Option 1.
Public financing	Government expenditures are expected to grow but to be more than offset by revenues.	Government expenditures are expected to grow slightly more than for Option 1 but to be still more than offset by revenues.
SMEs	The costs associated with the reform are not expected to be substantial for medium and large companies (more than 50 employees and yearly turnover over 12 mln GEL). However, they may prove significant for small enterprises (up to 50 employees and yearly turnover up to 12 mln GEL). For this reason, the government may want to consider introducing a simplified regime for small enterprises and even the introduction of a longer transition period and/or the realization of special support programs for such enterprises.	Expected impacts are qualitatively similar to those discussed in Option 1.

High impact

Medium impact

Low impact

C. COST AND BENEFITS ANALYSIS

In all following scenarios, we are assuming the same underlying demographic and economic trends for all Options, i.e. we treat demographic and economic trends as exogenous to the reform. While the assumption of exogeneity may be debatable, we maintain that in a context like the one under analysis – characterized by a high level of uncertainty – it allows us to produce more reliable estimates of the expected impact of the reform on different stakeholders, and does not arbitrarily tilt the results in one direction (in favor of reform) or the other (against reform)⁵².

BASELINE SCENARIO

We do not quantify any costs and benefits associated with the baseline scenario. Instead, we focus on the quantification of the incremental costs and benefits of Options 1 and 2, on the basis of the information collected.

UNCERTAINTIES

The main uncertainties here pertain to two issues:

• Evolution of water quality. Our estimates of the willingness to pay for water quality implicitly assume the water quality would remain stable in absence of the reform. In case water quality deteriorated we could expect an increased willingness to pay and, therefore, higher expected benefits from the reform;

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⁵² In this specific case our expectation is that the reform is likely to improve the long term development perspectives of the country.

• Evolution of water availability. We assume water availability (supply) remains constant and the only factor changing is demand. Greater water scarcity would increase the benefits associated with a better water management system.

OPTION 1 *QUANTIFIED COSTS*

- Private Sector
 - **Permit/license fees:** all companies abstracting surface water and/or discharging in surface water bodies will have to acquire the corresponding license/permit incurring a cost of 100 GEL each.
 - **Permit/license documentation:** all companies abstracting surface water and/or discharging in surface water wishing to obtain a permit/license will have to produce the required documentation. The cost for obtaining such documentation has been quantified (after consultation with the largest company in Georgia providing such services) in 1500 GEL for the preparation of the documentation for abstraction and 800 GEL for the documentation relative to discharge. We also assumed an (internal) opportunity cost of 24 GEL per permit/license.
 - User fees (surface water abstraction⁵³): abstractors of surface water will be required to pay for the water they abstract. According to the existing legislation the expected rates are the following:
- 1) General Fees:
 - a) I group (Caspian Sea basin) 0.01 GEL per/cub.m;
 - b) II Group (Black Sea basin) 0.005 GEL per/cub.m;
 - c) III Group (Black Sea water) 0.003 GEL per/cub.m.
- 2) Drinking water supply 0.01 Georgian Tetri (1/100 of Georgian Lari) per cub.m.
- Hydropower Stations 0.01% of general fees (refer above) per/cub.m. For example, fee for use of water from black sea basin (river, lake, etc.) will be - 0.0000005 GEL per/cub.m.⁵⁴
- 4) Irrigation and thermo-electric station 1% of general fees (refer above) per/cub.m⁵⁵.

• Public Sector

- Additional personnel and equipment costs: new hires to ensure the smooth application of the reform. The MENRP will need to increase its staff, in the following way:
 - River Basin Units:
 - 11 additional hires from 2018.
 - Permit system:
 - 1 additional hire in 2018;
 - o 1 additional hire in 2019;
 - 1 additional hire in 2024.
 - Monitoring;
 - o 9 additional hires for water quality monitoring, from 2018;
 - 4 additional hires for underground water monitoring (during the first 5 years of the reform).
 - Supervision:
 - 40 additional inspectors.

In addition to personnel costs, MENRP and River Basin Authorities will have to acquire the necessary equipment.

 $^{^{\}rm 53}$ Water discharge fees are not mentioned, at the moment, as they are not yet defined in the Law .

⁵⁴ It has to be noted that as activities of HPPs are subject to environmental impact permit, they are already paying this fees, thus incremental effect is zero. This information was checked with the tariff department of GNERC that confirmed payment of these fees by HPPs.

⁵⁵ Same as HPPs thermal power plants are also paying charges for water use for cooling, consequently incremental effect for them is also zero.

While the initial RBWMP are expected to be financed by donors (in this option), the subsequent plans are assumed to be paid by the public budget at a cost of approximately 25% of the first plan.

QUANTIFIED BENEFITS

- Private Sector
 - Profits of consulting businesses: consulting companies supporting companies applying for permits/licenses will have an increase in profits (which should be considered a transfer between businesses, not real costs). The average expected gross profits are assumed to amount to 16% of the compensation received.
 - **TEV gains:** estimated as average Willingness to Pay (WTP) per household per year on the basis of the model discussed in Appendix 6.
- Public Sector
 - **Revenues from permits/licences** paid by companies.
 - Revenues from user fees paid by companies.

UNCERTAINTIES

The main uncertainties here pertain to the following issues:

- Evolution of water quality. As in the baseline scenario our estimates of the willingness to pay for water quality implicitly assume the water quality would remain stable in absence of the reform. In case water quality deteriorated we could expect an increased willingness to pay and, therefore, higher expected benefits from the reform. The same effect would take place if the improvements in water quality would take place more slowly than expected under the reform;
- Evolution of water availability. We assume water availability (supply) remains constant and the only factor changing is demand. Greater water scarcity would increase the benefits associated with a better water management system;
- Value of discharge fees. We cannot compute them because of missing information. On one hand, bigger fees would increase costs for companies and customers. On the other hand, if properly calculated on the basis of environmental (social) costs would contribute to a more efficient functioning of the society;
- The amount of potential for efficiency gains is uncertain (with expected positive value but not quantified). Higher potential gains would increase the expected NPV for the society.

OPTION 2 QUANTIFIED COSTS

- Private Sector
 - **Permit/license fees:** same as in Option 1;
 - Permit/license documentation: same as in Option 1, with the only difference being a higher opportunity cost for the company (longer time due to the paper-based nature of the procedure in this Option);
 - User fees (surface water abstraction): same as in Option 1.
- Public Sector
 - Additional personnel and equipment costs: new hires to ensure the smooth application of the reform. The MENRP will need to increase its staff, in the following way:
 - River Basin Units:
 - 11 additional hires from 2018.
 - Permit system:
 - 3 additional hires in 2018.
 - Monitoring;
 - o 9 additional hires for water quality monitoring, from 2018;
 - 4 additional hires for underground water monitoring (during the first 5 years of the reform).

- Supervision:
 - 80 additional inspectors.

In addition to personnel costs, MENRP and River Basin Authorities will have to acquire the necessary equipment.

While the initial RBWMP are expected to be financed by donors (in this option), the subsequent plans are assumed to be paid by the public budget at a cost of approximately 25% of the first plan.

• **Basin Management Plans:** in this option two Basin Management Plans have to be paid with funds from the government budget. The cost is estimated to be approximately 100,000 Euro.

QUANTIFIED BENEFITS

- Private Sector
 - **Profits of consulting businesses:** same as in Option 1;
 - **TEV gains:** same as in Option 1.
- Public Sector
 - **Revenues from permits/licences** paid by companies. Same as in Option 1;
 - Revenues from user fees paid by companies. Same as in Option 1.

UNCERTAINTIES

The main uncertainties here pertain to the following issues:

- Evolution of water quality. As in the baseline scenario our estimates of the willingness to pay for water quality implicitly assume the water quality would remain stable in absence of the reform. In case water quality deteriorated we could expect an increased willingness to pay and, therefore, higher expected benefits from the reform. The same effect would take place if the increase in water quality would increase more slowly than expected under the reform;
- Evolution of water availability. We assume water availability (supply) remains constant and the only factor changing is demand. Greater water scarcity would increase the benefits associated with a better water management system.
- Value of discharge fees. We cannot compute them because of missing information. On one hand, bigger fees would increase costs for companies and customers. On the other hand, if properly calculated on the basis of environmental (social) costs would contribute to a more efficient functioning of the society.
- The amount of potential for efficiency gains is uncertain (with expected positive value but not quantified). Higher potential gains would increase the expected NPV for the society.

D. SUMMARY

Our results, summarized in Table 6.3 and in Figures 6.1 and 6.2, indicate that both options lead to a substantial expected change in NPV with respect to the Baseline Scenario. This means that the reform appears to lead to a net quantifiable increase in society's resources. This result is due to two main factors:

- 1. The relatively low incremental costs associated with the reform;
- 2. The relatively high TEV associated with expected improvements of water quality.

An important lesson that can be learnt from the quantitative part of our analysis is that WTP for higher water quality tends to decline with the improvement in initial water quality, but remain substantially higher than costs, also thanks to the expected increase in average household income. Given the large overlap between Option 1 and 2 (that differ just on the cost component – costs are higher in Option 2, by construction), it is not surprising that Option 1 generates a higher NPV.

From the qualitative point of view, we expect several additional (potential) impacts (Tables 6.2 and 6.3). Positive impacts are mostly related to a better alignment of private incentives to society incentives, reduced uncertainty about the availability and the quality of water (better overall water management), a greater control of extreme events and, more generally a higher quality of environmental goods and services enjoyed by the society as a whole. Negative (not-quantified) impacts are mostly related with the cost of upgrading (whenever necessary) the wastewater treatment equipment to satisfy the requirements of the new law.

Sensitivity analysis (Figure 6.2) confirms the robustness of the results to changes in the main assumptions. The NPV for Option 1 remains consistently higher than that for Option 2.

Sensitivity analysis also reveals that, *ceteris paribus*, the variable with the potentially larger impact on NPV is GDP growth (higher GDP growth makes benefits increase faster, while lower GDP growth makes them grow more slowly). Other relevant variables are, as expected:

- Discount rate (higher discount rate reduces NPV);
- Higher initial water quality (reduces NPV);
- Faster improvements in water quality (reduces WTP and NPV faster).

Finally, Figure 6.3 shows that average costs per household per year associated with the reform tend to be quite low and well below the estimated WTP.

	OPTION 1	OPTION 2
Incremental Benefits (PV)	167.41	167.41
Incremental Costs (PV)	-52.68	-56.86
Incremental Benefits – Costs (NPV)	114.73	110.56
Qualitative impacts (if quantitative not possible) ⁵⁶	POSITIVE: Reduced uncertainty about the availability water (better overall water management) Access to better quality of water for productive activities More efficient allocation of water resources among alternative uses Reduction in health-related public budget costs Potential reduction in flood damages NEGATIVE: Cost to adequate relevant equipment to the requirement of the New Law	POSITIVE: Same as those for Option 1 NEGATIVE: Same as those for Option 1

Table 6.3. Summary of incremental costs and benefits

⁵⁶ List those items that have a significant impact on the decision making, but cannot be quantified



Figure 6.1. Comparison of incremental costs and benefits of policy options (mil. GEL, real)

Figure 6.2. Sensitivity Analysis results. Incremental NPVs in Worst, Expected and Best case scenarios (mil. GEL, constant prices)





Figure 6.3. Evolution of WTP and average costs per household (GEL, constant prices)

E. SPECIFIC IMPACTS: POWER PLANTS, WATER SUPPLY COMPANIES AND IRRIGATION

A final aspect that is important to discuss before comparing the options is the expected (quantified) impact of the reform on power plants (hydropower and thermal power), on Water Supply Companies and on Georgian Amelioration (extrapolated from our model). This information was required explicitly by MENRP representatives.

The additional costs for hydropower plants are concentrated in the first period (when we assume all HPPs will need to get new permits) and amount to about 180,000 GEL in total. Costs for thermal power plants are instead estimated to be 24,201 GEL in total.

The expected impact of the reform on **Water Supply Companies and for Drainage-Irrigation** is reported in Figures 6.4 and 6.5



Figure 6.4. Cost for Irrigation - Drainage (LTD. Georgian Amelioration

Figure 6.5. Cost for drinkable water suppliers



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VII. COMPARING THE OPTIONS

While comparing the alternatives to identify the preferred one, we considered a number of criteria in addition to NPV. These criteria are:

Effectiveness: the capability to produce the desired results. In our case, the capability to:

- 1. Ensure the convergence of all water bodies toward a good quality status;
- 2. Ensure the continued availability of drinking water and access to sanitation to the population;
- 3. Ensure the access to water to all potential users;
- 4. Ensure the efficient allocation of water resources across alternative uses;
- 5. Ensure compliance with the EU WFD.

Feasibility: easiness of realization.

Minimization of risks associated with the reform:

- Monitoring, evaluation and decision making remain concentrated at the central level;
- Under the premise that "harmonization to EU directives is necessary" some legislation even some potentially harmful to the country – may be introduced with limited discussion and without being really required from the EU directive;
- Possibility of mistakes in the design of the economic instruments hampering the achievement of the main goals of the IRBM and to the development of the country;
- Ambiguity in the interpretation of the law and/or gaps preventing its most effective application;
- Insufficient availability of water data;
- Adverse affect on vulnerable social groups and small enterprises.

All these risks could be minimized by a consistent effort to share the goals of the reform among the public and maintaining a high level of transparency both with regard to the process followed to choose among different alternatives and to the future phases, providing full access to all available and relevant data to all relevant stakeholders (both at the local and at the national level) and to all interested citizens and organizations. Concerning the last risk, a useful mitigation strategy would be to accompany a thorough monitoring of the impacts with the predisposition of a fast-response mechanism to activate support initiatives if needed.

Maximization of collateral benefits associated with the reform:

- Capacity to respond quickly and effectively to environmental challenges and to catastrophic events;
- Greater predictability and reliability;
- Faster identification to optimal (efficiency enhancing) choices when facing tradeoffs.

A. SUMMARY OF OPTIONS

Figure 7.1. (Comparison	of options	usina mu	lti-criteria	analvsis

EVALUATION CRITERIA	OPTION 0	OPTION 1	OPTION 2
Incremental Benefits – Incremental costs (NPV)	-	114.7	110.6
Effectiveness 1 – Good Quality Status	-	+++	+++
Effectiveness 2 – Access to Drinkable Water and Sanitation	+	+	+
Effectiveness 3 – Access to Water to All Potential Users	0	++	++
Effectiveness 4 – Efficient Allocation Across Alternative Uses	-	+++	+++
Effectiveness 5 – Ensure Compliance With the EU WFD		++	++
Feasibility / Ease to comply	0	+++	++
Minimization of Potential Risks		+++	++
Maximization of Potential Benefits		+++	++

B. PREFERRED OPTION

Ranking of options

As it can be observed from Table 7.1, Option 1 is either superior or equivalent to both other options in all areas. We can, therefore, say, that Option 1 dominates clearly all other options and we recommend it both with respect to the status quo and to Option 2.

VIII. MONITORING AND EVALUATION PLAN

To keep track of the performance of the water management system after the reform, it is important to evaluate how well it responds to the reform objectives set in section IV. The indicators that we suggest using to evaluate the performance of the system are divided into four categories - indicators which ensure Convergence of all water bodies toward a good quality status, continued availability of drinking water and access to sanitation to the population, efficient allocation of water resources across alternative uses and compliance with the EU WFD.

Table 8.1. Indicators of progress towards meeting the objectives

INDICATOR	FREQUENCY OF EVALUATION	RESPONSIBILITY FOR MONITORING
Convergence of all water bodi	es toward a good quality status	
% of water bodies with complete and fully functioning monitoring system in place	Yearly	MENRP: River Basin Organizations, NEA
% of river basins with properly calculated environmental (pollution related) charges/fees in place and/or pollution market developed in place	Yearly	MENRP; Water Management Department, River Basin Organizations, MOESD,
% of instances in which penalties determined on the basis of standardized methodology reflecting environmental damages caused	Yearly	MENRP; DES
% of recovered costs related to the realization and operation of water treatment infrastructure	Yearly	MENRP; GNERC; Local Governments and Local water suppliers
% of water bodies with quality status below good (according to last assessment) with improved environmental indicators	Yearly	MENRP, River Basin Organization. NEA
% of water bodies achieving good status	Yearly	MENRP, River Basin Organization, NEA

Continued availability of drinking water and access to sanitation to the population

Quantity of "reserved" drinking water available per capita sufficient to meet minimum identified needs	Monthly	River Basin Organizations, MRDI, Local Governments, Local Water Suppliers
% of river basins with fully developed sanitation network	Yearly	River Basin Organizations, MRDI, Local Governments, Local Water Suppliers

Indicators to ensure the access to water to all potential users

% of individuals and/or firms requesting to use water and willing to pay the required tariff/fee and to respect the corresponding regulation have the possibility to do so	Yearly	MENRP, GNERC, Local Government, MENRP, Local Water Suppliers
Average time for obtaining access to water from the moment a demand is issued	Yearly	MENRP, GNERC, Local Government Local Water Suppliers

Efficient allocation of water resources across alternative uses

% of tariffs for water use and water abstraction calculated according to efficiency-based methodology	Yearly	MENRP; River Basin Organizations; GNERC
% of households with water meter at the point of delivery; % of major water users with water meter at the point of delivery;	Yearly	MENRP; River Basin Organizations; GNERC, Local Government Local Water Suppliers
% of households with water meter at the point of abstraction; % of major water users with water meter at the point of abstraction;	Yearly	MENRP; River Basin Organizations; GNERC, Local Government, Local Water Suppliers
% of river basins in which total abstraction quantities are fixed who have a basin-level market for water abstraction.	Yearly	MENRP; River Basin Organizations; , Local Government, water user association, NEA, GNERC

Compliance with the EU WFD

Number of active river basin organizations	Yearly	MENRP, GoG
Number of updated Integrated river basin management plans (IRBMP)	Yearly	MENRP; River Basin Organizations, River Basin Council, GoG
Number of categories of stakeholders involved in consultation process of IRBMP	Yearly	MENRP; River Basin Organizations, GoG
Transboundary agreements with Azerbaijan, Turkey, Russia and Armenia are signed.	Yearly	MENRP, GoG, Ministry of Foreign Affairs

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APPENDICES

Appendix 1: Organization, Timing and Consultations

The Regulatory Impact Assessment (RIA) on Law on Water Resource Management was implemented during the period between 13th of January, 2017 and 30th of June, 2017.

After signing the contract, on 13th of January, the RIA team started checking the available data, performing a review of the relevant literature, organizing interviews and meetings with the main stakeholders.

Between the 10th of January and the 10th of March the RIA team held several meetings with G4G and MENRP to acquire the necessary information to start the RIA process, explore the potential objectives of the RIA and define – together with the Ministry - the main option that would be analyzed in the RIA in addition to the baseline scenario. It was initially decided that only two options would be analyzed: 1. The do nothing or no policy change option; 2. Full implementation of proposed regulations (with a gap-analysis approach).

On the 10th of January, the team had its first meeting at MENRP with Mariam Makarova, Head of the Water Resources Management Service. The aim of the meeting was to explore the main directions of the draft law on water resource management, identify current problems and explore potential objectives of RIA. During the meeting, Ms. Makarova presented the main problems characterizing the sector, did a short review of the existing legislation and introduced the planned reform.

The RIA team met again with the representatives of the MENRP on the 14th of February. The objective of the meeting was to identify directions of the draft law which can be the focus of the RIA and explore major policy options.

The 1st milestone - RIA detailed action plan - was completed and sent to G4G on 31th of January.

On the 23rd of February, the team started the stakeholder consultation process, which ended on 15th of May. Table 2.3 below summarizes the key findings and attitudes of stakeholders toward the draft Law on Water Resource Management.

On the 2nd of March ISET arranged a meeting with the representatives of the main regulatory bodies, to facilitate a joint discussion of the issue and of the challenges ahead. Among the participants were representatives of: MENRP, GNERC and NEA. The goal of the meeting was to introduce ISET-PI team's international expert to the Georgian context, discuss the nature of the problem, identify expected directions of the reform impacts, and reveal opportunities associated with the upcoming reform.

On the 23rd of March, the RIA team had another meeting at MENRP with Mariam Makarova, together with G4G representatives. The main purpose of the meeting was to update them about the consultation process and to agree on problem definition and stated objectives of the RIA.

The 2nd milestone – mid-term report, was completed and send to G4G on 20th of April.

