EAP Task Force

Strengthening the economic and financial dimension of integrated water resources management in Azerbaijan, Georgia and Armenia
Case study on the Kura river basin

SYNTHESIS REPORT

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1. Introduction

The project "Strengthening the financial dimension of integrated water resource management in Georgia, Armenia and Azerbaijan – Case study on the Kura river basin" was launched by the Organisation for Economic Development & Cooperation (OECD) in the context of the EU Water Initiative National Policy Dialogue on IWRM. It aims at providing support to the Governments of the three countries as part of the implementation of the "Advisory Assistance Programme for Environmental Protection" that is financed by the German Federal Ministry of the Environment.

The overall goal of the project is to assess the economic and financial dimension of water management in Armenia, Georgia and Azerbaijan and to build the basis for a more coordinated approach to economic instruments for water management at the river basin level. When referring to "a more coordinated approach to economic instruments for water management", two distinct dimensions are considered in the context of this initiative:

- The trans-boundary dimension of water management; and,
- The potential for a coordinated application of economic instruments for water management at the river basin scale so economic instruments applied at the national level address effectively trans-boundary water management issues

The present report addresses both dimensions, with the purpose of providing an overall perspective of the economic and financial dimension of IWRM at the river basin scale. It builds on the insights on economic instruments for water management in each country gained through three Country reviews carried out by national experts in the first phases of this project[1]. The following two sections will provide more details about the context and the specific objectives of the project.

1.1. Description of framework conditions in the region and demands for project activities

In 2006, Armenia, Azerbaijan and Georgia signed the European Neighbourhood Policy Action Plans with the European Union (EU). Under these plans, each country is committed "to identify possibilities with neighbouring countries for enhanced regional co-operation, in particular with regard to water issues". The three countries are also committed to the implementation of the EU Water Framework Directive (WFD) and the development of River Basin Management Plans (RBMP), including for transboundary river basins.

The Caucasus countries committed to use the WFD principles as a basis for water management in the Kura river basin. Article 9 of the EU WFD deals specifically with water pricing and the application of the *polluter-pays-principle*. It promotes the use of water pricing that ensures an adequate recovery of the costs of water services, including environmental and resource costs, with adequate

[1] Tonoyan, V., 2012. Country Report on Economic Instruments for Water Resources Management in Armenia; Adeishvili, M., 2012. Country Report on Economic Instruments for Water Resources Management in Georgia; Verdiyev, R., 2012. Country Report on Economic Instrument for Water Resources Management in Azerbaijan.

contributions from different water uses (disaggregated into at least industry, households and agriculture). It also promotes pricing policies that provide adequate incentives for users to use water resources efficiently, and thereby contribute to the environmental objectives of the Directive.

National and regional roadmaps have been recently developed (with support from the European Union) for IWRM in the trans-boundary Kura-Araks river basin in the three Caucasus states. Their aim is to strengthen the technical and legal basis for full-scale implementation of IWRM principles in the South Caucasus countries and to harmonize the preparation of RBMP in each national part of the basin, thus preparing the basis for a regional coordinated plan for the entire river basin.

At this stage, all three Caucasus countries agree to cooperate on water protection issues, although joint water management is not yet considered at the regional policy agenda. There is a risk also that river basin management plans currently developed and adopted in the different countries are not financially sustainable because the implied costs exceed countries' public budgets and what economic sectors and households can afford.

1.2. Project goals

In this context, the overall goal of the project was to assess the economic and financial dimension of water management in Armenia, Azerbaijan and Georgia, in line with the requirements of the EU WFD. The following activities were carried out in the course of the project:

- Review of the existing economic instruments in the three countries, focusing in particular on the following questions: (a) How do these instruments contribute to current water management objectives? (b) Which financial revenues do these instruments generate? And, (c) Which institutional context and governance mechanisms have been put in place for supporting the implementation of these instruments?
- Assessment of existing economic instruments, assessing in particular whether the key principles referred to in Article 9 of the WFD (in particular: the polluter pays, the user pays, cost-recovery and the "incentiveness" principles) are satisfied. The assessment investigated possible affordability concerns that might arise in individual countries and for different water users' groups ;
- Identification of water management issues which are not (effectively) addressed by existing economic instruments at the national and river basin levels;
- Exploring ways to strengthen the use of economic instruments to manage the demand for water, reduce water pollution, promote low cost options and raise additional revenues for water policies in the basin. In this context, some (innovative) economic instruments, required to introduce IWRM principles, were proposed.