The 3rd milestone – workshop was conducted on 17th of May, RIA team conducted a workshop and presented preliminary results to major stakeholders. It was confirmed to focus the analysis on four main topics of the draft legislation: permitting system, increased monitoring, economic instruments and compliance to requirements EU Water Framework Directive (EU WFD).

The days between the 16th of May and the 9th of June were dedicated to finalizing the cost benefit model and gathering all the missing data necessary for the Cost Benefit Analysis (CBA).

On 8th and 9th of June, RIA team had an intensive second round of meetings with the key stakeholders to review all possible costs of the reform from the government perspective. The RIA team met with: Marian Arabidze, Head of Environmental Pollution Monitoring Department, NEA; Neli Korkotadze, Chief State Inspector, Department of Environmental Supervision (DES) at MENRP; Ramaz Chitanava, Head of Hydrometeorology Department, NEA; Merab Gaprindashvili, Head of Geology Department, NEA. In addition, on 9th of June RIA team had meeting with Zurab Mgaloblishvili, Director, Gamma Consulting LTD. The main purpose of the meeting was to quantify the potential future cost for companies in need of acquiring abstraction and/or discharge permits.

On 13th of June the RIA team presented the draft model and the preliminary results generated at MENRP (Mariam Makarova and Gizo Chelidze, Head of Integrated Management Department attended the meeting). During the meeting, after a detailed presentation of the methodology as well as of the cost and benefit components of the model, the MENRP representatives agreed with the proposed model.

Between the 13th and 26th of June the RIA team concluded the analysis, based on the agreed model.

On 26th of June the RIA team presented its final results at MENRP. Among the MENRP representatives were the Deputy Minister Ekaterine Grigalava, Gizo Chelidze, Head of Integrated Management Department and Mariam Makarova, Head of the Water Resources Management Service. MENRP representatives had some comments and suggestions regarding results of the study as well as one particular request. The request was to generate additional indicators highlighting the cost impact of the reform on the Ministry of Agriculture (MoA) and the Ministry of Regional Development and Infrastructure (MRDI), as well as on Hydro Power Plants.

On the 28th of June, RIA team sent the final report to MENRP and G4G for revision and feedback.

Throughout the work, the decision-making approach adopted by the team was collegial, coordinated by the team leader.

STAKEHOLDER / STAKEHOLDER GROUP	METHOD OF CONSULTATION	SUMMARY OF RESPONSES⁵7
Name of stakeholder / stakeholder group and size	E.g. interview (and when); review of consultation document; survey	Brief description of data / opinion gathered during consultation
		General comment: Regulation of water flows and its consumption is critical.
		The access to water still remains problem for the majority of villages in Georgia for more than 50% of population does not receive water from the network.
		GNERC is regulating 9 water companies in Georgia and 4 of them are private (i.e. water companies under Georgian Water and Power).
		System problems:
		 A lot of bureaucracy and diversified responsibilities;
GNERC, Grigol Mandaria, Water Supply Department Director GNERC, Nugzar Beridze, Director of Electricity	Interview, 23 th of February, GNERC office	• There is a problem of coordination and information asymmetry between Regulatory Commission and other responsible Governmental Institutions (in water supply, quality and sewerage system management);
Department		• There is no flexible and fast coordination mechanism to ensure that every regulatory body performs its functions well. A good example is related to complaint resolution: if someone makes a complaint to GNERC about drinking water quality, GNERC has to notify National Food Agency, as they have relevant laboratories to verify the quality. However, it is on the goodwill of
		the National Food Agency to verify each case, as they have their own testing schedule. In addition, GNERC is not updated automatically if there is new complaint in the National Food Agency. They receive it on demand. There is need of kind of a platform of information sharing and coordination in

Table A1.1.: Extended summary of consultation process

⁵⁷ Remember that RIA does not have to contain an outline of all comments received nor all answers to each issue or concern raised

the field on issues such as complaint resolution, violation of drinking water standards, etc;
 In order to avoid any conflict of interests between stakeholder groups all types of uses should be under one regulatory framework;
• High loss because of leakages. Nearly 70-80% of extracted water is lost in the system. Infrastructure is outdated and needs renovation; Efficiency problem is most pressing among state companies, however state is not strict in requesting higher efficiency standards from government owned water suppliers. This is primarily from considerations that it is costly for the state budget to substantially increase infrastructure cost. In addition, as some of the state owned market participants do not comply with standards it is challenging for GNERC to demand compliance from private companies;
• There is general lack of wastewater treatment plants. This is also partly due to the fact that main priority right now is ensuring proper water supply; Lack of economic incentives - due to very low water prices large number of customers are using water wastefully.
General suggestions:
According to worldwide practice, the management of water quality is not under the control of one Regulatory Institutions. The quality should be managed by the MoA (National Food Agency), however there is a need for a better system of coordination between government agency and the regulator. This has to be solved on the legal level;
Director of Water Department of GNERC thinks that in order to reduce wasteful consumption of water, it is preferable to introduce increasing block tariffs ⁵⁸ ;
Approach should focus on two things simultaneously: increasing consumer tariffs (and link them to consumption) and reducing leakages. Reduction of leakages and upgrading of infrastructure is time consuming and cannot be done at once. The tariff setting process at GNERC involves review of annual infrastructure spending and upgrade in case of need;
Sanitary/ecological flow flow ⁵⁹ of the river has to be controlled at least 10% of the flow should be kept in the basin ⁶⁰ ;
Hydrometric units should be created in order to

⁵⁸ Tariff for household is determined based on volume of water household consumes. The amount of water consumption determines the block (consumption category) the household is put in, tariff for water consumption increases for higher usage blocks. The block tariff encourages water conservation and efficient use.

⁵⁹ Needed amount of water that has to be kept in the surface water body to preserve ecological sustainability.

⁶⁰ However, later consultations revealed that experts do not agree on 10%, others think that it should be river specific.

		River Basin Units may differ very much by size/ area and may face different size of problems. They want to know exactly how the river basin units will be formed.
		Reform:
		GNERC is not aware of the proposed draft law and changes, they were not involved in consultations.
		GNERC itself is working on some improvements in tariff methodology related to water and they are eager to share their opinions with the MENRP.
		NEA is informed about the reform. Draft legislation was communicated to them, they have prepared comments and some of their comments were considered;
		Lack of data: There should be a data base for ground and surface waters for efficient allocation of information within stakeholder institutions;
		Regulation concerning the water is very dispersed and is sometimes conflicting;
		Pollution – there is no good data about surface water pollution and there are only few wastewater treatment plants ;
NFA Tamar Bagratia		The status of water resources is currently not defined. There is no classification of waters which is required by directive;
Head of Agency		Improvement of monitoring of every part of water bodies will be difficult and costly;
Head of Environmental Pollution Monitoring Department	IEA, Marine Arabidze, lead of Environmental collution Monitoring pepartment NEA, Ramaz Chitanava, lead of Hydrometeorology pepartment IEA, Merab Gaprindashvili. Head of Geology Department	NEA laboratory has to be upgraded to do all analysis required by the reform. Currently they have chemical analysis, but not all types of biology analysis;
NEA, Ramaz Chitanava, Head of Hydrometeorology		Georgia has sufficient human resources for the reform, but they need additional training.
Department		Other concerns:
NEA, Merab Gaprindashvili. Head of Geology Department		There are principal risks associated with underground waters;
Coolegy Department		Considering that many household have individual wells (in the regions of the country), that are not monitored and there is a lack of coordination between households on discharge of waste water and other pollutants, there is high risk of contamination of underground water bodies;
		At this stage mineral waters are regulated under the law on mining, were it is seen as a mineral resource and issues of environmental protection of these resource are not taken into account in the licensing process. To preserve environmental conditions of mineral waters it needs to be regulated under the same law on water resource management; According to representatives of NEA, the major increase in costs after implementation of the new legislation on water management will be related to the training of staff, because some part of the facilities and equipment
		aiready exists;

		It is quite costly to divide Georgian water resources by their typology and characteristics;
		Experts' evaluations/assessments are needed in order to start analysis of Georgian water resources;
		Major effect on businesses and consumers will be:
		 increase in costs for implementation of new technologies to clean wastewater;
		2. Arrangement of sewage networks around the country.
		 Upgrading monitoring equipment and increase in number of stations.
		Experience from preparations of Chorokhi- Adjaristskali River Basin Management Plan:
		Study was performed under the EU project for preparation of integrated river basin management plans for 6 countries in the black sea basin:
		Preparation of River Basin Management Plan took 2 years and contained 3 phases: i) analysis, ii) delineation iii) impact and pressure analysis;
Zurab Jincharadze, River basin management expert	Interview, 24th of February, ISET-PI office	Study team was a coordination unit and they subcontracted other teams for river basin analysis delineation (15 000 Euro); pressure and impact analysis (40 000 Euro). GIS mapping (20 000 Euro). 100 000 Euro in total;
		Monitoring for preparation of River Basin Management Plan took 3 years and costed approximately 100 000 Euro;
		Study did analysis of river according to European water framework directive, but not all types of required analysis. One such analysis done by them (chemical and biological together) costed 300 Euro. This is market price of the analysis. However, expert thinks that if NEA will be responsible to do it, it will cost lower. Actually, Georgia was one of the two countries with the highest cost in this regard among all the 6 countries studied under the EU project above mentioned.
		Expert's view on proposed reform:
		It is very important. Integrated River Basin Management (IRBM) gives countries a long-term vision of the river basin, improves monitoring of the situation and serves a good basis for strategic decision making. It is good tool for planning purposes. It is not as restrictive as it may seem, it is quite flexible tool of management. It does not require to achieve the best status in one phase (usually 6 years) it gives possibility to have gradual upgrade in the water quality;
		Reform is needs to be implemented as soon as possible Georgia already has pilot River Basin Management Plan prepared. If we delay, this plan will

		be outdated and money spend on it will be wasted. In addition, now Alazani and Khrami River Basin Management Plans are under preparation So country can use these pilot projects effectively;
		River basin regulatory bodies should have only coordinating function. There is no need to have all experts, they can be outsourced. Along with coordination, they should gather information and monitor implementation of the plans;
		At the first stage of the reform there is no need to have regulatory bodies in all river basins. Batumi, Tbilisi and Kutaisi representatives may be enough.
		Additional comments:
		Neither Turkey - with whom we share water resources – nor Georgia are part of Convention on the Protection and Use of Transboundary Watercourses and International Lakes. We did not sign this convention as it would impose a significant number of obligations on Georgia (upstream country). Georgia has still to start negotiation process with Turkey and have bilateral agreement on transboundary water resources. Azerbaijan is part of the convention as it does not share downstream rivers with other countries and the convention burden is much softer for them.
		According to the Organic Law of Georgia - Local Self- Government Code, municipalities' powers/responsibilities related to water management are: a) management of local natural resources, including water, forest and land resources owned by the municipality, in accordance with the law; b) water supply (including technical water supply) and provision of a sewerage system; development of the local amelioration system (Article 16).
NALAG, David Melua. Executive Director	Interview, 27 th of February, NALAG office	But local authorities are not able to fulfil their responsibilities, because of transitional article # 163 in the same law. According to this article, municipalities have to provide water supply and sewerage services through appropriate licensed entities. The creation of these entities is almost impossible, because of the many strict requirements that have to be satisfied. This is why local municipalities as a rule, give water supply rights to an already licensed company - to United Water Supply Company of Georgia. Theoretically anyone can get license for organizing water supply system but given the current legislative constraints, it's almost impossible to get one.
		Currently, the United Water Supply Company of Georgia manages sewerage systems and water distribution in rural settlements and villages and urban areas, even though theoretically these activities are under the responsibilities of Local Authorities. It acts like a monopoly and the quality of services it provides is not satisfactory. This company was created in 2007 unifying a number of municipal water companies. The idea behind unification was to make the field attractive to investors. However, the state was not able to

	attract investors in the system and the company was left in public hands.
	The current system of water supply in municipalities is problematic because of managerial and bureaucratic issues.
	According to NALAG Director, water supply and sewerage systems should be managed and implemented jointly and simultaneously, because a water system can't be organized without the assistance of sewerage system. However, current regulation does not oblige to have water supply and sewerage system together. As building sewage infrastructure is very costly, the state is closing an eye on this issue.
	Currently about 80% of urban settlements have water supply systems in Georgia, while only 25% have sewage systems. (
	Only 5% of village settlements have got central water supply systems.
	The majority of water systems are not fully functioning because of several significant gaps (drains, wells, etc. are not appropriate for clean water supply).
	NALAG director thinks that the major problem in the water management sector municipalities face is a structural problem. The mechanism to manage these resources is absent. He does not agree with general statement that they lack good and qualified staff. According to him, municipalities do have qualified staff on environmental and pollution issues. But, as far as there is no clear definition of the functions for Local Authorities, the staff cannot perform their duties efficiently.
	Concerns about the reform:
	• The Ministry of Environmental has not officially shared draft document with them and they were not involved in consultation process. They would like to receive official version from the ministry as they usually do with other draft legislations and they will provide their feedback afterwards.
	• Major concern is that proposed law is not an organic law, and all clauses which will conflict with laws on higher hierarchy (like Organic Law of Georgia, Local Self-Government Code) will lose power. So respondent thinks that this law will not have any impact in the current legislative setup.
	NALAG Director thinks that optimal solution and design of the water resource management system will be the following:

		 Deconcentration⁶¹ of the power of water management to local authorities (i.e. a transfer a power to them, making them accountable to the central government) accompanied by the transfer of needed financial resources;
		 After devolution local authorities can coordinate within a river basin;
		 Proposed setup will need changes in equalization transfer formula⁶².
		The director of NALAG thinks that the Water Law needs improvements. If the main idea is to ensure the good functioning of municipality in management of water supply, other laws also need to be improved or changed (for example the Law about Budget, Law about Local Authorities and etc. in order to avoid conflicts within laws).
		In addition, he states there are legislative gaps, for instance current law uses term of water resource of local importance, while not defining it.
National Food Agency: Mariam Gorgadze. Head of non Animal Origin Food and Drinks Division of Food Department:		People interviewed are familiar with the reform concept, had seen previous draft versions of the proposed law too. They have very specific comments regarding the latest version of the draft law. Particularly, Article 6, which defines competences of the MoA:
Zurab Zurashvili, Head of International Relations Department, Division of Harmonization with EU;		One of the competences is defined in the following way: the MoA has to ensure drinking water quality control. Ministry representatives think that this term "control" has to be changed by "state control", as only control is broad term and involved many actions, while
Nino Kharabadze, Specialist of International Relations Department, Division of Harmonization	Interview, 9th of March, National Food Agency office	state control is very specific and is their responsibility. It contains inspection, monitoring, documentation checking, analysis and recommendations;
with EU.		They also state that the point d) in article 6 is not stated in a proper way and is ambiguous. It is not clear what competence is assumed under this statement:
Ketevan Laperashvili, Deputy Head of Food and Agriculture Department		One of the issues, raised by them was classification of water products. The draft law will abolish the existing law and, accordingly, classification rules of water products. So, the classification of water products has to be somewhere in the new regulation, either in the law of water management or in supplementary regulations. This is a very important issue and has to be taken into account;
		National Food Agency does not have laboratories for water quality checks. They outsource this service.

⁶¹Deconcentration—redistribution of the decision making authority and financial and management responsibilities among different levels of the central government. It can merely shift responsibilities from central government officials in the capital city to those working in regions, provinces or districts, or it can create strong field administration or local administrative capacity under the supervision of central government ministries and is often considered to be the weakest form of decentralization.

⁶²It is a formula defined in the Georgian Budgetary Code used to calculate transfers from state budget to local budgets.

		Agency's staff collect samples and bring it to laboratories that do analysis;
		National Food Agency currently does two types of control of drinking water: planned and non-planed (upon a request). At the beginning of each year they plan control points and indicators of interest, based on their own sampling methodology. However, if GNERC or someone else requests checking of other points, they usually do it. Depending on resource availability and availability of outsourcing company (which does laboratory checks), they decide to do it or not satisfy the request. Currently they have requests from GNERC but are not able to check water quality as due to requirements of tender procedures;
		In case water quality is not satisfactory, National Food Agency writes recommendations and water provider companies are obliged to fulfill them. If they do not manage in certain given period they are fined.
		Information about water checks and annual reports are publicly available.
		As for water management costs, National Food Agency cannot provide this category separately as these costs are interlinked with other costs. They can provide information about the amounts paid to outsourcing companies for water quality checks by years.
		Interviewed people think that new legislation will increase costs for companies' operations in the sector and laboratory costs.
MRDI		Ministry of Regional Development and Infrastructure of Georgia was involved in the discussions of draft law 2 years ago, but there is no much institutional memory left now. People involved in the discussion process are not working there anymore;
Matsatso Tepnadze, Head		Main problems of the draft law according to people interviewed are:
Nika Rosebashvili,	Interview 16th of	 Dates proposed in the draft law. They think that it is impossible to comply with all regulations in short period of time and they need at least 5 years;
with Regions and Local Self-government agencies	March, Ministry of Regional	2. Representative of United Water Supply Company (UWSCG) thinks that standards set are very high
David Metreveli, Paata Jioshvili, Legal Support Service	Development and Infrastructure of Georgia's office	UWSCG rough calculations it will cost GEL10 bln for the company to comply with all standards. And if company has this money they will need minimum 5 years to upgrade all infrastructure;
UWSCG		3. This draft law contradicts with existing legislation.
David Kordzaxashvili, Legal Department		Problems are with the definition of waters of local importance. They are not defined anywhere yet.
		They propose to implement all the changes gradually and give possibility to system for adaptation.
		When asked about local authorities, United Water Supply Company representative said that the company is not willing to receive new infrastructure for management from local authorities. Construction of

		water supply infrastructure usually is not negotiated with the company in the first stage, many standards are not met and when the company becomes owner of such infrastructure it inherits additional problems. UWSCG thinks that licensing conditions are not as strict as local authorities say, and claim that there are cases in which local municipalities have created and are operating such companies (as examples they cite Batumi, Marneuli, Sachkhere also in Ozurgeti, and Borjomi - but the last two do not have license yet. They are in process of getting it). Ministry representative thinks that main problems faced by local authorities is lack of finances and non- adequate regulatory base.
GWP Nino Sulkhanishvili, Head of Environmental Service Department of GWP Beso Koberidze, Deputy Head of Legal Department GWP	Interview, 6 th of April, Georgian Water and Power	 Georgian Water and Power was not involved in consultations process of preparation of the law. However, they have reviewed the proposed legislation and have provided comments. The company had comments regarding distribution of responsibilities among different agencies, permit systems, sanitary protection zones and wastewater treatment. Specifically: 1. At this point the company is applying for underground water abstraction permits from NEA as a mineral resource for next 5 years. Under the proposed legislation the responsibility for water abstraction permits is given by MENRP protection. The company was interested whether their permits will still be valid after draft law is in place; 2. Article 6, paragraph 4.L states that protected areas (zones) of the water bodies (sanitary zones were activity and development is restricted due to contamination risks) is determined by MENRP, while projects of sanitary zones are approved by local government (article 3, para 8,D). The company was interested in who approves these sanitary zones, their opinion is that sanitary zones have to be determined and approved by one Ministry in order to make it simpler for the companies to solve issues arising from this zoning. In addition, the company is concerned that in many cases it is hard to negotiate with local governments as they try to put all responsibilities on the companies. The GWP thinks that it should be the prerogative of the MoLHSA to determine and approve these zones; 3. In addition to determination and approval of sanitary zones under its management (for example, Jinvali, Bulachauri) there are houses and restaurants. Consequently, either properties have to be removed from the zones – with the owners of those properties being compensated – or these actors will have to be regulated to avoid any contamination of the drinking waters;
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		 As soon as new law on water management is approved GNERC will have to amend water consumption and supply rules;
		 Technical rules for wastewater discharge into the water bodies are problematic considering that most rules adopted are from the Soviet Union standards for Russia SFSR that are not adequate for Georgia. New rules have to be established;
		6. One of the most problematic issues is industrial wastewater and waste discharge in sewage networks that causes breakdown of both networks and potentially will put into risk biological waste water treatment plant. There is a need for legislative acts that will regulate the substances that can be discharged in sewage networks.
Ministry of Energy of Georgia David Sharikadze, Head of Energy Department	Interview 11 th of April, Ministry of Energy	 Ministry of Energy of Georgia was involved in the consultations process about the draft law on water resource management. The main concerns of the ministry were articles related to licensing of entities that are required to receive environmental impact permit. Article 16 paragraph 4 states that water users that are subject to ecological expertise⁶³ do not have to receive additional permits for water use. On the contrary, article 18 paragraph 5 states that those water users who are subject to ecological expertise, or environmental impact permit should receive water use permit without additional regulatory steps. This is one of the main concerns for the Ministry of Energy, considering the hydro power plants are subject to environmental impact permits covering water use, thus they should not need additional permit for water use. The issue has not yet been solved in the final draft. Some of the terms in the law are not well defined. Examples are transit, transition waters, transboundary lakes and artificial lakes (water bodies); Wording in the law is not clear and gives ground for subjective thinking and ambiguity. Words like "important" and "substantial" are used in number of instances to characterize pollution of surface or underground water bodies, instead of such word specific measures have to be introduced; Article 4 paragraph Z defines the term pollution that includes air and soil pollution. The representative of the ministry states that, considering that the law is about water management issues, the definition of pollution has to be related to water only and should not cover air and soil; The law does not state clearly, which government entity is going to control water use for energy generation purposes. The Ministry representative states that current set-up gives large number of

⁶³ Under Current law on ecological expertise #5603, 14.12.2007.

		 entities such responsibilities. There should be one entity responsible for energy sector's water use, both for hydro powers and thermal power plants; 5. Another important issue is treatment of sanitary zones and in particular of those buildings that are currently built within the territory of such zones. This is not defined in the law. 6. Under the draft law on water management it is not clear how small HPPs (with capacity under 2MW) will be treated. Specifically, it is not clear whether they will have to receive water use permit. Originally, the purpose of deregulating them from any type of permits was to support development of such small HPP stations; 7. The draft law under current set-up can become an obstacle for future investments in hydropower sector due to unclear regulation and regulating entities. If law is concrete, clear and less bureaucratic it can help the investors to plan their actions well It is also not clear how number of years of validity for special water use permits is defined. Specifically, representative of Ministry of energy thinks that unless water use specifications of HPP's equipment are changed it will be useless to request renewal of water use permits every 30 years.
		The Green Movement of Georgia has been involved in the process of formation of the draft law. However, they were not familiar with the final draft. The general concern of the stakeholder towards the law was that it is not detailed enough, thus giving different government agencies the possibility to interpret the law in multiple ways. The level of detail should be such that it defines the principles of all sub-laws that have to be formed afterwards. Some of the other comments are the following:
The Greens Movement of Georgia / Friends of the Earth Georgia, Nino Chkhobadze Co-Chair	Interview 19 th of April, The Greens Movement of Georgia / Friends of the Earth Georgia office	 Licensing of the underground water has to be put under the same law, as surface water i.e. Law on Water Resource Management. The system of environmental impact permits and ecological expertise is problematic as it does not look at overall environmental picture, rather each area of expertise and each permit looks at specific area of impact. Thus it is frequent that other environmental impacts are left out of consideration. Ms. Chkhobadze thinks that Georgia has to use EU approach and introduce system of one integrated permits. This will be much simpler system that will include all types of environmental impacts of the polluter. She also thinks as law introduces requirements for new permits it will violate EU water framework directive. River basin organizations have to be independent and must have independent council and decentralized management to provide better monitoring of the water users. One of the options proposed was case of Netherlands, where river basin councils are elected. Supervision, monitoring and prevention of water

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		 pollution must be done by the river basin organization as well, that has to be in close cooperation with the local government. Checks have to be conducted with pre-agreed schedule of the water user. 5. The general principles of "user pays" and "polluter pays" leave space for interpretation. For this reason all charges/fees have to be written in the law, so that there is less space for interpretation. 6. Economic benefits of this law are substantial. Specifically, it can ensure that whole country has same quality of water supply and wastewater treatment services. The law envisages very large infrastructure development that can bring substantial benefits to the country in general.
DES, Ministry of Environment and Natural Resource Protection of Georgia Neli Korkotadze Chief State Inspector	Interview 4 th of May, Ministry of Environment and Natural Resource Protection of Georgia	 Representatives of Department of Environmental Supervision of Ministry of Environment of Georgia, were involved in discussions of the law however the process became too long. They have not reviewed the latest version in detail, however the respondent thinks that the version is acceptable. From the point of view of responsibilities of DES in the law, the chief state inspector does not see any changes. However, she expects much higher responsibilities and costs, as the number of entities to be checked will substantially increase. Except checking licensed enterprises DES does not monitor actively water pollution. Other pollution incidents are discovered either casually by the inspectors, or in reaction to complaints. Specific points that chief inspector addressed have been following: 1. Introduction of the law can bring initial pressure on the costs for businesses, as they will have to comply with more stringent standards of water abstraction and discharge. 2. Conflicts between different water users are currently in place and ministry representative thinks that the local bodies will not be able to resolve them. 3. Environmental Impact permits were not an adequate measure to protect the water resources from pollution. 4. Integrated permit system will be hard to implement in practice, as it will make for some parties easier to take permits, but will complicate things for others who need only one or two permit. 5. Costs of DES will substantially increase as number of regulated entities will increase. At this stage they supervise around 10,000 entities with staff of 423 people from whom 120 are inspectors. DES usually inspects 200 entities per year as a plan. In many regions inspectors with specific knowledge of different impacts are lacking. They will require around 30 additional inspectors specialized in water issues (total of 150 inspectors). 6. Infrastructure is also lacking, they only have mobile laboratory, however they cooperate with National Enviro

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		 cooperation is not enough for reacting on such violations that need fast reaction. There are number of cases when it became impossible to prove the evidence due to inability of the simplest materials, such as sterilized containers. 7. Salaries of the staff are very low, average salary is 800 GEL, while in many cases the fines the inspector gives are substantially larger creating threat of corruption. Considering, that frequently it is hard to identify violation, there is large risk of corruption through bribing the inspector. This also causes very frequent rotation of the staff, as most of them find jobs in the private sector with higher salaries. 8. Unlike many other regulatory entities of the state frequently have regulatory fees, however DES is 100% financed by the government and no regulation fees are set. All charges and fines from the entities go to the central budget with standard procedures. 9. At this stage there is no system of voluntary inspection, private sector frequently wants to check its compliance to avoid large fines. There has to be environmental audit services within the DES. 10. Methodology of calculating damage is old. 11. They have electronic registry of the regulated entities and fines, however the database has to be improved. 12. Overall, DES does not have enough finances and flexibility. For example if a company wants voluntary check, DES can not offer this service as it is not allowed with a legislation. They have only punitive function
GA, Advisor to the Director Nikoloz Abuashvili	Interview 6 th of May, ISET Policy Institute	 Mr. Abuashvili also serves as an advisor at UWSCG, thus the interview covered topics of amelioration, drinking water supply and waste water treatment. The general comment, about the process around the draft law was that amelioration company was not involved. MoA was involved in discussions, however amelioration company was not. Comments, about issues raised in the law related to water supply and waste water treatment (i.e. functioning of all waste water treatment plants by 2021) were the following: WWTP can be built with the subsidies from the government and/or the donor funding, however how will operation and maintenance costs be covered? Due to many alternative sources of water supply etc. collection figures are low for UWSCG. Tariff system also has to be improved not to allow cross-subsidization between sectors. Another important problem is that even when WWTPs are built there is a general lack of people who will operate it properly. Lack of skilled personnel for operating WWTPs is one of the biggest problems. In some places (for example Poti), there has been a problem, when WWTP has been constructed with much larger capacity then demanded, making it impossible for the company to operate it.

There is also problem of metering both water
supply and waste water. Problem with water
supply meters is that many of them were
purchased with wrong specifications creating
problems in winter. On the waste water as it is
bord to motor waste water discharge the problem
naid to meter waste water discharge the problem
exists with those households and industries who
nave water supply from their own wells. In this
case, it is hard to monitor the exact discharge.
Thus for the waste water discharge there is the
problem of monitoring the use of infrastructure,
thus creating problems for setting correct
charges.
For the Amelioration Company:
1. The company has started to discuss providing
services of waste water discharge to the farmers
as there is some experience from the other
countries. However discussions are at the initial
Slaye.
2. GA sometimes has problems of water quality,
specifically in some systems they had high PH
levels. In general in terms of water quality the big
problem is water discharge into water bodies from
fisheries. When fertilizers are used to grow fish
and afterwards water is abstracted from the
bodies were discharge happened from fisheries
farmers have problems with properly calculating
amount of fertilizers. Measurements of quality of
water and its volume is a problem for GA
2 Another problem is supply of water to hydronower
3. Another problem is supply of water to hydropower
to use water in winter when electricity prices are
to use water in winter when electricity prices are
high, instead most of water supply for irrigation
purposes happens in summer, when electricity
prices are low and HPPs are not interested in
generation. It is frequently a reason of conflict
between GA, MoE and MoA. The new law might
involve MENRP in this conflict, however there
might be a potential to solve the problem in case
priorities are set correctly. Another problem on the
same tonic is when discharge from hydronower
happens not back in the system, but apparetally in
happens not back in the system, but separately in
the ravines, in this case water is lost for the
agricultural purposes.
For the general comments, Mr. Abuashvili does not
see licensing as a problem, as long as UWSCG and
GA remain in government ownership (monopolies) as
licensing can be solved on the government level. He
does not understand logic of years set for renewal of
licensing as water supply standards are far more
frequently changing as evetame for irrigation. He also
nequently changing, as systems for impation. The disc
sees a big potential in small capacity www i P tor the
rurai settlements.

		RMG was not involved in consultation process.
		RMG thinks that currently there is excess bureaucracy to some extent, as they have to fill some forms that come from the Soviet times (so called "pads") purpose and use of these forms is ambiguous;
		With current legislation they abstract water according to technical regulation that does not require permit. It should be noted that most of the RMG-s water consumption comes from the closed water circle. In addition, they have another source of water from utilities.
		Current legislations is more comfortable for them.
Rich Metals Group (RMG) Head of Environment protection department. Micheil Kvaratkhelia Konstantine Khachapuridze	Interview 15 th of May RMG Office	 RMG has provided following comments on the draft law⁶⁴: 1. the term –ecological cost is ambiguous and is not defined properly; 2. Issuing special permit on water abstraction from surface water bodies and water discharge should be added to the competencies of the MENRP in article 6; 3. Move terms protected and sanitation zones from article 10 to term definitions section; 4. They do not understand regulation on wells from 10 and 25 meter come from (article 15, paragraph 2 a). They suspect that it might be problematic for government to regulate as many households have wells much deeper than 25 meters used for non-commercial purposes; 5. They are interested what the sanctions are if article 31 is violated. In addition, who will pay for costs for pollution if company is insolvent and / or becomes one.
		During the interview additional concerns were revealed:
		 RMG thinks that it will increase costs for the government as there is lack of laboratories, equipment and qualified staff. Their biggest concern is that there is lack of professional inspectors who understand production /mining specificities; Considering that they will have to pay for water use and discharge, as well as build waste water treatment facilities, their costs will definitely increase. However it is not going to be a big burden for their companies. As the company also receives water from the utilities, they do not understand how government will regulate this case with proposed draft law.
National Environment Agency (NEA), Marine Arabidze, Head of	Interview 8 th of June	The main aim of the meeting was to identify costs of monitoring of surface water and estimated changes with respect to the reform.
Environmental Pollution Monitoring Department	NEA UNICE	Current situation:
		In 2017 NEA schedule includes 158 checking

⁶⁴ The RIA team has shared draft law with RMG in advance

 points (some are checked twice a month, some once a month and etc); Yearly transportation and allowance costs for monitoring activities were GEL 25 000 in 2017 and half of them is on water quality monitoring – GEL 12 500 Expected costs of proposed reform:
1. Defineation has to be done. This cost will be covered in river basin management plans and are expected to be paid by donors. Delineation in Adjara is already done, Khrami-Debeda and Alazani-Iori projects are expected to prepare RBMP that includes delineation;
 Identifying pressure and impacts - this cost will be covered in river basin management plans;
3. Expected number of monitoring points (all the three sets of indicators) 300 after the reform. Associated costs (transportation and allowance + consumable and maintenance are expected to double)
4. analysis
Biological – new staff, training, equipment (special nets, electro fishing equipment, books and etc. are needed). Particularly:
 USD 100,000 for equipment; 4 new personal (biologists) in Tbilisi, 3 new personal in Kutaisi. Batumi already has staff. Average wage GEL 900 (gross). Current wages are GEL 700 (junior researcher), 900 (researcher), 1,100 (senior researcher). For the head of the team we can assume GEL 1500 These staff members need training (1 week). Training of trainers may be conducted; For biological analysis NEA will need maintenance, consumables and net equipment costs – USD 10,000 per year.
Chemical
 Laboratory equipment USD 0.5 mln. Is expected to be paid by donor; Currently new central laboratory is built in Tbilisi. It is expected to be finished in October 2017. Costs of the laboratory are on average GEL 700,000. in addition, it will need accreditation too and accreditation costs up to GEL 10,000[not to be included as cost due to Water Framework Directive (WFD)]; In scope of the reform NEA will need 2 additional chemists (to work on gas chromatograph). Wage GEL 1,100.
Current costs of consumables and maintenance for chemical and physical analysis are: USD 40,000 consumables, USD 10,000 maintenance. They are expected to double in Tbilisi. To this should be added also extra consumables and maintenance costs for Kutaisi (approximately 20,000 + 5,000 USD yearly).

		Equipment costs (only at the beginning) 150,000 USD
		Common costs
		 Two new cars – Mitshubishi L 200 (market price per car USD 23,500 year of production 2017); 4 additional staff members for field monitoring (900 GEL/month)
		5. Giving status to water bodies – classification. There is no experience in this regard in Georgia. So training for everyone in classification based on data, assigning borders is needed. Supported by donors, e.g. Technical Assistance and Information Exchange instrument of the European Commission (TAIEX). Software also might be needed, but they hope that some donors will finance it (cost unclear anyway).
		Additional concern:
		There is need of online data portal in order to manage water sector efficiently. Currently database is not automatically shared between different state organizations such as NEA, DES and MENRP. Slovakia has good experience of building such online platform in twining project with Italy and it cost EURO 2 mln. This Slovak data portal is easily accessible for the public too.
		Water quality information is free of charge by legislation and thus NEA is not receiving revenues from selling this information.
		In addition, in case river basins will be more decentralized, there is possibility that additional laboratory in Telavi will be needed to be built. It will approximately cost USD 100,000, will need 2 people (with wage GEL 900, gross), 1 supervisor (GEL 1,250, gross) and a car.
		Before 1990th Georgia had 493 monitoring points of underground water.
National Environment Agency (NEA), Merab Gaprindashvili Head of Geology Department	Interview 9 th of June NEA Office	Currently country has 40 monitoring points. Out of these: 6 are on spring water, automatic monitoring, but one has to go there every 6 month and take data with USB; 9 are on Alazani river, data is monitored online but it does not measure everything – some sensors are missing; 25 checking points are the best quality available, they provide monitoring in online regime.
		In 2017, 2 new points will be added and starting from 2018, country will have 52 checking points (6 spring and 46 bore-holes).
		Equipment for one checking point of good quality costs approximately GEL 12,000 – 15,000 and has 5 sensors. The maintenance cost of one checking point per year is GEL 100.
		 In case of the reform: number of checking points has to be increased to 100 (double). This increase may be spread over 5 year period, thus adding 10 per year; Geology department will need 4 new staff, gross

		salary GEL 1,300 • Two new cars. One of the concerns Mr. Gaprindashvili raised is that AA agreement and correspondingly draft law does not include issues on landslides and raging mountain torrents, as these issues are not problematic in Europe, but are major issues in Georgia.
Department of Environmental Supervision (DES), Ministry of Environment and Natural Resource Protection of	Interview 9 th of June, Ministry of Environment and Natural Resource	 The main aim of the meeting was to identify costs of monitoring of surface water and estimated changes with respect to the reform. Currently, in 2017, DES has 70 planned checks for companies that have environment impact permit. In case of the reform this number has to be double to 140 per year. As for unplanned checks currently they are approximately 140 per year, and she expects their number to double to 280. It has to be mentioned, that with increased public awareness on environmental pollution issues, number of unplanned checks are increasing. Additional checks, to implement responsibilities under the new law i.e. checking companies subject for surface water abstraction and discharge permits, DES will need: 40 additional inspectors, gross salary GEL 1,000; one express laboratory
Resource Protection of Georgia Neli Korkotadze Chief State Inspector	Protection of Georgia	 8 cars. Major concern and problem DES faces is paper work and absence of data exchange portal between DES, NEA, MENRP and Revenue Service. At this stage companies who are responsible to submit their self- monitoring results and reports under environmental impact permit do it through delivering a hard-copy. Scanning and review of this documentation and their comparison with conditions of environmental impact permits are taking large portion of the time of inspectors. In addition, to check information under licensing condition about payment of resource fees DES has to request information about each license owner from RS, this procedure takes at least one week. In case the company does not submit annual report of self-monitoring the fine is only GEL 150 that in some cases is less than the travel costs for submission.
National Environment Agency (NEA), Ramaz Chitanava, Head of Hydrometeorology Department	Interview 9 th of June, NEA office	The main aim of the meeting was to identify costs of monitoring of surface water and estimate changes with respect to the reform, but Mr. Chitanava confirmed that draft law does not impose additional requirements on his department and they will not have to bear additional costs. Hydrometeorology Department will continue to follow its plans. Still we provide some information about current situation and plans.

 Currently Georgia has 58 checking points. 49 from them are automatic ones; In future it will be needed to increase number of checking points to 200; Cost of one automatic checking point is (price, installation and delivery) is USD 10,000. Yearly maintenance and operational (i.e. measuring the quantity of water) costs per point – GEL 1,000; Increased number of checking points will require: 5 new specialists, with gross wages GEL 1,500; 2 new cars, 2 new measurement equipment (cost of one equipment is approximately EURO 40,000); In addition to checking points, number of meteorological stations will have to increase from 33 to 100. This increase has to occur gradually, 10 new stations per year. Cost of one meteorological stations will be paid by donors. To sum up, regardless the fact that Mr. Chitanava does not expect increase responsibility related to the reform, he thinks that in case of the new law he will have additional legitimate basis to lobby department needs for expansion. 		
		 Currently Georgia has 58 checking points. 49 from them are automatic ones; In future it will be needed to increase number of checking points to 200; Cost of one automatic checking point is (price, installation and delivery) is USD 10,000. Yearly maintenance and operational (i.e. measuring the quantity of water) costs per point – GEL 1,000; Increased number of checking points will require: 5 new specialists, with gross wages GEL 1,500; 2 new cars, 2 new measurement equipment (cost of one equipment is approximately EURO 40,000); In addition to checking points, number of meteorological stations will have to increase from 33 to 100. This increase has to occur gradually, 10 new stations per year. Cost of one meteorological stations will be paid by donors. To sum up, regardless the fact that Mr. Chitanava does not expect increase responsibility related to the reform, he thinks that in case of the new law he will have additional legitimate basis to lobby department needs for expansion.

Appendix 2: official comments on the draft law from MRDI and UWSCG

"წყლის რესურსების მართვის შესახებ " კანონპროექტის პირველადი შენიშვნები შპს "გაერთიანებული წყალმომარაგების კომპანია"

ზოგადი ხასიათის შენიშვნები:

წარმოდგენილი კანონპროექტი "წყლის რესურსების მართვის შესახებ" მოიცავს მრავალ ხარვეზს, რომლის ამოქმედების შემთხვევაშიც შეუძლებელი გახდება შპს "საქართველოს გაერთიანებული წყალმომარაგების კომპანიის" (შემდგომში "კომპანია") გამართული ფუნქციონირება.

აღსანიშნავია ის გარემოება, რომ კანონპროექტს თან არ ახლავს განმარტებითი ბარათი და შესაბამისად არ არის წარმოდგენილი თუ რა დამატებითი ფინანსური ვალდებულებების აღება მოუწევს საქართველოს იმისათვის, რომ კანონით გაწერილი ვალდებულებები შეასრულოს.

აუცილებელია კანონქვემდებარე ნორმატიული აქტების შემუშავება, რომლითაც ზუსტად განისაზღვრება *ზედაპირული წყლების სენსიტიური არეალები*, ეს საშუალებას მისცემს კომპანიას შეიმუშაოს ჩამდინარე წყლების გამწმენდი ნაგებობების მშენებლობის სამოქმედო გეგმა/სტრატეგია, პრიორიტეტების მიხედვით.