The final purpose of the project was the development of a shared view on the economic dimension of integrated water resource management at the river basin scale, building on the identification of common issues and the application of common methods.

2. Methodology

As previously mentioned, this synthesis report builds on three individual Country reviews developed by national experts supported by international experts who: provided methodological assistance; developed the agenda of a regional workshop where preliminary national results were presented and discussed; facilitated the workshop; and, developed the present synthesis report.

The project benefited from the impetus created by the aforementioned EU project on Trans-boundary River Management Phase II, the two projects complementing each other. The OECD facilitated the overall coordination of the project, monitored project implementation, liaised with public authorities in the three countries, and ensured quality control of data collection and final outputs. It also communicated on projects outcomes in international fora, including via the EU Water Initiative Water Working group and the EAP Task Force.

Country reviews provided information on existing economic instruments and water management issues in individual countries, stressing those not currently addressed. These reports also proposed potential new economic instruments to be introduced at the national and trans-boundary level, highlighting the expected benefits of an improved water management deriving from the implementation of these instruments.

This synthesis aims at conducting a comparative assessment of the three national insights. It attempts to provide some elements putting light on the potential for a common approach to the economic and financial dimension of water management in the Kura river basin.

The aim of this chapter is to briefly describe the methodology adopted by the project as a whole, giving an overall picture of all steps which eventually brought to the present synthesis.

2.1. Conceptual framework adopted by the project

One of the main requirements to be met in the Country reviews was the collection and provision of information in a harmonized and comparable way across the three countries involved. For this purpose, a Working Group Meeting involving experts from the three countries was organized in Paris December 2011 for developing jointly the common conceptual framework to be applied in each individual country for the assessment of existing economic instruments (Figure 1). The present synthesis also relies on the same conceptual framework, although it expands on it by covering also issues and themes specifically related the regional dimension of economic instruments for water management.