მიზანშეწონილად მიგვაჩნია პროექტის განხილვაში აქტიურად იყვნენ ჩართულნი მუნიციპალიტეტები, რომელთა ერთ-ერთ უმნიშვნელოვანეს კომპეტენციას განეკუთვნება პროექტების დაცვის ზონების სასმელი წყლის წყაროების სანიტარული დამტკიცება და ასევე საქართველოს მასშტაბით არსებული მსხვილი საწარმოები, რომლებიც ზედაპირული წყლების საკმაოდ დიდი დაბინძურების წყაროს წარმოადგენენ. გამომდინარე იქიდან, რომ დღეის მდგომარეობით შპს "საქართველოს გაერთიანებული წყალმომარაგების კომპანიის" მიერ პროექტით გათვალისწინებული გამწმენდი ნაგებობები გათვლილია მხოლოდ 4 კომპონენტის (BOD, COD, შეწონილი ნაწილაკები, TN (Total N)/TP (Total P)) გაწმენდაზე აუცილებელია მსხვილი საწარმოებისთვის დადგენილ იქნას გამწმენდი ნაგებობების მოწყობა ფუნქციონირების სფეროდან გამომდინარე და გარკვეულ დონეზე გაწმენდილი წყალჩაშვების წარმოება, იმისათვის, რომ კომპანიის მიერ მოწყობილი გამწმენდი ნაგებობა არ დადგეს საფრთხის წინაშე.

აუცილებელია კანონში შევიდეს ჩანაწერი, რომლითაც დარეგულირდება ჩამდინარე წყლების გამწმენდი ნაგებობის ფუნქციონირების შედეგად წარმოქმნილი ნარჩენი ლამის მართვისა და განთავსების საკითხები.

კონკრეტული ხასიათის შენიშვნები:

მირითადი ყურადღება გვინდა გავამახვილოთ კანონპროექტის შემდეგ მუხლებზე:

მუხლი 20.

პუნქტები 1-2 და ქვემოთ ჩამოთვლილი ქვეპუნქტები, რომლის შეუფერხებელი შესრულება, კანონპროექტის მიღებისა და ამოქმედების შემთხვევაში, წყალმომარაგების კომპანიის ამჟამინდელი ტექნიკურ-მატერიალური აღჭურვილობით შეუძლებელია და რაც მოითხოვს დამატებით ფინანსურ რესურსებს, ასევე დასაზუსტებელია ზოგიერთი ტერმინოლოგია.

მუხლი 20, ქვეპუნქტი 1:

გ) აწარმოოს წყალსარგებლობის აღრიცხვა კანონმდებლობით დადგენილი წესით;

ვ) უზრუნველყოს წყლის აღების წერტილებში წყალმზომების ან ჰიდრომეტრიული საგუშაგოების დამონტაჟება;

დასაზუსტებელია, რას გულისხმობს წყალსარგებლობის აღრიცხვა კანონით დადგენილი წესით. თუ კანონით დაკისრებულ იქნება სეზონური აღრიცხვის ვალდებულება, მაშინ წინააღმდეგობაში მოდის ამავე პუნქტის "ვ)" ქვეპუნქტი, რომელიც ქმნის ვალდებულებას ყოველი წყალაღების ობიექტზე მოეწყოს წყალმზომები ან დამონტაჟდეს ჰიდრომეტრიული საგუშაგოები.

მუხლი 20, ქვეპუნქტი 2:

ბ) თვითმონიტორინგის გზით სისტემატურად აკონტროლოს ჩამდინარე წყალში დამაბინძურებელ ნივთიერებათა კონცენტრაცია, რომლის რაოდენობაც არ უნდა აღემატებოდეს ნებართვით დადგენილ ზღვრებს;

გ) წესრიგში იქონიოს გამწმენდი და სხვა ნაგებობები, ტექნიკური მოწყობილობები, რომლებიც გავლენას ახდენენ წყლის მდგომარეობაზე;

დ) აწარმოოს წყალსარგებლობის აღრიცხვა კანონმდებლობით დადგენილი წესით;

მიზანშეწონილად მიგვაჩნია განისაზღვროს რა იგულისხმება წყალში დამაბინპურებელ ნივთიერებათა კონცენტრაციის სისტემატური კონტროლი, რა პერიოდულობას მოიცავს სისტემატიური კონტროლი (იქნება ეს ე.წ "online" რეჟიმში თუ რაღაც გარკვეული პერიოდულობით).

ასევე ზუსტად განისაზღვროს, რა იგულისხმება კანონმდებლობით განსაზღვრული წესის ქვეშ.

მუხლი 20, პუნქტი 4:

"ზედაპირულ წყლის ობიექტებზე სპეციალური წყალსარგებლობის ნებართვის მოქმედების პერიოდში, ნებართვის გამცემი ორგანო უფლებამოსილია, მოსთხოვოს ნებართვის მფლობელს, შეასრულოს წყალაღების და წყალჩაშვების შედეგად წყლის ობიექტზე ზემოქმედების შემამცირებელი ის ღონისმიებები, რომელთა განხორციელების აუცილებლობაც განპირობებულია მდინარეთა სააუზო მართვის გეგმებით განსაზღვრული მოთხოვნებით".

გამომდინარე იქიდან, რომ წყალაღების თუ წყალჩაშვების ობიექტების მოწყობა საჭიროებს ფინანსურ და დროის საკმაოდ დიდ რესურსებს მიზანშეწონილად მიგვაჩნია დაზუსტდეს რას მოიცავს მდინარეთა სააუზო მართვის გეგმებით განსაზღვრული მოთხოვნები, იმისათვის რომ ობიექტების მოწყობა მოხდეს ზემოაღნიშნულ მოთხოვნათა შესაბამისად გონივრულ ვადებში.

ასევე მიზანშეწონილად მიგვაჩნია ზემოაღნიშნულ პუნქტს დაემატოს ვადები, რა ვადებში უნდა მოხდეს წყალაღების და წყალჩაშვების შედეგად წყლის ობიექტზე ზემოქმედების შემამცირებელი ღონისძიებები. აუცილებელია ეს იყოს გონივრული ვადები იმისათვის, რომ არ მოხდეს წყალმომარაგებასთან ან წყალჩაშვებასთან შემცირებით გამოწვეული პრობლემები.

მუხლი 21:

ავარიული მცირეწყლიანობის, წყლის ობიექტზე "განსაკუთრებული საშიშროეზის, სტიქიური 56 ეპიზოტიის გაჩენის სიტუაციის, ეპიდემიის ექსტრემალურ მოვლენების, სამხედრო მოქმედებების დროს და 6635 გამომდინარე, ზედაპირულ საზოგადოებრივი ინტერესებიდან შემთხვევებში, სპეციალური წყალსარგებლობის ნებართვის მფლობელის, 69000 ობიექტებზე ექსპერტიზის ასევე, გარემოზე ზემოქმედების ნებართვის ან/და ეკოლოგიური სპეციალური წყალმოსარგებლის უფლებები შეიძლება მფლობელი დასკვნის შეიზღუდოს ნებართვის გამცემი ორგანოს მიერ."

განიმარტოს რა იგულისხმება ტერმინში "და სხვა ექსტრემალურ შემთხვევაში", რაც წინამდებარე კანონპროექტით, ნებართვის გამცემ ორგანოს საშუალებას აძლევს სპეციალური წყალმოსარგებლის უფლებები შეუჩეროს ექსპერტიზის დასკვნის მფლობელს.

მუხლი 31.

"1. წყლის ობიექტების დაბინძურების, დანაგვიანების, დაშრეტის და სხვა უარყოფითი ზემოქმედებისაგან დაცვის მიზნით აკრძალულია:

ო) შთანმთქმელი ჭაბურღილების ბურღვა და შთანმთქმელი ჭების მოწყობა, აგრეთვე გაზისა და ნავთობის დამუშავებული საბადოების, შახტებისა და კარიერების, ბუნებრივი მიწისქვეშა სიცარიელეების სამრეწველო და საყოფაცხოვრებო ჩამდინარე წყლების ჩასაშვებად გამოყენება, თუ ამან შეიძლება გამოიწვიოს მიწისქვეშა წყლების შემცველი ჰორიზონტების დაბინძურება;

პ) ისეთი საქმინობა, რამაც შესაძლოა დააზიანოს წყალმომარაგების ნაგებობა, გააუარესოს წყლის ხარისხი და შეამციროს წყლის დებეტი."

გამომდინარე იქიდან, რომ ინერტული მასალის მოპოვება (ქვიშის) მირითადად ხდება წყლის გამფილტრავი ფენებიდან, რომელიც შემდგომში ხელს უშლის წყლის ფორმირებას და მის ბუნებრივ ფილტრაციას, აუცილებელია რომ დოკუმენტში მკაცრად განისაზღვროს ინერტული მასალების მოპოვების აკრმალვა მდინარეების ფორმირეზა. ხდება სასმელი წყლის ასევე კალაპოტში, საიდანაც აქტიურ მიზანშეწონილად მიგვაჩნია კანონში შეტანილ იქნას ჩანაწერი, რომ თითოეულ კონკრეტულ შემთხვევაში აუცილებელია მოხდეს წინასწარი შესწავლა შესაბამისი კომპეტენტური უწყების მიერ და მხოლოდ შესწავლის საფუძველზე იქნას დადგენილი მდინარის (თუ სხვა წყალაღების ობიექტის) სანიტარული დაცვის ზონა სამეწარმეო თუ სხვა საქმიანობისთვის, კონკრეტული ადგილის მახასიათებლებიდან გამომდინარე, იმისათვის რომ არ მოხდეს წყლის ზუნებრივი წყაროების კალაპოტის ცვლილება და კომპანიის სათავე ნაგებობებისა თუ სატუმბი სადგურების გაუქმება.

შპს "საქართველოს გაერთიანებული წყალმომარაგების კომპანიას" თავისი ფუნქციონირების პერიოდში, პრაქტიკაში ქონია შემთხვევა, როდესაც სხვადასხვა სამეწარმეო საქმიანობის გამო დაუკარგავს დებეტი და ვეღარ განუხორციელებია მისი სამეწარმეო საქმიანობა.

მუხლი 42:

"წყალსარგებლობისთვის გათვალისწინებული ობიექტები, რომლებიც ექვემდებარებიან სანებართვო რეჟიმს და რომელთა დაპროექტება, მშენებლობა ან ექსპლუატაციაში გადაცემა მოხდა ან დაიწყო "წყლის შესახებ" საქართველოს კანონის მე-18 მუხლის მე-4 პუნქტით განსაზღვრული მოთხოვნების გაუთვალისწინებლად, ვალდებული არიან, "წყლის რესურსების მართვის შესახებ" საქართველოს კანონის ძალაში შესვლიდან 12 თვის განმავლობაში, უზრუნველყონ ამ ობიექტების ამ კანონის 31-ე მუხლის მე-3 პუნქტის მოთხოვნებთან შესაბამისობაში მოყვანა, ხოლო ურბანული ჩამდინარე წყლების გამწმენდი ნაგებობის მოწყობა - 2021 წლამდე."

გამომდინარე იქიდან, რომ დღეის მდგომარეობით შპს "საქართველოს გაერთიანებული წყალმომარაგების კომპანია" ოპერირებს დაახლოებით 340 დასახლებულ პუნქტში შეუძლებელია განხორციელდეს ურბანული ჩამდინარე წყლების გამწმენდი ნაგებობების მოწყობა 2021 წლამდე, თუნდაც შემუშავებულ იქნეს შესაბამისი სამთავრობო სტრატეგია და მოძიებულ იქნეს მნიშვნელოვანი ფინანსური რესურსები.

მიზანშეწონილად მიგვაჩნია პირველ რიგში გამოკვლეულ იქნეს ჩაშვების ადგილების სენსიტიურობა და დადგინდეს წყალჩაშვების ობიექტების მოწყობის რიგითობა სენსიტიურობის მიხედვით. შესაბამისად მუხლი შესაძლებელია ჩასწორდეს შემდეგნაირად 2021 წლისთვის შემუშავებული იქნას "ჩამდინარე წყლების გამწმენდი ნაგებობების მოწყობის" სტრატეგია, ხოლო გამწმენდი ნაგებობები მოეწყოს ეტაპობრივად (მაგ. 2030 წლამდე მეტად სენსიტიური არეალისთვის, ხოლო 2030 წლის შემდგომ ნაკლებად სენსიტიური არეალისთვის) ზედაპირული წყლების სენსიტიური არეალების შესაბამისად.

იმისათვის, რომ წარმოდგენა ვიქონიოთ, თუ რა მასშტაბის ინვესტიციებსა და სამუშაოს შესრულებაზეა საუბარი, გვინდა აღვნიშნოთ, რომ აზიის განვითარების ბანკის მიერ დაფინანსებული "ურბანული მომსახურების გაუმჯობესების პროგრამის" ფარგლებში, რომლის უშუალო განხორციელება დაწყებულია 2011 წლიდან და სავარაუდო დასრულების თარიღია 2019 წელი, ჩამდინარე წყლების გამწმენდი ნაგებობები მოეწყობა მხოლოდ შემდეგ ქალაქებში: ზუგდიდი, ფოთი, ურეკი, ანაკლია, მარნეული, ჭიათურა და გუდაური. ასევე, დაგეგმილია ქ. თელავში და წყალტუბოში ჩამდინარე წყლების გამწმენდი ნაგებობის მოწყობა; საქართველოს რეგიონული განვითარებისა და ინფრასტრუქტურის სამინისტროს ინფრასტრუქტურის პოლიტიკისა და განვითარების პარტნიორებთან ურთიერთობის დეპარტამენტის ინფრასტრუქტურის პოლიტიკის სამმართველოს უფროსის მოვალეობის შემსრულებელს, ქალბატონ მაცაცო ტეფნამეს

> ამავე სამინისტროს სამართლებრივი უზრუნველყოფისა და ადამიანური რესურსების მართვის სამსახურის უფროსის მოვალეობის შემსრულებლის, დავით მეტრეველის

სამსახურებრივი ბარათი

ქალბატონო მაცაცო,

საქართველოს რეგიონული განვითარებისა და ინფრასტრუქტურის სამინისტროს სამართლებრივი უზრუნველყოფისა და ადამიანური რესურსების მართვის სამსახურში (შემდგომში - სამსახური) 2016 წლის 16 მარტის №904-01 სამსახურებრივი ბარათით წარმოდგენილ "წყლის რესურსების მართვის შესახებ" საქართველოს კანონის პროექტის (შემდგომში - კანონის პროექტი) მიმართ სამსახურს გააჩნია შემდეგი შენიშვნები და წინადადებები:

 კანონის პროექტის მე-4 მუხლის "უ" - "ქ" ქვეპუნქტები განსაზღვრავს ზედაპირული წყლის, მიწისქვეშა წყლის და ეკოლოგიური სტატუსების ცნებებს. აღსანიშნავია ის გარემოება, რომ კანონის პროექტით არ არის დადგენილი თუ რომელი ორგანოს მიერ, ან რა სახის ადმინისტრაციულ-სამართლებრივი აქტით ხდება წყლისთვის ზედაპირული ან მიწისქვეშა წყლის სტატუსის მინიჭება. შესაბამისად, მიზანშეწონილია დაზუსტდეს აღნიშნული საკითხი.

2. კანონის პროექტის მე-6 მუხლის მე-3 პუნქტი ადგენს საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს კომპეტენციას, რაც მოიცავს წყლის ობიექტების იდენტიფიკაციასაც. მიზანშეწონილია, განიმარტოს რას გულისხმობს "წყლის ობიექტების იდენტიფიკაცია" და დაზუსტდეს გულისხმობს თუ არა იდენტიფიკაცია წყლის ობიექტებისთვის სტატუსის მინიჭებასაც.

ამასთან, ამავე მუხლის მე-3 პუნქტის "ჟ" ქვეპუნქტი საქართველოს გარემოსა და ბუნებრივი რესურსების დაცვის სამინისტროს კომპეტენციად განსაზღვრავს სენსიტიური არეალების და აგლომერაციების იდენტიფიცირებას, სადაც ადგილი აქვს მუნიციპალური ჩამდინარე წყლებით ზემოქმედებას. აღსანიშნავია ის გარემოება, რომ კანონის პროექტში არ არის განმარტებული ტერმინი "მუნიციპალური ჩამდინარე წყლები", რაც ბუნდოვანს ხდის მე-3 პუნქტის "ჟ" ქვეპუნქტით გათვალისწინებული ვალდებულების შინაარსს. გამომდინარე აქედან, მიზანშეწონილია განიმარტოს ტერმინი "მუნიციპალური ჩამდინარე წყლები".

3. კანონის პროექტის მე-6 მუხლის მე-5 პუნქტი საქართველოს რეგიონული განვითარებისა და ინფრასტრუქტურის სამინისტროს (შემდგომში - სამინისტრო) ვალდებულებად განსაზღვრავს წყალმომარაგებისა და წყალარინების სისტემების განვითარების სახელმწიფო პოლიტიკის განხორციელებას და კომპეტენციის ფარგლებში, ტექნიკური და საინვესტიციო პროგრამების მომზადებას წყალმომარაგების სისტემებისა და ურბანული ჩამდინარე წყლების შეგროვებისა და გაწმენდისათვის.

აღსანიშნავია ის გარემოება, რომ სამინისტროს საქმიანობის სფეროს განეკუთვნება საქართველოს წყლით უზრუნველყოფისა და მოსახლეობის წყლით განვითარების სისტემეზის დანერგვისა COS ხელშეწყობის მომარაგეზის ღონისძიებათა განხორციელების უზრუნველყოფა და კოორდინაცია, ნაცვლად წყალმომარაგებისა და წყალარინების სისტემების განვითარების სახელმწიფო პოლიტიკის განხორციელებისა. ამასთან, წყალმომარაგების სისტემებისა და ურბანული ჩამდინარე წყლების შეგროვებისა და გაწმენდისათვის ტექნიკური და პროგრამების მომზადება ასევე სცილდება სამინისტროს საინვესტიციო კომპეტენციას. გამომდინარე აქედან, მიზანშეწონილია, კანონის პროექტით დადგენილი სამინისტროს ვალდებულებები შესაბამისობაში იქნეს მოყვანილი სამინისტროს საქმიანობის სფეროსა და ამოცანებთან.

4. კანონის პროექტის მე-15 მუხლის მე-7 პუნქტის თანახმად, სააუზო მართვის ტერიტორიული ერთეულები ვალდებულნი არიან, ამ მუხლის მე-6 პუნქტით გათვალისწინებული აკრმალვების დადგენისთანავე გამოაქვეყნონ საერთო წყალსარგებლობის შეზღუდვის პირობები. აღსანიშნავია ის გარემოება, რომ სააუზო მართვის ტერიტორიული ერთეულების ცნება კანონის პროექტში არ არის განმარტებული. შესაბამისად, დასაზუსტებელია არის თუ არა "სააუზო მართვის ტერიტორიული ერთეული" და "მდინარის აუზის/სააუზო უბნის მართვის ტერიტორიული ერთეული" იდენტური ცნებები. ამასთან, უნდა განისაზღვროს სად ქვეყნდება საერთო წყალსარგებლობის შეზღუდვის პირობები.

5. კანონის პროექტის 32-ე მუხლის თანახმად, წყლის რესურსების დაცვასა და გამოყენებაზე ზედამხედველობა და კონტროლი ხორციელდება სამინისტროს სახელმწიფო საქვეუწყებო დაწესებულების - გარემოსდაცვითი ზედამხედველობის დეპარტამენტის მიერ და დაკონკრეტებულია რას მოიცავს ზედამხედველობა.

ის გარემოება, რომ მუნიციპალიტეტის ორგანოების აღსანიშნავია საქმიანობის ზედამხედველობის ფორმები და წესი განისაზღვრება კოდექსით, სახელმწიფო ზედამხედველობის სახეებია რომ რომელიც ადგენს, სამართლებრივი ზედამხედველობა და დარგობრივი ზედამხედველობა, ხოლო 130-ე განსაზღვრავს სამართლებრივი ზედამხედველობისა 05 მუხლი დარგობრივი ზედამხედველობის ორგანოებს. შესაბამისად, მუნიციპალიტეტისა და სახელმწიფო ორგანოების უფლებამოსილებათა გამიჯვნის პრინციპიდან გამომდინარე, სხვა სახის ზედამხედველობა მუნიციპალიტეტის ორგანოების მიერ ხორციელდება. განხორციელებაზე უფლებამოსილების 56 საკუთარი ეწინააღმდეგება კოდექსს 32-0 მუხლი QS გამომდინარე აქედან,

მუნიციპალიტეტისა და სახელმწიფო ორგანოთა უფლებამოსილებების გამიჯვნის კონსტიტუციურ პრინციპს.

პატივისცემით,

დავით მეტრეველი

სამსახურის უფროსის მოვალეობის შემსრულებელი

სამართლებრივი უზრუნველყოფისა და ადამიანური რესურსების მართვის სამსახური

Appendix 3: Old and New Institutional Setup of Water Sector



Appendix 4: Relevant Excerpts from Background Paper to the RIA of the Draft Law on Water Management

1. PROPOSED MODELING FOR COST BENEFIT ANALYSIS

The Regulatory Impact Analysis for the water sector in Georgia includes a cost factor, whereby the proposed reform of water law and its effects on administration and society is approached from the point of view to ensuring efficient and effective regulation at lowest total cost to government and society. This requires a cost benefit modelling process adapted to the aim of the process

The aim of the analysis is to assess the main impacts of regulatory reform. The process of legal reform in Georgia involves introducing Integrated Water Resources Management through a national water law aligned with European legislation, adopting national policy with targets on Water and Health, and taking measures for water related ecosystems protection and sustainable resource use.

The Costs and Benefits of Regulation:

Legislative acts and policy initiatives most often produce both costs and benefits for society as a whole. While benefits typically coincide with the reason why governments take action (*i.e.* the main goals of the policy action at hand), a sound analysis of new legislative measures also requires a careful assessment of costs. In addition, especially for broad, cross-cutting policy initiatives, understanding what benefits and costs will be generated by a given regulatory option, and who is going to be affected both positively or negatively by it (so-called "distributional impacts") is an essential activity for a policymaker. This is why cost-benefit analysis has become so central in government activity today, and it certainly is for the European Commission through its RIA system.

In a general sense, Regulatory Impact Assessment should set out the logical reasoning that links the problem, its underlying drivers, the objectives and a range of policy options to tackle the problem. They must present the likely impacts of the options, who will be affected by them and how. Typically, the Director General will indicate the validation process of the RIA, which follows the following steps:

- Establishment of inter-ministerial coordinating group for the RIA;
- Preparation of RIA inception report;
- Public information and open public consultation
- Collection of all relevant evidence including data on expected costs and expert views
- Drafting of RIA

This process is shown in Figure 1 below:

Figure 1: The RIA cycle



Categories of Costs and Benefits of Regulation:

- 1. The policy process: to identify which costs and benefits can emerge, and at which stage.
- 2. Provides a map of regulatory costs and benefits by dividing them into macro areas for ease of understanding by the reader and desk officer.
- 3. Taxonomy of costs, whereas
- 4. Introduces main categories of benefits.
- 5. Contains an indication of the types of costs and benefits that affect various categories of stakeholders (consumers, businesses, public administrations, etc.).

Figure 2: The procedure of performance in 4 states:



Typically, costs can be distinguished based on various parameters:

- The type of cost per se (administrative, compliance costs, charges, nonmonetary costs).
- The relation between the legislative act and the cost considered (direct and indirect costs).
- The frequency of occurrence of the costs (one-off costs, and recurring costs).

2. ASSESSING THE COSTS AND BENEFITS OF REGULATION

- The degree of certainty of the costs (costs v. risks).
- The nature of the addressee/target of the costs (businesses, citizens/consumers, public authorities, third country actors, etc.).
- Whether then can be described as economic, social or environmental costs.

A key issue in analysing regulatory reform is the assessment of the expected costs of regulatory reform: impacts are to be expected in terms of:

- Institutional and administrative transitions,
- Economic costs through water pricing / water use fees and investments required for efficiency gains in production in various sectors;
- Costs and benefits of water resources protection / environmental protection and monitoring;(including transboundary impacts)
- Cost of services and Infrastructure/ Leakage reduction

In a general sense, impacts can be expected in the following areas:

- 1. General impacts at national level related to the development of the necessary policies and frameworks;
- 2. The transition to River Basin Management;
- 3. Institutional change and new competencies in various Ministries;
- 4. The introduction of a permit system;
- 5. Introduction of water pricing and tariffs
- 6. Introduction to water services and infrastructure

3. GENERAL IMPACTS AT NATIONAL LEVEL

Beyond more specific and thematic impacts, impacts are also to be expected at the national level which are general and structural in nature and affect the implementation of policies at sub-national level. These general impacts at national level include:

- Definition of overall government policy on water resources protection and utilisation
- Policy on establishment of authorised bodies
- General rules on water quality standards, protection and penalties for infringement
- Integrated control by the state of river basin management and coordination amongst institutions
- Protection of water bodies of national interest
- Research and monitoring at national level

ISSUE	ΑCTIVITY	ІМРАСТ	STAKEHOLDERS
Overall government policy on water resources protection and utilisation	Drafting of policy in line with Water Act	Staff, time and operational costs	MENRP, MHLSA, MoA, MoF
Policy on establishment of authorised bodies	Drafting of policy in line with Water Act	Staff, time and operational costs	MENRP, MHLSA, MoA, MoF
General rules on water quality standards, protection and penalties for infringement	Drafting of water quality standards	Staff, time and operational costs	MENRP, MHLSA, MoA, MoF
Integrated control by the state of river basin management and	Establishment of directorate: catchment management	HR planning, budgeting	MENRP

Table 1: General impacts at the national level

coordination amongst institutions			
Water body approach	Identification of water bodies of national importance, drafting of rules for protection and licensing	Staff, time and operational costs	MEHRP
Coordinated research and monitoring at national level	Reform of national monitoring institution, establishment of oversight body for consultative monitoring with key functions in line with EU water quality norms	HR planning, budgeting	MEHRP

4. RIVER BASIN MANAGEMENT

For the purpose of management of river basins, the following territorial entities shall be established on the territory of Georgia as presented in Figure 3:

There are 6 main River Basins in Georgia:

- Alazani- Iori Basin District
- Mtkvari Basin District
- Khrami- Debeda Basin District
- Enguri-RioniBasin District:
- Chorokhi-Adjaristskali Basin District
- Bzipi- Kodori Basin District

Figure 3: River basin districts



The Draft Water Law refers to key obligations (and corresponding impacts) such as the development of River Basin Management Plans (RBMP), identification of competent authorities, mandating of Basin Districts, the introduction of a 'water body approach', and the setting of environmental objectives including water quality standards for a list of key substances, and reform of the monitoring system.

Table	2:	River	Basin	Management	(
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ISSUE	ΑCTIVITY	ІМРАСТ	STAKEHOLDERS
Organisation in terms of River Basin Management WFD	Establish territorial bodies for each of 6 river basins	Additional expenses for staff salary, office equipment,	MoF
Classification of water bodies: Delineation of water bodies, identification of ecological status of water bodies	Strengthen of water monitoring system according to of WFD requirements (introducing of bio monitoring system, increase of water monitoring network; increase of frequency of sampling)	Increase of expenses for corresponding equipment and other laboratory reagents, staff and etc.	MENRP - NEA

Elaboration river basin management plans (every 6 years)	Establishment of river basin councils; Carry out field surveys and investigative monitoring ; Development following studies: 1 River Basin District (RBD) general analysis; 2. Identification of significant impact and risks caused by human activity on the status of surface water or groundwater bodies; 4. Identification of environmental objectives for surface waters, ground waters and protected water bodies; 5. Elaboration on activity program designed for the achievement of environmental objectives.6. Prioritization of elaborated program of measures.	Additional costs for implementation of corresponding studies	MENRP - NEA
Adoption of River Basin Management Plans	Elaborated Plans should be approved by the Governmental decree of Georgia	Obligation for implementation of program of measures	MENRP-NEA

New administrative system and costs have to be developed with more variables and changes include:

- 1. Consumers/ What are the changes (variables?)
- 2. Cost of investment (increase in regulation, administration)
- 3. River Basin Water Council (monitoring, repairing and operation)

5. INSTITUTIONAL CHANGE:

The new authorities' component in water resources management will consist of:

- Government Commission (Regulator);
- Minister`s Cabinet;
- MENRP;
- MoLSHA;
- MoA;
- MRDI;
- Ministry of Justice;
- Municipalities;
- The MENRP includes:
- The Water Division, Integrated Management Department;

- The Department of Environmental Impact Permits;
- DES;
- NEA.

The management of water supply and wastewater drainage systems is exercised by three companies, with different territorial responsibilities:

UWSCG founded under the MRDI in 2010 provides water supply and sanitation services throughout the country in urban settlements, excluding Tbilisi metropolis and the Autonomous Republic of Adjara. The company currently serves about 300,000 residential and 15,000 non-residential customers, with 51 service-centers and employing around 2,400 staff members. UWSCG is 100% state-owned and provides services to more than one million people and more than 5,000 industrial and commercial customers. The company receives loans from the European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD) and Asian development Bank (ADB) for rehabilitation projects.

GWP, a private company, operates in the capital city Tbilisi and neighbouring cities of Mtskheta and Rustavi since 2007. The company services about 400,000 customers throughout Tbilisi, including 2,000 public and 15,000 commercial organizations.

Batumi Water Utility (established in 2016) provides water supply and sanitation services to the capital city of the Ajara Autonomous republic Batumi and neighboring rural settlements. In other urban settlements of the Ajara Autonomous Republic water services are provided by municipal water companies including Kobuleti, Khelvachauri, Shuakhevi, Keda and Khulo water municipal companies.

GA, formerly United Amelioration Systems Company of Georgia (UASCG), operates under the MoA and is responsible for managing the national irrigation and drainage infrastructure. It has 20 local service centres managing water irrigation and drainage in various municipalities.

GNERC regulates tariffs charged in drinking water supply, sanitation and irrigation.

Local self-governance bodies are responsible for management of water resources of "local importance". These local authorities have only limited competences and are of peripheral importance to water management (UNECE, 2016).

A review of regulatory impacts therefore needs to include an overview and calculation of the expected impacts on each of the above authorities. In addition, institutional change can be expected through changes in the regime of metering and monitoring, cost recovery and enforcement. The general enforcement regime needs to be strengthened in the following ways:

Increased pollution monitoring and issuing of pollution charges

Increased cost recovery for water, sanitation and wastewater services in urban areas

Increased cost recovery for irrigation water in rural areas

Furthermore, the procedures for the development of river basin management plans need to be clarified which involves tasks for various state institutions in setting RBMP objectives, making analyses, assessing measures, making maps, establishing registers and consulting with stakeholder platforms.

The main responsibility of data collection lies on NEA with municipalities (local governments) to collect environmental data for the water bodies of local importance (that is not defined). Data collection will increase over the river basins. Optimal number of stations for water quality monitoring has to be discussed with corresponding department of NEA.

Benefit Analyses: The institutional framework will have a positive impact on transparency and awareness (public users and regulators), establish tariff systems, improve efficiency and infrastructure development, support inclusive growth, make the industry self sustaining, and help business and overall economy.

Table 3: General Institutional Impacts

ISSUE	ΑCTIVITY	ІМРАСТ	STAKEHOLDERS
Coordination amongst institutions	Assessment in institutional impacts per ministry	Additional expenses for staff salary, office equipment,	MoF, National Regulator, MENRP, MoLHSA, MoA, MRDI
Procedures for the development of RBMPs	Setting RBMP objectives, making analyses, assessing measures, making maps, establishing registers and consulting with stakeholder platforms	Additional expenses for staff salary, office equipment,	MoF, National Regulator, MENRP, MoLHSA, MoA, MRDI
Improvement of monitoring, enforcement and cost recovery	Increased pollution monitoring and issuing of pollution charges, monitoring leakages, metering, billing and enforcement in urban areas, monitoring leakage, metering billing and enforcement in rural areas (irrigation)	Additional expenses for staff salary, equipment,	MENRP

6. INTRODUCTION OF PERMIT SYSTEM:

According to the new draft law, a water user needs to get permits for special uses of water, including:

- Discharge of wastewater in surface water bodies.
- Abstraction of water from surface water.

The procedure for permit application, setting and approval needs to be defined. In addition, needs that should be taken into account to maintain a reserve in each basin include:

- Ecological / environmental flows;
- Basic needs reserve: drinking water and sanitation.

National policies need to clarify the mandate of permitting authority which define:

- Chemical and ecological Environmental Quality Standards;
- EQS compliance testing procedures;
- Relationship between variable hydrological flow regime and water quality standards.

Table 4: Introducing the Permit System

ISSUE	ACTIVITY	ІМРАСТ	STAKEHOLDERS
Policy on permitting	Development of procedure for permit application, setting and approval	Additional expenses for staff salary, equipment, public information	MENRP, River Basin Districts
Determination of Reserve per District	Determination of Ecological / environmental flows; Basic needs reserve: drinking water and sanitation	Additional expenses for staff salary, equipment, public information	MENRP, River Basin Districts
Translation of water quality standards for permit requirements	Determine chemical and ecological Environmental Quality Standards, develop EQS compliance testing procedures	Additional expenses for staff salary, equipment, public information	MENRP, River Basin Districts

7. INTRODUCTION OF WATER PRICING AND TARIFFS:

This includes:

- Setting of volumetric fees for water abstraction from surface water bodies.
- Modification of volumetric fees for groundwater abstraction
- Modification of tariffs for water, sanitation and wastewater services/ improvement of metering and collection
- Tariff setting system for water discharge (introducing of polluter pays principle)

ISSUE	ΑCTIVITY	ІМРАСТ	STAKEHOLDERS
Water use fees	Setting of volumetric fees for water abstraction from surface water bodies	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water use fees	Modification of volumetric fees for groundwater abstraction	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water tariffs	Modification of tariffs for water, sanitation and wastewater services	Additional expenses for staff salary, equipment, public information	MENRP, Regulator, Municipalities
Water tariffs, water demand	Improvement of metering and collection	Additional expenses for staff salary, equipment, public information	MENRP, Regulator, Municipalities

Table 5: Introducing Water Pricing and Tariffs

8. MEASURES FOR AVOIDING DETERIORATION OF WATER BODIES:

These include:

- Setting of pollution charges for discharge into public water bodies;
- Calculation of maximum pollutant load per water body;
- Classification of water bodies into status types;
- Baseline assessment of aquatic ecosystems;
- Implementation of rules for water resources monitoring and water quality status mapping, including annual monitoring plans and involvement of water users;
- Definition of measures for coastal waters;
- Assessment of possible transboundary impacts and information sharing with riparians;
- Funding of restoration works for water bodies of importance.

The above categories of regulatory cost will be estimated based on the number of institutions involved and the related staff and material costs per item at local current rates. Given the planned transition time, the hours invested per item can be estimated based on average local costs. Each cost will be weighed against the long-term benefits of the measure in question, such as a reduction in flood risk and damage to public property versus the investment costs of flood risk reduction, over a ten-year planning period.

Table 6: Measures for Avoiding Deterioration of Water Bodies

ISSUE	ΑCTIVITY	ІМРАСТ	STAKEHOLDERS
Water quality management	Setting of pollution charges for discharge into public water bodies	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water quality management	Calculation of maximum pollutant load per water body	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water quality management	Classification of water bodies into status types	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water quality management	Baseline assessment of aquatic ecosystems	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water quality management	Implementation of rules for water resources monitoring and water quality status mapping, including annual monitoring plans and involvement of water users	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Water quality management	Definition of measures for coastal waters	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts
Transboundary water management	Assessment of possible transboundary impacts and information sharing with riparians	Additional expenses for staff salary, office equipment,	MENRP, River Basin Districts

Assessment of the Critical Points of the Setup of the Water Management System

What are the critical points of the current setup concerning?

- Overlapping responsibilities;
- Gaps (nobody responsible);
- Gaps (missing resources);
- Problems due to implementation (issues that on paper should not exist);
- Other.

Expected new challenges:

• without the reform;

• with the reform.

Expected evolution of the points mentioned in the previous column

- without the reform;
- with the reform.

Analyzing and proposing changes to the Georgian draft Water Law and to related six bylaws. Draft Legal Gap Analysis.

It is expected that licensing terms for local water supply companies, construction and maintenance of water infrastructure will be simplified for local governments, with new law on water supply and wastewater of local governments.

Economic Changes include:

Available information and protections about costs of implementation

Expected projections with and without reform?

Costs of Setting up River Basin Organizations:

- 1. Office;
- 2. Staff salaries;
- 3. Office appliances;
- 4. Car(s);
- 5. Site visits;
- 6. Trainings.

Appendix 5: Legal Gap Analysis

1. EXECUTIVE SUMMARY

Government of Georgia has initiated new Draft legislation for water resources management in Georgia, aiming to approximate Georgian environmental legislation to the European standard. The same is expressed in the Association agreement signed between Georgia and European Union.

Current document briefly reviews existing legislation gaps related to water resources management in Georgia. The main gaps reviewed are: institutional, strategic, legislative, permitting system and gaps in measurements.

Against existing system, proposed legislation is significantly modifying current system, by adopting river basin management system. For that purposes, it is proposed to increase the role of various authorities, such as, Minister's cabinet, local self-governments authorities, etc. Besides, new legislation sets new procedures and permitting requirements for water users. Therefore, reform is affecting on many areas of economy, water users. At the same time, state has to increase its capacity and resources in order to effectively manage and monitor water resources, not from the legislative point of view, but, what is more important, in real practice.

Current document also reviews compliance of draft legislation with the EU directives. To summarize, new legislation is in compliance with EU directives, while, it requires several inputs in order to achieve high standards for regulating water resources management.

2. REVIEW OF EXISTING LEGISLATIVE FRAMEWORK

The main law regulating water resources currently in Georgia is "Law on Water", which was adopted in 1997 and amended several times. It could be highlighted the most important acts being part of water resources management legislation:

- Organic Law Local Self-Government Code;
- Law on Licenses and Permits;
- Law on Minerals;
- Law on Fees on Use of Natural Resources;
- Government Decree on permit of abstraction of Water from Surface Water Body and Discharge into Surface Water Body, dated August 11, 2005, N137.

Besides, there are different laws and by-laws, which regulated various aspects related to water resources management.

At the same time, Georgia has ratified several international agreements, which are binding for Georgia and has higher legal power, than any act in Georgia, except Constitution of Georgia and Constitutional Agreement.

It could be highlighted several gaps in existing legislation, which needs urgent regulation, in order to reduce water pollution, improve quality of water, reduce negative impacts of different activities on water bodies, increase access on drinking water.

These gaps may be separated in several groups, namely:

1. Institutional Gap – there are different authorities involved in water resource management. Although, it could be concluded, that their roles are not clearly defined in regulatory frameworks. There are administrative bodies responsible for various aspects, but, their functioning is not coordinated and not targeted to solve specific problems. It is also not clear the allocation of responsibilities between central and local governments.

2. Strategic Gap – there is no clear strategy for water resources management. Therefore, existing legislation does not give understanding to beneficiaries on how the water resources shall be allocated on long-term perspective.

3. Legislation Gap – there is legislation gap for regulating water resources management. There is no legislation on water basins, status of water, therefore, legislation does not regulate how the quality of water should be improved, how the resources shall be allocated properly and rationally.

4. Permitting Gap – there is only permit required for abstraction of underground water; there is no permit required for abstraction of surface water, also, no permit required for discharge of waste water unless the capacity of waste-water treatment plant requires to conduct Environmental Impact Assessment (EIA) and obtain Environmental Impact Permit. Therefore, there is gap in regulating tariffs for water use, excluding underground water abstraction.

5. Gap in Measurements – Existing legislation does not set specific requirements for measurements of water quantity and water quality. The number of water bodies measured during the year is limited and quantity of water used is not measured as well. Therefore, it makes hard to set baselines on various water bodies.

3. PROPOSED LEGISLATION

According to Draft Law of Georgia on Water Resources Management, it is defined competences of various authorities.

There will be following authorities competent in Water Management:

- 1. Government Commission;
- 2. Ministers' Cabinet;
- 3. MENRP;
- MoLHSA;
- 5. MoA;
- 6. MRDI;
- 7. Ministry of Justice;
- 8. Basin Management Regional Service (under MENRP);
- 9. Municipality.

Out of these authorities, Basin Management Regional Services are newly established bodies under MENRP, which is additional cost for the state budget. Besides, MENRP has to establish consulting-coordination council for basin management, which is not separate entity or department, but, will require additional resources for MENRP.