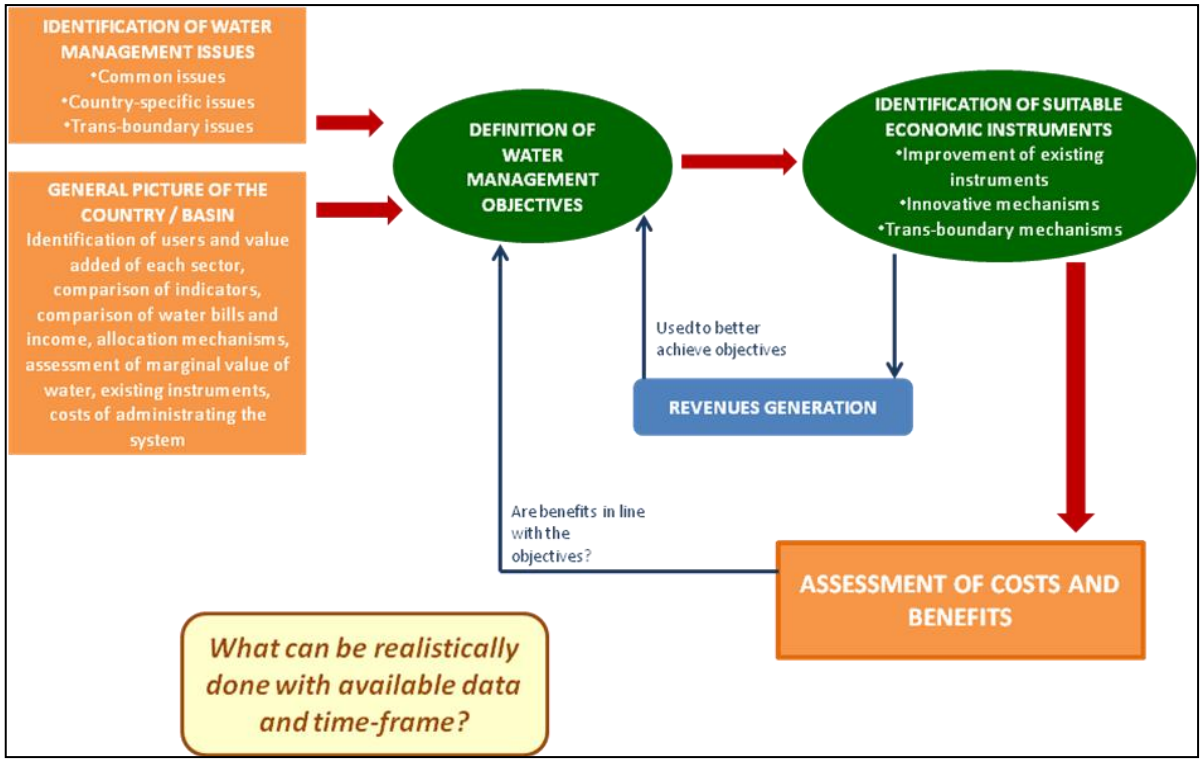


Figure 1. Conceptual framework adopted by the project.

This framework is composed by several 'blocks' which represents the main topics explored in the course of the project, as follows:

I. General description of the Country's water management: the existing water resource management context was explored, and this involved the assessment of the existing economic instruments for water management at the national level.

II. Water management issues at national and river basin level: the major water management issues which are not currently addressed by existing economic instruments were identified, as well as issues which are shared among the three countries and could therefore allow the development of common approaches to address them.

III. Definition of water management objectives: development of water management objectives, in response to the issues previously identified, which could be achieved both at the national and river basin level through the reform of existing economic instruments and/or the implementation of new instruments.

IV. Identification of suitable new (innovative) economic instruments at the national and river basin scale: to respond to the issues identified in step II, and to achieve the water management objectives identified in step III, new economic instruments to be implemented at the national and river basin scales were proposed for each country. The different proposals were then discussed to reach a common view on integrated water management in the basin and, in particular, on the use of economic instruments to reach common objectives. The expected revenues of the new instruments and their use for financing the water sector were crucial aspects that were taken into account.

V. Assessment of costs and benefits: The assessment of costs and benefits linked to the introduction of new economic instruments (or the reform of existing economic instruments) is one of the elements to be considered when evaluating the feasibility and suitability of an economic instrument. While cost estimation can be conducted in a relatively easier way, as it can build on existing data on costs of currently used instruments, the assessment of benefits of improved water management are rarely taken into account in a comprehensive manner, being often neglected or under-estimated in many current approaches to water management: Due to time constraints, it was not possible to tackle both costs and benefits. Moreover, due to the scarce attention normally given to benefits, focusing mainly on the expected benefits deriving from the introduction of new economic instruments - and therefore from an improved water management – appears as the priority. And a qualitative assessment of those benefits was then attempted in the context of this study.

2.2. Key project actions

The project work plan included the following activities:

- A **scoping mission** to collect contextual information and reference documents (roadmaps and plans), to establish a Regional Working Group and to agree upon a work programme and time schedule. It included a two day Working Group meeting in Paris, where national and international experts met and worked on shared and harmonised concepts and methods. The meeting reviewed past and on-going projects on the economics of water management in the region, and in particular on the results of the parallel OECD project on economic instruments for water management in the Debed river basin in terms of methodology applied, data required and policy questions to be addressed;
- A **review of the use of economic instruments for water resources management in the three countries**. The objective was to review the status of economic instruments (e.g. abstraction charges, pollution charges, water tariffs, penalties, other economic instruments if implemented) in the preparation of the reference documents (roadmaps, plans) for the Kura river basin. This phase built on a review of existing documents and of the process that led to the development of economic instruments to perform a sound overview of the status of economic instruments in the three countries and of their performance (in terms of cost-recovery, incentiveness, affordability, etc.). Additional information was collected on water uses and water management in each country to 1) put the current economic instruments in their context and understand their performance, and 2) identify the potential for new economic instruments to respond to existing water management issues. This work extensively relied on the data and results of on-going EU trans-boundary river management Phase II and related projects in terms of water (quantity, quality) and water uses (domestic, industry, agriculture, energy).
- The **identification of new (innovative) economic instruments** (e.g. payments for ecosystem services) that could be applied in the Kura river basin, building on: a) existing literature; b) reports and research from other (EU and non-EU) countries); c) the outcome of interviews with key experts and stakeholders for assessing the feasibility and relevance of proposed options; and d) the outcome of the parallel OECD project on innovative economic instruments for water management in the Debed river basin.