4. CHANGES IN PERMITTING SYSTEM:

According to new Water Resources Management, water user needs to get permit for special use of water:

- 1. Discharge of wastewater in surface water body;
- 2. Abstraction of water from surface water.

There is also possibility to get combined water, which allows to use water for both purposes mentioned above.

Change in Permitting system effects on cost of water users. According to current legislation, there is such system for abstraction of surface water:

Law on Fees for use of Natural Resources defines the fees for water use, both – underground and surface water. Although, the same law says, that payer of that fees can be the person (physical or legal), which is subject of license according to other legislation (sub-paragraph "a" of article 3). The law on licenses and permits sets licensing requirement only for abstraction of underground water. Therefore, the norm which sets fees for abstraction of surface water exists in the legislation, but, is not actual in reality.

After adoption of new law on Water Resources Management, this norm will be effective again, as according to the amendment in the law on Fees for the use of Natural Resources, sub-paragraph "e"65 will be added which defines, that payer of the fees can be the person which abstracts surface water

⁶⁵ This provision will come into force as from January 1st, 2021, according to received draft amendment at relevant law.

resources. As mentioned, after adoption of this provision, existing fees will be applicable⁶⁶ for surface water users:

- 1. General Fees:
 - a)I group (Caspian Sea basin) 0.01 GEL per/cub.m.
 - b)II Group (Black Sea basin) 0.005 GEL per/cub.m.
 - c) III Group (Black Sea water) 0.003 GEL per/cub.m.
- 2. Drinking water supply 0.01 Georgian Tetri (1/100 of Georgian Lari) per cub.m.
- 3. Hydropower Stations 0.01% of general fees (please, refer above) per/cub.m. For example, fee for use of water from black sea basin (river, lake, etc.) will be 0.0000005 GEL per/cub.m.
- 4. Irrigation and thermo-electric station 1% of general fees (please, refer above) per/cub.m

Besides, the user has to pay permit fee, which is considered to be 100 GEL for water abstraction from surface water body, 100 GEL - for discharge of wastewater into surface water body and 200 GEL for combined permit.67

According to existing legislation, which remains unchanged, all the fees will be transferred to central budget.

According to existing legislation, there is no need to get permit for abstraction of water from surface water body. As for wastewater discharge, there is required to get EIA permit if the capacity of wastewater treatment plant is minimum 1000 cub.m/day. For less capacity discharge, there is no need of permit.

It needs to be regulated the process of permitting in more details. The main gap seems to be the case, when one person needs to get permits for abstraction of water from many places. In such case, it is not clearly regulated, whether person needs to get one permit, or permit per each place of abstraction. It may have significant importance, when the user is, for example, United Water Supply Company of Georgia, or Georgian Amelioration Company, which abstract water from many places in Georgia.

Besides, according to draft Water Resources Management, there is need to set fee for discharge of wastewater into surface water. According to received draft law amendments, there is no amount considered for such fee. As this provision is considered to come into force as from January 1st, 2019, it is possible to set the specific amount afterwards.

To summarize, after adoption of Water Resources Management and related legislative package, there will be following additional fees considered:

- 1) Permit fee for abstraction of water from surface water body 100 GEL; This amount will be transferred to central budget.
- 2) Fee for use of surface water depending on industry and amount of water abstracted. Specific amount for fees are set by existing legislation which will become effective after relevant changes; currently, it is not regulated how the fees from this usage will be allocated and managed, therefore, it needs to be regulated in more details.
- Permit Fee for discharge of wastewater into surface water 100 GEL; This amount will be transferred to central budget.
- 4) Fee for discharge of wastewater into surface water depended on adoption of relevant changes, which are not submitted, yet.

It is worth to mention, that fees mentioned above as 2nd and 4th articles, are applicable for those persons, which have EIA permit received before adoption of Water Resources Management.

⁶⁶ It is not considered to change the mentioned fees according to received draft amendment at relevant law.

⁶⁷ These norms are considered to come into force as from January 1st, 2018, according to received draft amendment at relevant law.

5. VALIDITY OF PERMIT

As there is no permit required under existing legislation for use of surface water, new Water Resources Management will be compared to zero scenario. General validity of permit is defined for 5 years, unless otherwise defined by the law. Exceptions are defined as follows:

Irrigation systems – 10 years;

Hydropower stations - 30 years;

Centralized potable water supply - 30 years;

It means, that water user has to renew its permit after expiration of every permit validity.

It may be significant problem for those users, which get permit for discharge of wastewater, as it will be hard to update treatment plants at every 5 years. There could be two options for more effective regulation: (i) to consider higher validity of permit or (ii) to consider definition of permit validity based on individual river basin management plans.

In order to get permits, water user has to prepare various documentation. Hereby are submitted, investigations, which may be related to high costs:

Water abstraction permit:

Preparation of topographical map;

Hydrological and hydro-chemical description of water body;

Wastewater discharge:

Hydrological and qualitative description of water body;

Description of treatment plant and its characteristics;

Calculation of norms of limited discharges;

Description of emergency discharges;

Control systems for limited discharges.

After getting permit, water user is obliged to ensure proper functioning of treatment plant, water meter, water quality control systems, hydrometric centers. Functioning of all these systems are related to high costs, which will be borne to water users.

Existing water users have to ensure compliance of their systems to WML until January 1st 2018 and for wastewater treatment – until January 1st, 2021. For irrigation, discharge of water permit, will be effective from January 1st, 2025.

As a result of increased requirements for the water users, including monitoring of permitted activities, MENRP will have to significantly increase capacity for monitoring of issued permits, which will require additional costs from state, not only by increasing staff amount and cost, but, by technological development, as well.

5. WATER RESOURCES MANAGEMENT ON BASIN LEVELS

According to Water Resources Management Government has to adopt National Water Resources Planning and Management Strategy. After that, it has to adopt Water Resources Management Plans for each river basin. The main steps are following:

National Water Resources Planning and Management Strategy is submitted by Government Commission to Ministers' Cabinet for approval.

Water Resources Management Plans are submitted by MENRP to Ministers' Cabinet for approval. Before approval, plans are reviewed by territorial consulting-coordination counsels, which are consulting body for the MENRP. Composition and rule of activity of mentioned counsel is defined by the MENRP.

Municipalities shall be involved in Water Resources Management Plan preparation and they shall ensure implementation of those plans. It is not defined, how they shall ensure it.

The biggest difficulty for the government will be to ensure adoption of proper strategy and then, proper plans.

5.1 Classification

Every water body will be classified by typical characters and water status. For classification of water, it is required to be considered hydro-biological, hydro-morphological, physical-chemical parameters, for underground water quantitative and chemical parameters, based on which, statuses are granted to underground and surface water.

According to ecological status of the water, considering biological, hydro-morphological, physical and chemical parameters, surface water bodies are classified as follows:

- High;
- Good;
- Average;
- Bad;
- Very Bad.

Considering chemical status, surface water bodies are classified as:

- Good;
- Bad.

Considering water status, underground water is classified as:

- Good quantitative status underground water body;
- Bad quantitative status underground water body;
- Good chemical status underground water body;
- Bad chemical status underground water body.

Highly modified or artificial water bodies are classified as follows with following ecological potential:

- High;
- Good;
- Average;
- Bad;
- Very bad.

Government has to set ecological standards for water quality, which are minimum requirements to avoid damage for human health or environment. Every 6 years, it is required to review parameters of water which is condition for setting ecological standards for water quality.

It is required to have real monitoring measurements in order to grant status for each water body.

Therefore, it will be significant cost for state budget to grant status to each water body.

5.2 Management Plans

MENRP has to adopt Water Resources Management Plans and submit to Ministers' Cabinet for approval. After classification of each water body, it will be defined targets which will be goal of the government to reach. Also, it will be defined the steps and measure to reach these targets.
Generally, for each surface water the target is to reach "Good Water Status", including "Good ecological status" and "Good chemical status". For underground water, the target is to reach "Good quantitative" and "Good chemical" status.

If the water has Bad or Very Bad status, it is set target individually, unless, the cost will be significantly high or it is impossible to reach better status. In such case, measures are taken to avoid worse status and less environment protection measures are applicable.

If there are several optional statuses for water body, the strictest measure shall be chosen.

MENRP shall ensure public participation, including publication of draft Management Plans.

What are the proposed legal acts?

What are the regulatory gaps left? For example, one thing that was actively mentioned during stakeholder consultation was treatment of sanitary zones and property that is built there. Also lack of clarity in few definitions is also was raised as an issue. Attached is the full stakeholder consultation report.

Who is regulating whom? Who are regulatory bodies and what types of uses do they regulate? (maybe + a table of regulatory bodies under new legislation and their corresponding regulation sectors)

What should be additional legal changes, or documents that have to be produced for draft law to function.

5.3 Compliance with EU WFD

According to Association Agreement, Georgia and EU shall cooperate for Environment Protection and specifically, Title 6, Article 302.c defines, that one of the areas of the cooperation shall be "water quality and resource management, including flood risk management, water scarcity and droughts as well as marine environment;". Besides, article 306 defines, that "Georgia will carry out approximation of its legislation to the EU acts and international instruments referred to in Annex XXVI to this Agreement in accordance with the provisions of that Annex."

In the sector of water resources, following six directives are considered to be approximated:

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy as amended by Decision No 2455/2001/EC;

Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks;

Directive 91/271/EEC of 21 May 1991 concerning urban waste water treatment as amended by Directive 98/15/EC and Regulation (EC) No 1882/2003;

Directive 98/83/EC of 3 November 1998 on quality of water intended for human consumption as amended by Regulation (EC) No 1882/2003;

Directive 91/676/EC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources as amended by Regulation (EC) No 1882/2003;

Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for Community action in the field of marine environmental policy.

The most important directive should be considered to be **Directive 2000/60/EC of the European** Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy as amended by Decision No 2455/2001/EC, known as EU Water Framework Directive.

Georgia has no obligation to fully implement those directives, but rather, the various provisions have to be included there.

From EU WFD the following articles shall be implemented:

-adoption of national legislation and designation of competent authority/ies;

Timetable: those provisions of that Directive shall be implemented within <u>four years</u> of the entry into force of this Agreement.

-identification of river basin districts and establishment of administrative arrangements for international rivers, lakes and coastal waters (Article 3(1) to 3(7));

Timetable: those provisions of that Directive shall be implemented within <u>four years</u> of the entry into force of this Agreement.

-analysis of the characteristics of river basin districts (Article 5);

Timetable: those provisions of that Directive shall be implemented within <u>five years</u> of the entry into force of this Agreement.

-establishment of programs for monitoring water quality (Article 8);

Timetable: those provisions of that Directive (related to ground water) shall be implemented within <u>eight years</u> of the entry into force of this Agreement.

Timetable: those provisions of that Directive (related to surface water) shall be implemented within <u>six</u> <u>years</u> of the entry into force of this Agreement.

-preparation of river basin management plans, consultations with the public and publication of these plans (Articles 13 and 14).

Timetable: those provisions of that Directive shall be implemented within ten years of the entry into force of this Agreement.

As it can be seen, from above-mentioned list, implementation of EU Directives in Georgian legislation shall be finally made within 10 years, considering fact, that it is really hard to implement all provisions of WFD. Therefore, it is important to ensure enforcement of new water resources legislation part by part. Otherwise, it could be difficult to implement provisions of the legislation in reality.

The main obligations of Georgia can be considered, that are met in new legislation on water resources. However, some provisions are not fully implemented in new legislation, such as, part of definitions, also, at this stage, it is not clear how by-laws will regulate the relevant parts from directives, such as Annex II and Annex III of the directive. Therefore, it could be only assessed after having by-laws drafted. Coming from the importance of Annexes II and III, it could be discussed to integrate these parts in the law, not in the by-laws, notwithstanding that annexes include quite technical parameters and terminology. Therefore, it could be recommended to include them as annexes of the law, instead of considering them in by-laws.

Although, implementation of whole directive is not formal obligation of Georgia, it should be taken into consideration, that implementation of directive principles is sometimes impossible without implementation of other parts of the directive.

Article 4 of the directive there are different requirements for (a) surface waters; (b) groundwater; (c) protected areas. Article 6 requires establishment of a register of all areas lying within each river basin district which have been designated as requiring special protection. As mentioned above, these article are not formally binding for Georgia, however, article 8 which is mandatory to be implemented, requires to have monitoring programs for protected areas. Therefore, without using articles 4, 6 and annex 4, it would be difficult to implement article 8, as well. Current draft does not include provisions about protected areas. Although, the related changes in the legislation include changes in the different laws on protected areas. It would be more clear to have references in current law and regulation on protected areas, in order to ensure full compliance of the Law to the directive.

One of the most important clause in the directive which is not mandatory to be implemented is article 9 – Recovery of costs for water services. This article is not properly included neither in the draft law, nor in related changes of other laws. There is no proper tariff methodology in place and without that, it is hard to assess the compliance of the legislation with EU WFD.

Appendix 6: Methodology applied to estimate the TEV

Due to the existing time and resources constraints, a direct measure of the WTP of economic agents (within each basin) had to be ruled out.

The RIA team opted, instead, for an estimation of the WTP of economic agents based on the existing economic literature, in particular on a meta-analysis study performed by Brouwer et. al.(2009).

In their meta-analysis, the authors pool the results of 54 studies estimating the WTP for water improvements (on the basis of the RFF water quality ladder) in order to identify the relationship between the characteristics of the data collection exercise and of the area under analysis and the WTP for improvements in water quality. The results are in Table A6.1.

	Dummy	Mean	Std.	Coefficient	Std.	<i>p</i> <
			deviation	estimate	error	
Constant				-0.806	0.952	0.398
Water quality change	Abs value	2.288	1.261	0.003	0.047	0.949
Baseline quality level	Abs value	3.220	1.349	-0.349	0.042	0.001
Nonuse value	yes	0.707	0.456	0.528	0.103	0.001
Drinking water	yes	0.044	0.205	0.730	0.265	0.006
Irrigation water	yes	0.008	0.088	-1.207	0.480	0.012
Nature conservation	yes	0.206	0.405	0.222	0.156	0.156
Recreational fishing	yes	0.388	0.488	-0.282	0.125	0.025
Recreational boating	yes	0.329	0.470	-0.311	0.123	0.012
Recreational swimming	yes	0.306	0.461	0.154	0.112	0.170
Recreational walking	yes	0.026	0.158	-0.258	0.371	0.487
Amenity	yes	0.054	0.226	-0.811	0.271	0.003
Rivers	yes	0.470	0.500	-0.080	0.163	0.625
Lakes	yes	0.080	0.271	-1.154	0.225	0.001
Local scale	yes	0.126	0.332	-0.396	0.207	0.057
Regional scale	yes	0.522	0.500	-0.644	0.180	0.001
National scale	yes	0.229	0.421	-0.220	0.179	0.221
Welfare measure=CS	yes	0.740	0.439	0.283	0.142	0.046
In person interviews	yes	0.558	0.497	-0.231	0.233	0.322
Mail survey	yes	0.339	0.474	0.084	0.206	0.684
Telephone survey	yes	0.051	0.221	-0.299	0.327	0.361
Fund	yes	0.072	0.259	0.765	0.211	0.001
Income taxation	yes	0.136	0.343	-0.631	0.192	0.001
Municipal taxation	yes	0.129	0.335	0.514	0.198	0.010
Open-ended question	yes	0.265	0.442	-0.063	0.212	0.766
Dichotomous choice	yes	0.154	0.362	0.602	0.217	0.006
Iterative bidding	yes	0.375	0.485	0.226	0.208	0.279
Payment card	yes	0.152	0.359	0.425	0.232	0.067
Payment per day	yes	0.021	0.142	0.759	0.365	0.038
Payment per trip	yes	0.021	0.142	2.048	0.420	0.001
Payment per month	yes	0.136	0.343	1.252	0.199	0.001
Payment not specified	yes	0.023	0.151	-1.233	0.303	0.001
Household income	Nat log	10.651	0.596	0.504	0.087	0.001
Population density	Nat log	13.203	2.335	-0.049	0.035	0.161
Lake density	Nat log	4.005	1.761	0.057	0.034	0.091
Road density	Nat log	9.208	1.194	0.109	0.066	0.102
Adjusted R-square				0.592		
N				388		

Table A6.1.: Meta-regression results (dependent variable: WTP/household/year in 2007 USD)

The WTP (and the corresponding TEV) has been calculated for each Georgian River Basin starting from these estimates.

First, a common "base" was calculated by fixing all the non-relevant variables (typically those associated with the design of the 54 studies) to their mean values;

We have collected information about the value of the relevant variables at the basin level.

The variables are the following:

- Expected water quality change (in our case distance from 10)
- Baseline quality level
- Importance of irrigation in the basin (in our case share of individuals in rural areas)
- Natural Log of Household Income in the Basin
- Natural Log of population in the Basin
- Natural Log of the total lake surface area (in HA) in the Basin.

For the estimation, an additional challenge concerned the household income variable. To be able to estimate the value of WTP per household per year today it was necessary first to convert today's household incomes in GEL in 2007 USD (PPP) values. Later, after predicting the WTP per household per year in 2007 USD (PPP) it was necessary to convert it back in today's GEL.

NOTE: as the dependent variable of the meta-regression is expressed in logs, the predicted WTP had to be converted back in 2018 GEL by applying the function exp(In WTP).

Appendix 7: River Basin RIA Assessment

To assess the water quality of the river basins, we used the water quality ladder developed by Resources for the Future (also known as the RFF water quality ladder). According to the RFF water quality ladder, the water quality is being defined in terms of their suitability for, or ability to support, specific recreational activities - e.g., boatable, fishable, and/or swimmable water quality.

The Water Quality Ladder (see Figure A6.1 below) maps a collection of water quality parameters like nitrogen, phosphorus and dissolved oxygen onto an index of water quality levels⁶⁸. State of the water in the river is assessed by a number ranging from 0 to 10; a higher number indicates better (e.g. drinkable) water quality and lower number indicates poor (e.g. non-boatable) water quality.

The ladder associates different levels of water quality with changes in how water of that quality can be used. Movements along the ladder represent either potential increases in benefits to members of society from higher water quality, or potential increases in costs to members of society from lower water quality.



Figure A6.1: RFF Water Quality Ladder

In determining the water quality for the River Basins, project team focused on assessment of water quality monitoring data⁶⁹ and used expert judgment method. Project team revised data obtained from water monitoring stations. The general quality of surface water was evaluated with respect to following parameters: nitrogen, phosphorous and dissolved oxygen.

It worth mentioning that, the number of natural and human factors can influence state of surface water within river basins. These may include the volume of river flow, local geology, climatic conditions, the degree of development along rivers, non-point sources of runoff (such as agricultural fields) and point

⁶⁸ Source: Vaughan, 1986; Mitchell and Carson, 1989; Carson and Mitchell, 1993

⁶⁹ Georgia has long time series data concerning the chemical composition of open waters. National Environmental Agency (NEA) is conducting monitoring of water quality on 61 rivers and 6 lakes and 2 reservoirs of Georgia. Information on water quality monitoring results is available at the website of NEA.

sources of effluent that discharge into rivers. Since there are no sufficient data available on above issues, these factors were considered during expert judgment exercise.

Study addressed only surface water (ground water quality were excluded due to lack of data).

Following to study assumption, baseline water quality were assessed for 5 River basins across Georgia. Conditions of River Basins were coded according to the proposed methodology.

The results summarized in Table A6.1 (below) provide a useful overview of water quality valuation research.

RIVER BASIN	MAIN RIVERS	MUNICIPALITIES COVERED	RANKING	PRESSURES
Alazani-lori (catchment area: 12080 km²)	Alazani-Iori River basin consists of the rivers: Alazani, Iori, Ilto, Stori, Chelti, Lopota, Duruji, Turdo, Khodashniskhevi, Kabali, Adedi, Vashliani, Gombori, Ole	River basin covers following municipalities of Kakheti Region: Telavi, Akhmeta, Gurdjaani, Dedoflistskaro, Lagodekhi, Sagaredjo, Signagi, Kvareli, and Tianeti municipality (Mtskheta-Mtianeti Region)	7	Pollution from agricultural activities; pollution from sewage discharge; sand and gravel abstraction; water bodies at risk from livestock activities
Mtkvari River Basin (catchment area: 19740 km ²)	River basin consists of the rivers: Mtkvari, Paravani, Potskhovi, Kvabliani, Bordjomula, Didi Liakhvi, Patara Liakhvi, Medjuda, Lekhura, Eastern Prone, Kavtura, Ksani, Aragvi, Algeti, Tergi, Baidara, Snostskali, Chkheri, and Brolistskali	River basin covers following areas: City of Tbilisi; Municipalities of Samtskhe-Javakheti Region (Adigeni, Akhaltsikhe, Aspindza, Akhalkalaki, Ninotsminda and Bordjomi); Municipalities of Shida Kartli Region (Khashuri, Kareli, Gori, Kaspi); municipalities of the Kvemo-Kartli Region (Gardabani, Tianeti, Tetritskaro); Municipalities of Mtskheta-Mtianeti Region (Mtskheta, Dusheti, Stepantsminda). River basin also covers Tskinvali occupied territory	6	transboundary river basin, area is heavily impacted from economic activities and population density; heavy point and non-point pollution; river is experiencing extensive hydro- morphological change due to HPP constrictions/operations and gravel extraction
Khrami- Debeda River Basin (catchment area: 5202 km ²)	River basin consists of the rivers: Ktsia- Khrami, Korsuchai, Shavtskala, Aslanistskali, Shulaveri, Mashavera, Moshevani, Bolnisi, and Debeda	River basin consists of municipalities of Samtskhe Javakheti (Bordjomi) and Kvemo Kartli (Tsalka, Dmanisi, Bolnisi, Marneuli and Tetritskaro) Regions	5	Relatively small basin, however, copper mining operation heavily pollutes rivers Kazretula and Mashavera
Enguri-Rioni River Basin (catchment area: 22 416 km ²)	River basin consists of the rivers: Enguri, Mulkhra, Magana, Nenskra, Tkhishi, Jumi, Rioni, Kvirila, Dzirula, Chkherimela, Khanistskali, Tsablaristskali, Gubistskali, Tskhenistskali, Jonoula, Nogela,	River Basin consists of municipalities of Samegrelo-Zemo Svaneti (Mestia, Tsalenjikha, Chkhorotsku, Martvili, Khobi, Senaki, Abasha and City of Poti),	6	area is heavily impacted from extensive development along rivers, non-point and point sources of effluent that discharge into rivers; hydro- morphological changes of river

TABLE A7.1: Water Quality Valuation for River Basins of Georgia

	Tekhuri, Tsivi, Khobi, Chanistskali, Pichori, Supsa, Gubazeuli, Natanebi, Choloki, Bjujzi	Racha-lechkhumi and Kvemo Svaneti (Oni, Ambrolauri, Tsageri) Imereti (Sachkhere, Chiatura, Kharagauli, Zestaponi, Bagdadi, Vani, Tskaltubo, Khoni, Samtredia, Terjola, Tkibuli, Tskaltubo and Samtredia, as well as City of Kutaisi), Guria (Lanchkhuti, Ozurgeti and Chokhatauri) Rerions, as well as Kobuleti Municipalitie of Adjara Autonomous Republic		resulting from sand and gravel extraction
Chorokhi- Ajaristskali River Basin (catchment area: 2 483 km ²)	River basin consists of the rivers: Chorokhi, Adjaristskali, Skhalta, Machakheela, Korolistskali, Kintrishi, Chakvistskali, Achkva.	River basin consists of municipalities of Adjara Autonomous republic (Khelvachauri, Kobuleti, Keda, Shuakhevi, Kulo) and City of Batumi	7	Abundant information is available for this river basin; Chorokhi-Ajaristskali River Basin Management Plan were developed first time in Georgia. Information is available on following issues: analyses of water use, trends in water supply, identification of heavily modified water bodies etc
Bzifi-Kodori River Basin (catchment area: 7722 km ²)	Bzipi-Kodori River basin consists of the rivers: Psou, Jove-Kvara, Gagripshi, Bziphi, Gega, Lashipse, Khipsta, Apsta, Gumista, Western Gumista, Eastern Gumista, Kelasuri, Kodori, Sakeni, Chkhala, Tumushi, Dgamishi, Tskhenishtskari, Mokva, Lagidga, Okumi, Didi Eristskali, and Patara Eristskali	River basin covers territories of occupied Apkhazia Autonomous Republic		Was excluded from the assessment

The RBMP objectives are mainly targeted at the improvement of the ecological status of the Surface Water Bodies, by means of reducing or eliminating, where possible, the risk factors (significant pressures). This means that water status is not allowed to deteriorate, only to improve from some current (baseline) condition to the WFD objective of reaching good chemical and ecological water status.

Appendix 8: River Basin Characteristics

Metholodogical Notes

Physical and socio-economic characteristics of River Basin Districts are derived from the data provided by "Census 2014" (Geostat), National Environmental Agency of Georgia, Ministry of Environment of Georgia, Business statistics (Geostat) and "Natural Resources and Environment Protection in Georgia, 2015" (Geostat).

Population shares⁷⁰ were used in order to provide economic indicators on the basin level, because some River Basins Districts are sharing the territory of the same region (for example in Alazani – Iori River Basin Districts – there is included Tianeti part of Mtskheta – Mtianeti region).

While characterizing the basins by economic variables (namely turnover, value added, purchase of goods and services and number of employed), the main assumption used in the calculations was that *more population leads to more active economic performance* (for example, turnover for Alazani – lori River Basin includes turnover of Kakheti region and turnover of Mtskheta – Mtianeti region that is weighted by the share of population living in Tianeti municipality).

To characterize economic activity and the most important sectors within the basins, we used ranking method based on the shares of kind of economic activities in a given region. On the first stage the regional values of economic indicators (such as turnover, value added, purchase of goods and services and number of employed⁷¹) were weighted by the shares of population in order to transform regional data into a river basin data. Then, within each basin, sectors with the highest shares in a given economic indicator (for example, turnover) adding up to 90%, were considered as the most important ones in determining economic performance of the given basin.

Average monthly income (rural\urban) of household per River Basin District was calculated according to share of households of different regions within the basin. Regional rural\urban average monthly income and regional rural\urban average household size were derived using "Household Survey - 2014"⁷² data provided by Geostat. Number of households per River Basin District was calculated using rural\urban population by regions (and municipalities) and regional average rural\urban household size. Average monthly rural\urban income for households per basin was derived by multiplication of regional average monthly rural\urban household income by the share of households of the given region in the basin.

Average growth rates of number of companies by kind of economic activities, were calculated according to geometric average of yearly percentage change (from 2012 to 2017) in each sector (Geostat).

Number of possible permits

In order to estimate number of possible permits in each sector (per basin), we used the survey conducted by WEG and G4G for energy consumption. As far as the data is representative for energy consumption for each sector, the assumption we follow is that the data would be applicable to derive broad picture for the whole Georgia concerning to water abstraction from the surface water (rivers and reservoirs).

⁷⁰ Source: Geostat – 2014 General Population CENSUS Main Results - General Information.

link - http://census.ge/en/2014-general-population-census-main-results-general-information/202#.WVJx4-uGOUk

⁷¹ Source: Geostat – Business Statistics

link - http://geostat.ge/index.php?action=page&p_id=212&lang=eng

⁷² Source: Geostat – IHS Databases – 2014

Link - http://geostat.ge/index.php?action=meurneoba&mpid=1&lang=eng

INFORMATION BY BASIN

Alazani - Iori Basin District

Physical Characteristics



The area of Alazani- Iori Basin District is 12.080 km². The west border of the basin begins on the north branch of the Caucasian ridge, mountain Tebulo, existing on Atsunta ridge, follows Atsunta ridge in the south, obtains south-west direction at Borbalo Mountain of the Caucasian ridge and from the mountain Tchicho follows first Kartli ridge, then Sabaduri ridge, crosses Saguramo - Ialno ridge and ioins the mountain Udabno on Iori Plateau. Along the west border of the basin, there are the following highest peaks of the mountain system: Tebulo Mountain (4,493 m), Amugo (3,840 m), Didi Borbalo (3,294 m), Tchicho (3,076 m), Natakhtari (966 m) and Udabno (879 m). The north border coincides with the state border of Georgia, in particular the Caucasian ridge and its north- east branch - Pirikita ridge. The border begins at Tebulomountain and goes up to Tivonroso. The east border goes down from

Tivonroso Mountain towards the south and follows the river Alazani up to Mingechauri water basin. Along the east border of the basin there are the following highest peaks of the mountain system: Tebulo mountain (4,493 m), Komito (4,261 m), Dani mountain (4,174 m), Diklo mountain (4,285 m), Shavi Klde (3,578 m), Ninikas Tsikhe (3,117 m) and Tivonroso(3,374 m). The south border follows first the river Iori, then river Mtkvari and Iori watershed and joins Udabno Mountain. In this section there are Mtskemsis Mta (890 m) and Udabno (879 m).

The above described boundaries of Alazani- Iori Basin District includes the municipalities of Kakheti region: Telavi, Akhmeta, Gurjaani, Dedoplistskaro, Lagodekhi, Sagarejo, Signagi, Kvareli and Tianeti municipality of Mtskheta- Mtianeti region.

The main rivers of the Alazani- Iori Basin District are: Alazani, Iori, Ilto, Stori, Chelti, Lopota, Duruji, Turdo, Khodashnis Khevi, Kabali, Adedi, Vashliani, Gombori and Ole. Total length of medium and big rivers in Alazani – Iori basin District is 682 kilometres (on the territory of Georgia). In this Basin District total surface area of main lakes and reservoirs (basically Sioni Reservoir) is 12 km² (Source: Eliso)

Regarding to protected areas, Alazani – Iori Basin District includes Algeti National Park, Batsara – Babaneuri Protected Areas, Vashlovani Protected Areas, Tusheti Protected Areas, Mariamjvari Strict Nature Reserve, Kazbegi National Park and Chachuna Managed Reserve administration (Source: National Environmental Agency of Georgia).

Socio – Economic Characteristics

Total Population of Alazani – Iori Basin District is 328,051 (among them, urban population is 74,376 and rural population is 253,675) persons. Concerning to the number of households, this Basin District includes 90,501 households in total (where, urban households amount to 21,375 and rural households amount to 69,126). Regarding to population densities, number of population per square kilometres is 27 persons and number of households per square kilometres is 7 households. Taking into account the length of medium and average rivers, number of population per kilometre of rivers is 481 persons and 133 households. For the surface area of main lakes of the basin, number of population per square kilometres of lakes is 27,338 persons and 7,542 households.

Value added of Alazani – Iori Basin District amounts to 285,728,285 GEL (and value added per capita within the basin is 871 GEL). Average income per month for urban household is 935.8 GEL and for rural one it amounts to 760.4 GEL. Concerning to economic activity (based on combined rankings of value added, turnover, purchase of goods and services and number of employed), manufacturing,

wholesale and retail trade and construction sectors are leading contributors to economic performance in the given Basin District.

Total number of firms in Alazani – lori Basin District amounts to 3,223. The vast majority of firms are concentrated in small businesses (nearly 98%). Based on percentage shares of number of companies by kind of economic activities, wholesale and retail trade (56%), manufacturing (14%) and construction (6%) represent the most prominent sectors. More than a half of employed population in the basin is employed in small businesses (55%) and 33% is employed in medium size businesses. According to the distribution of employment within sectors in Alazani – lori Basin District, 27% is employed in manufacturing sector, 21% is employed in wholesale and retail trade sector and 11% is employed in construction sector (Sources: Business statistics (Geostat); "Natural Resources and Environment Protection in Georgia, 2015" (Geostat); "Census 2014" (Geostat); HIS Databases – 2014 (Geostat) and Draft of Sub-Legislation - 2017).

Mtkvari Basin District

Physical Characteristics

The area of Mtkvari Basin District is 19,740 km². The west border of the basin goes through Likhi



ridge, then follows Adiara- Imereti (meskheti) ridge to the north-east of the basin and at Zoti mountain comes down to south, follows Arsiani ridge and joins the state border of Georgia. The highest peaks of the mentioned mountain system are: Zekara Mountain (3828 m), Ribisa (2,470 m), Mepistskaro (2,850 m), Zoti Mountain (2,676 m) and Chanchakhi (2,506 m). The south border of the basin follows the state border of Georgia, in particular, goes along the east branch of Arsiani ridge, crosses the gorge of Potskhovi river, goes to Erusheti plateau, crosses the gorge of the river Mtkvari and Kartsakhi lake, follows Nialiskuri ridge, from Agchagali mountain

(2,857 m) of Javakheti ridge goes to Javakheti ridge, in 3 km from Paravani lake from Dalidagi mountain (2,661 m) turns to the west and from Karataashi mountain (2,857 m) first goes up to Samsari mountain (32.84 m) and follows Samsari ridge to the north, up to Taykyetili mountain (2.582 m), then sharply turns to the west, goes along the area north of Tabatskuri Lake and from Msrali Mta Maintain (2,481 m) goes up ShaviKlde mountain (2,850 m). From Shavi Klde mountain (2,850 m) it follows Trialeti ridge to the east and in 6 km east from luris kedi mountain (2,203 m) comes down in south- east direction towards Bedeni ridge; from Yaila mountain (1,951 m) follows Bedeni ridge to the east and from Bedeni Mountain (1,875 m) goes down in south -east direction to the town Tetritskaro, then follows river Algeti and river Ktsia- Khrami watershed and joins the riverbed of Mtkvari river near the village Tsereteli. There are the following highest peaks of the mountain system along the south border of the basin: Kenchaula (2,992 m), Shabanibeli (2,646 m), Gumbati (2,964 m), Gekdagi (2,783 m), Sambortsva (3,003 m), Achkasari (3196 m), Shavi Klde (2,850 m), Arjevani (2757 m), Iuris Kedi (2203 m), Yaila (1,951 m) and Bedeni (1,875 m). The east border of the basin begins at the north branch of the Caucasian ridge, Tebulo mountain existing on Atsunta ridge, follows Atsunta ridge to the south, turns to the south-west near Didi Borbalo mountain of the Caucasian ridge and from Tchicho mountain first follows Kartli ridge, then Sabaduri ridge, crosses Saguramo-Yalno ridge and joins Udabno mountain on lori plateau. There are the following highest peaks along the east border of the basin: Tebulomountain (4,493 m), Amugo (3,840 m), Didi Borbalo (3,294 m), Tchicho (3,076 m) and Natakhtari (966 m). The north border of the basin goes along the Caucasian ridge and, consequently, the state border of Georgia. It begins from Zekara Mountain and goes towards the east, to the watershed of Dvaleti and Khorkhi ridges. Crosses Dariali gorge in the north-east, goes along Shani and Kidegani ridges, crosses the gorge of Asa River, crosses first Khevsureti ridge, then river Arghuni gorge and connects to Tebulo Mountain through Metso ridge. There are the following highest peaks of the mountain system along the north border of the basin: Jimara (4,780 m), Mkinvartsveri (5,033 m),

Shani mountain Mta (4,462 m), Martini mountain (3898 m), Makhismagali (3,990 m), Mutsdostavi (3,512 m) and Tebulo mountain (4,493 m).

The above described boundaries of the Mtkvari Basin District includes: Tbilisi city, Adigeni, Akhaltsikhe, Aspindze, Akhalkalaki, Ninotsminda and Borjomi municipalities of Samtskhe- Javakheti region. Khashuri, Kareli, Gori, Kaspi municipalities of Shida Kartli region. Gardabani, Tianeti, Tetritskaro municipalities of Kvemo Kartli region. Mtskheta, Dusheti, Stepantsminda municipalities of Mtskheta-Mtianeti region (the occupied territory of Tskhinvali region is also located on the territorial entity of the basin).

The main rivers of the Mtkvari Basin District are: Mtkvari, Paravani, Potskhovi, Kvabliani, Borjomula, Didi Liakhvi, Patara Liakhvi, Mejuda, Lekhura, East Prone, Kavtura, Ksani, Aragvi, Algeti, Tergi, Baidara, Snostskali, Chkheri and Brolistskali. Total length of medium and big rivers in Mtkvari basin District is 930 kilometres (on the territory of Georgia). In this Basin District total surface area of main lakes and reservoirs (Lake Bazaleti, Lisi Lake, Jinvali Reservoir, Samgori Reservoir, Lake Sagamo, Lake Paravani, Khozapini Lake and Lake Jandara) is 106 km².

Regarding to protected areas, Mtkvari Basin District includes Borjomi – Kharagauli Park, Tbilisi National Park, Kazbegi National Park, Javakheti Protected Areas and Liakhvi Strict Nature Reserve.

Socio – Economic Characteristics

Total Population of Mtkvari Basin District is 1,820,487 (among them, urban population is 1,381,808 and rural population is 438,679) persons. Concerning to the number of households, this Basin District includes 513,399 households in total (where, urban households amount to 393,367 and rural households amount to 120,032). Regarding to population densities, number of population per square kilometres is 92 persons and number of households per square kilometres is 26 households. Taking into account the length of medium and average rivers, number of population per kilometre of rivers is 1,958 persons and 552 households. For the surface area of main lakes of the basin, number of population per square kilometres of lakes is 17,158 persons and 4,839 households.

Value added of Mtkvari Basin District amounts to 11,334,048,198 GEL (and value added per capita within the basin is 6,226 GEL). Average income per month for urban household is 959.7 GEL and for rural one it amounts to 769.7 GEL. Concerning to economic activity (based on combined rankings of value added, turnover, purchase of goods and services and number of employed), wholesale and retail trade, manufacturing and transport and communication sectors are leading contributors to economic performance in the given Basin District.

Total number of firms in Mtkvari Basin District amounts to 43,958. The vast majority of firms are concentrated in small businesses (nearly 97%). Based on percentage shares of number of companies by kind of economic activities, wholesale and retail trade (43%), real estate (16%) and manufacturing (6%) represent the most prominent sectors. 41 percent of employed population in the basin is employed in small businesses and 37% is employed in large size businesses. According to the distribution of employment within sectors in Mtkvari Basin District, 12% is employed in manufacturing sector, 24% is employed in wholesale and retail trade sector and 12% is employed in real estate sector (**Sources**: Business statistics (Geostat); "Natural Resources and Environment Protection in Georgia, 2015" (Geostat); "Census 2014" (Geostat); IHS Databases – 2014 (Geostat) and Draft of Sub-Legislation - 2017).

Khrami- Debeda Basin District

Physical Characteristics

The area of territorial entity of Khrami - Debeda Basin District is 5,202 km². The west border of the



basin begins from the mountain Agchala (3,196 m) existing on Javakheti ridge, in 3 km north from Paravani lake it turns from Dalidagi mountain (2,661 m) towards the west; from Kharatashi mountain (2,857 m) it goes up first Samsari mountain (3,284 m) and follows Samsari ridge towards the north up to Tavkvetili mountain (2,582 m); then it abruptly turns to the west, goes along the area north to Tabatskuri lake and from Mshrali Mta mountain goes up Shavi Klde mountain (2,850 m). The highest peaks of

the mentioned mountain systems are: Agchala mountain (3,196 m), Dalidagi (2,661 m), Kharatashi (2,850 m), Samsari (3,284 m), Tavkvetili (2,582 m), Mshrali Mta (2,481 m) and Shavi Klde (2,850 m). The south border of the basin, from Agchala Mountain (3,196 m) follows the state border of Georgia, in particular, it goes along Loki ridge, goes down to Kvemo Kartli lowland, goes along the state border, following the riverbed of Debeda river. There are the following highest peaks along the south border: Avakisari (1,866 m), Osinovaya (1,881 m), Dezakari (1,636 m) and Tanadagi (800 m). The north border of the basin begins from Shavi Klde mountain (2,850 m), follows Trialetirigde to the east and in 6 km east from Yuri ridge (2,203 m) it goes down south-east to Bedeni ridge (1,875 m), from Yaila mountain (1,951 m) it follows Bedeni ridge to the east and from Bedeni mountain (1,875 m) goes down south-east to the town Tetritskaro, then follows Algeti river and Ktsia-Khrami river watershed and joins the riverbed of Mtkvari river near the village Tsereteli. There are the following highest peaks of the mountain system along the north border of the basin: Shavi Klde (2,850 m), Arjevani (2,757 m), Yuri ridge (2,203 m), Yaila (1,951 m) and Bedeni (1,875 m). Section of the east border goes along the riverbed of Mtkvari river, from Tsiteli Khidi to the confluence of the river Algeti.

The above described boundaries of the Khrami - Debeda Basin District includes Borjomi municipality of Javakheti region and Tsalka, Dmanisi, Bolnisi, Marneuli and Tetritskaro Municipalities of Kvemo Kartli region.

The main rivers of the Khrami - Debeda Basin District are: Ktsia- Khrami, Korsuchai, Shavtskala, Aslanistskali, Shulaveri, Mashavera, Moshevani, Bolnisi and Debeda. Total length of medium and big rivers in Khrami - Debeda Basin District is 266 kilometres (on the territory of Georgia). In this Basin District total surface area of main lakes and reservoirs (Lake Tabatskuri and Tsalka Reservoir) is 47.9 km².

Regarding to protected areas, Khrami - Debeda Basin District includes only Borjomi-Kharagauli National Park administration.

Socio – Economic Characteristics

Total Population of Khrami - Debeda Basin District is 221,207 (among them, urban population is 54,890 and rural population is 166,317) persons. Concerning to the number of households, this Basin District includes 60,880 households in total (where, urban households amount to 15,530 and rural households amount to 45,350). Regarding to population densities, number of population per square kilometres is 43 persons and number of households per square kilometres is 12 households. Taking into account the length of medium and average rivers, number of population per kilometre of rivers is 832 persons and 229 households. For the surface area of main lakes of the basin, number of population per square kilometres of lakes is 4,618 persons and 1,271 households.

Value added of Khrami - Debeda Basin District amounts to 405,223,517 GEL (and value added per capita within the basin is 1,832 GEL). Average income per month for urban household is 942.4 GEL and for rural one it amounts to 756.8 GEL. Concerning to economic activity (based on combined rankings of value added, turnover, purchase of goods and services and number of employed),

manufacturing, wholesale and retail trade and electricity sectors are leading contributors to economic performance in the given Basin District.

Total number of firms in Khrami - Debeda Basin District amounts to 2,330. The vast majority of firms are concentrated in small businesses (nearly 98%). Based on percentage shares of number of companies by kind of economic activities, wholesale and retail trade (52%), manufacturing (13%) and real estate (8%) represent the most prominent sectors. 45 percent of employed population in the basin is employed in small businesses and 31% is employed in large size businesses. According to the distribution of employment within sectors in Khrami - Debeda Basin District, 31% is employed in manufacturing sector, 15% is employed in wholesale and retail trade sector and 7% is employed in mining sector (**Sources**: Business statistics (Geostat); "Natural Resources and Environment Protection in Georgia, 2015" (Geostat); "Census 2014" (Geostat); IHS Databases – 2014 (Geostat) and Draft of Sub-Legislation - 2017).

Enguri - Rioni Basin District

Physical Characteristics



The area of the territorial entity of Enguri -Rioni Basin District is 22.416 km². The west border of the basin goes along Kodori, Bokhunstou and Akiba ridges, follows Okumi and Enguri river watershed, from Gvalialia Mountain goes down to the south and joins the Black Sea at the confluence of the river Gagida. The highest peaks of the mentioned mountain system are Gvandara Mountain (3,984 m), Maguashirkha (3,852 m), Khojali (3,909 m), Akiba (2,811 m) and Gvalialia (1,801 m). The east border of the basin does along Liki ridge, where the highest peaks are Zekara Mountain (3,828 m) and Ribisa (2,470 m). The south border goes along Adjara- Imereti (Meskheti) ridge and its west branch. The highest peaks in the mentioned mountain system are Mepistskaro (2,850 m)

and Khno Mountain (2,598 m). From the north the basin borders the Caucasian ridge, highest peaks of which are Shkhelda mountain (4,368 m), Ushba (4,700 m), Tikhtengeni (4,618 m), Tetnuldi (5,058 m), Shkhara (5,203 m), Ailama (4,547 m), Laboda (4,314 m), Chanchakhi (4,462 m) and Khalatsa (3,938 m). The west border of the basin goes along the Black Sea from Gagida river to Natanebi river and confluence on its tributary, Choloki river.

The above-described boundaries of Enguri-Rioni Basin District includes Mestia, Tsalenjikha, Chkhorotsku, Martvili, Zugdidi, Khobi, Senaki, Abasha municipalities of Samegrelo-ZemoSvaneti region and Poti city. Oni, Ambrolauri, Lentekhi, Tsageri municipalities of Racha - Lechkhumi and Kvemo Svaneti region and Kutaisi city. Lanchkhuti, Ozurgeti and Chokhatauri municipalities of Guria region and Kobuleti municipality of Adjarian Autonomous Republic.

The main rivers of Enguri - Rioni Basin District are Enguri, Mulkhra, Magana, Nenskra, Tkheishi, Jumi, Rioni, Kvirila, Dzirula, Chkherimela, Khanistskali, Tsablaristskali, Gubistskali, Tskhenistskali, Jonoula, Noghela, Tekhuri, Tsivi, Khobi, Chanistskali, Pichori, Supsa, Gubazeuli, Natanebi, Choloki and Bzhuzhi. Total length of medium and big rivers in Enguri - Rioni Basin District is 1,481 kilometres (on the territory of Georgia). In this Basin District total surface area of main lakes and reservoirs (Enguri Reservoir and Lake Paliastomi) is 56.4 km².

Regarding to protected areas, Enguri - Rioni Basin District includes Borjomi-Kharagauli National Park, Imereti Caves Protected Areas, Kolkheti National Park, Mtirala National Park, Kobuleti Protected Areas, Natural Sites Complex of Samegrelo and Natural Site Administration of Okatse.

Socio – Economic Characteristics

Total Population of Enguri - Rioni Basin District is 1,084,880 (among them, urban population is 455,386 and rural population is 629,494) persons. Concerning to the number of households, this

Basin District includes 302,460 households in total (where, urban households amount to 130,562 and rural households amount to 171,898). Regarding to population densities, number of population per square kilometres is 48 persons and number of households per square kilometres is 13 households. Taking into account the length of medium and average rivers, number of population per kilometre of rivers is 733 persons and 204 households. For the surface area of main lakes of the basin, number of population per square kilometres of lakes is 19,235 persons and 5,363 households.

Value added of Enguri - Rioni Basin District amounts to 1,783,963,774 GEL (and value added per capita within the basin is 1,644 GEL). Average income per month for urban household is 941GEL and for rural one it amounts to 771.4 GEL. Concerning to economic activity (based on combined rankings of value added, turnover, purchase of goods and services and number of employed), manufacturing, wholesale and retail trade and electricity sectors are leading contributors to economic performance in the given Basin District.

Total number of firms in Enguri - Rioni Basin District amounts to 15,220. The vast majority of firms are concentrated in small businesses (nearly 99%). Based on percentage shares of number of companies by kind of economic activities, wholesale and retail trade (52%), manufacturing (12%) and construction (8%) represent the most prominent sectors. More than a half of employed population in the basin is employed in small businesses (57%) and 23% is employed in large size businesses. According to the distribution of employment within sectors in Enguri - Rioni Basin District, 23% is employed in manufacturing sector, 16% is employed in wholesale and retail trade sector and 11% is employed in Human health and social work activities sector (**Sources**: Business statistics (Geostat); "Natural Resources and Environment Protection in Georgia, 2015" (Geostat); "Census 2014" (Geostat); IHS Databases – 2014 (Geostat) and Draft of Sub-Legislation - 2017).

Chorokhi-Adjaristskali Basin District

Physical Characteristics

The area of the territorial entity of Chorokhi-Adjaristskali Basin District is 2,483 km². The north border



of the basin begins at the north ending of Arsiani ridge, goes towards the west and near the village Gorgadzeebi turns to the north-west, goes through Kvabliani and Naghvarevi river watershed up to Sakhornia mountain, then turns to the south-west up to Khino mountain, follows Kintrishi and Achistskali river watershed and joins the Black Sea with the riverbed of Achkava river. There are the following highest peaks along the north border of the basin: Chanchakhi (2,506 m), Sakhornia (2,755 m) and Khino (2,598 m). The east

border of the basin begins at Chanchakhi Mountain and goes through Arsiani ridge up to Kenchaula Mountain (2,992 m). The south border of the basin represents the state border of Georgia. From Kenchaula Mountain it goes along the top of Shavsheti ridge, goes down from Muratkhana Mountain towards the south-west, crosses Machakhela river gorge and from Bashturki Mountain goes towards the west, crosses Chorokhi river gorge and joins the Black Sea near Sarpi village. There are the following highest peaks along the south border of the basin: Kenchaula (2,992 m), Rkiniskari (2,376 m), Imerkhevismta (2,537 m), Korda (2,371 m), Muratkhana (1,888 m), Bashturki (1,712 m) and Boloka (1,531 m). The west border of the basin goes along the Black Sea from the confluence of Achkhvariver to Sarpi village.

The above-described boundaries of Chorokhi-Adjaristskali Basin District includes Khelvachauri, Kobuleti, Keda, Shuakhevi and Khulo municipalities of Adjarian Autonomous Republic and Batumi city.

The main rivers of Chorokhi-Adjaristskali Basin District are Chorokhi, Adjaristskali, Skhalta, Chirukhistskali, Machakhela, Khorolistskali, Kontrishi, Chakvistskali and Achkhva. Total length of medium and big rivers in Chorokhi-Adjaristskali basin District is 116 kilometres (on the territory of Georgia).

Regarding to protected areas, Chorokhi-Adjaristskali Basin District includes Kintrishi Protected Areas, Machakhela National Park, Mtirala National Park and Kobuleti Protected Areas.

Socio – Economic Characteristics

Total Population of Chorokhi-Adjaristskali Basin District is 259,159 (among them, urban population is 156,153 and rural population is 103,006) persons. Concerning to the number of households, this Basin District includes 71,564 households in total (where, urban households amount to 43,497 and rural households amount to 28,067). Regarding to population densities, number of population per square kilometres is 104 persons and number of households per square kilometres is 29 households. Taking into account the length of medium and average rivers, number of population per kilometre of rivers is 2,234 persons and 617 households.

Value added of Chorokhi-Adjaristskali Basin District amounts to 908,736,226 GEL (and value added per capita within the basin is 3,506 GEL). Average income per month for urban household is 961.5 GEL and for rural one it amounts to 773.9 GEL. Concerning to economic activity (based on combined rankings of value added, turnover, purchase of goods and services and number of employed), construction, wholesale and retail trade and manufacturing sectors are leading contributors to economic performance in the given Basin District.

Total number of firms in Chorokhi-Adjaristskali Basin District amounts to 6,028. The vast majority of firms are concentrated in small businesses (nearly 98%). Based on percentage shares of number of companies by kind of economic activities, wholesale and retail trade (48%), hotels and restaurants (10%), construction (9%) and manufacturing represent the most prominent sectors. More than a half of employed population in the basin is employed in small businesses (52%) and 25% is employed in medium size businesses. According to the distribution of employment within sectors in Chorokhi-Adjaristskali Basin District, 19% is employed in construction sector, 17% is employed in wholesale and retail trade sector and 15% is employed in manufacturing sector (**Sources**: Business statistics (Geostat); "Natural Resources and Environment Protection in Georgia, 2015" (Geostat); "Census 2014" (Geostat); IHS Databases – 2014 (Geostat) and Draft of Sub-Legislation - 2017).

Appendix 9: Improved control of extreme events (G4G Expert Opinion)

A key component of the Water Management Law is the development of River Basin Management Plans (RBMP). RBMP will be reviewed every six years.

A long-term goal of the RBMP is to protect surface and ground water of the River Basin District from risks that undermine their ecological status through attaining a number of environmental quality objectives.

The river basin management plan for each river basin district should include the following:

General description of the characteristics of the *river basin district*, including a map showing the location and boundaries of the surface and ground water bodies and a further map showing the types of surface water bodies within the basin.

Summary of the significant pressures and the impact of anthropogenic activity on the status of surface and ground waters, including point source pollution, diffuse pollution and related land use, the quantitative status of water including abstractions and an analysis of other impacts of human activity on water status.

Map showing any protected areas.

Map of the monitoring network.

Map of the results of the monitoring programme showing the status of all water bodies and protected areas.

List of the environmental objectives set for all water bodies, including those where the use has been made of derogations.

Summary of the economic analysis of water use.

Summary of the programme or programmes of measures.

Register of any more detailed programmes and management plans and a summary of their contents.

Summary of the public information and the consultation measures taken, their results and the changes to the plan as a consequence.

List of competent authorities.

Contact points and procedures for obtaining background documentation and information, including actual monitoring data.

Article 11 of the WFD, sets out a requirement for each Member State to develop a PoM in order to achieve environmental objectives. Measures are divided into two types: i) Basic measures; ii) Supplementary measures. The basic measures are obligatory and aim at meeting environmental objectives through implementing EU Directives other than EU WFD and national legislation in support of the WFD. Supplementary measures are optional and aim at facilitating the achievement of environmental objectives in combination with basic measures. These activities are research, technological diffusion, demo and pilot, infrastructure improvement and other type of activities, etc.

The *river basin management plans* and *programmes of measures* are not intended as a once-only exercise, but as a dynamic process based upon a six-yearly cycle of updating. In this way, changes to the pressures on a *water body*, both natural and anthropogenic, can be recognised and new measures developed to overcome them. Furthermore, refinements to the monitoring programme, and the availability of further data, will enable fine-tuning to existing measures and give early warning of new problems so that appropriate action can be taken.

Chorokhi River Basin Management Plan is first attempt to develop RBMP according to WFD in Georgia. The River Basin Management Plan addresses significant water management issues in the Chorokhi-Ajaristskali River Basin District posing risks to ecological status of water bodies, through setting number of Environmental Objectives and designing Programme of Measures (PoM) to attain these objectives.

Document identifies and lists technically and financially feasible PoM; among them are measures supporting flood control activities, those include:

Erosion-minimizing soil cultivation: contour cultivation, direct sowing, mulch sowing with existing or new equipment, cultivation primarily at right-angles to the slope.

Restoration of range and pasture lands and revegetation of floodplain zones.

Avoidance of livestock grazing in water protection strips by providing alternative shading and water;

Review/recalculation of water abstraction quantity taking into consideration ecological flow level in the river;

rehabilitation of drainage canals;

Implementation of river bank erosion control/prevention activities (restoration of floodplain zones, putting of river bank reinforcement structures, rectification of river bed morphology, etc.)

These measures (structural and non-structural) were ranked as of high priority in result of integrated cost and economic effectiveness analysis.

Moreover, development of RBMP's requires a new surface and groundwater monitoring system with automatic stations. Water flow monitoring allows predicting floods and minimizes threats to human life and property.

Note: Traditionally, flood control has focused on reactive measures and practices. This means that initial interventions largely relies on control of floods through structural measures, which are only later supported by certain non-structural measures. Structural measures have only shifted or disturbed ecological balance rather than mitigating flood risks. It is recommended therefore that both structural and non-structural measures of flood control and water use should be integrated.

Appendix 10: Potential Impact on ETM market (G4G Expert Opinion)

Law on Water Resources Management aims to more effectively allocate the limited water resources among the users that will bring secured and guaranteed access to the water resources for the various sectors, including for the hydropower stations. The stable access to the water resources will promote attraction of the new investments in the sector and promote realization of the Electricity Trading Mechanism (ETM).

The Georgian Ministry of Energy & Natural Resources (MENRP) is committed to facilitating private sector led development of Georgian hydropower resources. This strategy requires that Georgian hydropower plants have access to an Electricity Trading Mechanism (ETM) that provides transmission paths, trading tools and risk mitigation options so they can sell their electricity into the Turkish and regional electricity markets.

In 2012, MENRP has asked USAID HIPP to develop a Cost Benefit Analysis for the implementation of the ETM. This report describes the results of this analysis.

While the ETM has been designed to minimize the extent of change and investment required within the Georgian energy sector, its implementation will incur costs. Capital expenditure includes an estimated 20 million USD for a new IT platform and another 10 million USD for metering. Additionally, GSE, ESCO and GNEWRC will all need to learn new skills as the Georgian power system becomes increasingly compliant with EU competitive market principles and harmonized with Turkey's power market rules and procedures, changes that will require the promulgation of rules on Transmission System access and use (Grid Code,) as well as regulations that impose the minimal essential technical requirements to enable efficient operation of the electricity system.

However, the benefits far outweigh the cost, and include:

The ETM has an estimated Net Present Value (NPV) of 1.2 billion USD to Georgia, between 2015 and 2025 alone. This translates into a reduction in domestic cost-based tariffs of over 10% for the nation's retail electricity consumers.

By enabling Georgian hydro plants to sell large volumes of their output at the higher prices available on regional markets, the ETM will allow private developers to secure a return on their investment in Georgia from external sales, rather than relying heavily on domestic consumers.

The ETM will also enable Georgia to leverage its natural resource base to turn the energy industry into Georgia's leading export sector. As well as increasing energy security through reduced gas import dependence, the ETM will help Georgia reduce its large trade deficit.

By attracting more private capital to the energy sector, the ETM will free up the Government's limited budgetary resources for investment in other areas, such as social development, health and education.

Appendix 11: Potential Impact on Irrigation and Agriculture (G4G Expert Opinion)

Law on Water Resources Management aims to more effectively allocate the limited water resources among the users that will bring secured and guaranteed access to the water resources for the various sectors, including for the irrigation system. The stable access to the water resources will promote implementation of the recently adopted Irrigation Strategy of Georgia.

Ministry of Agriculture adopted Irrigation Strategy of Georgia which recommends regulation of irrigation service providers by the National Energy and Water Supply Commission of Georgia (GNERC). In the strategy as the regulatory framework considered: (1) licensing, (2) tariff setting, (3) dispute resolution, and (4) regulation of service quality. Considering the existing impact of proper regulation to the reliability of services in the energy and water supply sectors of Georgia, if implemented most probably the proper regulation of irrigation sector should increase the reliability of services such as Georgia Amelioration.

Actual irrigated area in Georgia, which was as much as up to 400,000 hectares during the Soviet period had dwindled to approximately one-tenth of that by 2012⁷³, and it was accompanied by the level of reliability of services with the potential for increase. Rehabilitation investment together with the sector reform is expected to increase reliability of services and restore irrigated area to 200,000⁷⁴ hectares by 2025. This will increase water demands from the current level of around 150 MCM to around 900 MCM per year⁷⁵.

However, a lack of storage and a progressive loss of snowpack storage when demand is high and river flows are at their minimums or Inter-sectoral competition⁷⁶ for water if not properly managed may cause shortages later in growing seasons. Thus in case of water scarcity or Inter-sectoral competition the demand side management and increase in irrigation water use efficiency might not be sufficient to mitigate the risk associated with the water resource availability which at some portion might influence the reliability of services if the proper water resources allocation system (plan specifying abstraction amounts/volumes, conditions and timetables for diversion and storage of water) is not in place and the right for the surface water abstraction not reserved through the permit.

Respectively considering the existing impact of proper regulation to the reliability of services in the energy and water supply sectors of Georgia, the investment in rehabilitation of irrigation infrastructure together with the proper regulation of irrigation sector and preserving the rights for the water abstraction, most probably should increase the reliability of services offered by the service providers such as GA and water and land resources use efficiency. These most likely will lead to the increase in annual yield productivity from 10 year mean (2005-2015)⁷⁷ at least to 5 year⁷⁸ (2005-2010) maximum of yield productivity⁷⁹.

⁷³ Source AG.ge Webpage Accessed 06/26/2017 15:25 PM

⁷⁴ Irrigation Strategy of Georgia 2017-2020 Paragraph –Rehabilitation and Modernization

⁷⁵ Irrigation Strategy of Georgia 2017-2020 Paragraph – Rehabilitation and Modernization

⁷⁶ Irrigation Strategy of Georgia 2017-2020 Paragraph – Inter-sectoral competition for water

⁷⁷ ENPARD Agriculture of Georgia Review -2015 Paragraph 6 – Crop Productivity

⁷⁸ GEOSTAT Statistical Publication 2015 – Agriculture / 5 year Average productivity of crops

⁷⁹ Main Assumptions: Crop Distribution under the irrigated Area, Productivity, Prices average for past 10 years remains constant; Hypothetic Numbers of Crop Distribution under the Irrigation Systems which coincide with the Scheme Command Area.



The increase in agriculture output comparative to the non-proper regulation expressed in money terms can be estimated as up to 2.5 billion GEL⁸⁰ comparative to the impact of irrigated area expansion without the regulation of the sector for the period 2018-2025 and preservation of

the right for the water abstraction.

⁸⁰ ENPARD Agriculture of Georgia Review -2015 Paragraph – 8 Retail Prices

USAID Governing for Growth (G4G) in Georgia Deloitte Consulting Overseas Projects LLP Address: 85 Z. Paliashvili Street, Tbilisi Phone: +995 322 240115 / 16