- The organisation of a **regional multistakeholder meeting in Tbilisi**, involving regional and international stakeholders and experts. This workshop facilitated the discussions on the economic dimension of water management at national and regional level (including trans-boundary water management); explored the potential for a common approach to economic instruments for water management; and identified key areas for further work and research (including pilot testing that could be performed as part of on-going EC and UNDP-funded regional projects).
- The preparation of the present **project final report**, synthesizing the results of the review in the three countries and the opportunities for further work on the economic dimension of IWRM in Kura river basin, complemented by the outcome of the discussions that have taken place during the regional multistakeholder meeting organised in Tbilisi.
- The preparation of a targeted **project synthesis** (4 pages) to be produced in English and translated in national languages and Russian for wider dissemination of the project results and key messages within the three countries and in the region.

2.3. Data sources

The analysis performed under the project was conducted according to the methodology developed in the Project Working Group, supported by available data, national strategic documents (IWRM roadmaps) and interviews with selected experts. No primary data was produced as part of this project.

This synthesis report, in particular, fully relies on the information provided in the Country reviews. It preparation was facilitated by discussions (during the regional meeting and workshops) among experts from different countries on key concepts, issues and experiences.

Country reviews were based on available data and information (e.g. existing reports, official documents, statistical data etc) complemented by interview and discussion with key experts from several stakeholder groups (Ministries, agencies, institutions and international organizations). The data sources used in each Country review are listed in Annex I.

3. Existing economic instruments in Armenia, Georgia and Azerbaijan

3.1. Overview of the existing economic instruments in the three countries

In general, traditional economic instruments can be found in the three countries, namely:

- Tariffs for drinking water, sewage and wastewater treatment;
- Tariffs for irrigation water;
- Environmental taxes, be it abstraction fees and/or pollution fees;
- Fines and penalties for water users that do not comply with the existing regulation in terms of abstraction and/or pollution discharges.

The practical application of these instruments present similarities and discrepancies across Armenia, Georgia and Azerbaijan. The following sections provide an overview of the existing instruments and their application in the three countries, a detailed comparative synthesis of their financial aspect being presented in Annex I of this report.

Tariffs for drinking water, sewage and wastewater treatment

Tariffs for drinking water supply, sewage and wastewater treatment exist in all three countries, being applied in similar ways, although they can be combined or separated with unitary rates (per cubic meter of water abstracted for example) showing some variability from one country to the other. In general, rates are about 0.35-0.45 USD/m^3 in Armenia and Azerbaijan, whereas in Georgia rates amount to 0.12 USD/m^3 in Tbilisi and 0.25 USD/m^3 in other cities. The general trend for these rates, however, is an increase in water tariffs in the three countries, as a result in particular to the rehabilitation of existing water infrastructure and the building of wastewater treatment plants.

In general, the water tariffs currently in place allow only for a partial recovery of the operational and maintenance costs of water services. The recovery rates for operation and maintenance costs for drinking water services are estimated at 71%, 75% and 93% in Azerbaijan, Georgia and Armenia, respectively.

In terms of affordability, estimates from the three countries showed that domestic water bills represent from less than 1% to 2.2% of the average household income. These values, however, do not reflect the magnitude of the impact across different income groups, and low-income households are likely to be significantly more affected by current water bills and by a potential future increase of water tariffs. These results might slightly differ if calculations account for water bill effectively collected (as this would imply lower burden on households than calculated). Collection rates in Azerbaijan compose about 75%. In Armenia the average collection rate by the five water supply companies has composed 99% in 2011.

Drinking water and sanitation services are normally administered by water supply companies and municipalities. In terms of legal status, water companies present different arrangements. In Armenia, domestic water services are totally managed by private companies which, however, are strongly

subsidized by the Government. However, there are about 560 self-supplied rural communities, which are in charge of providing water supply and discharge services. In Georgia and Azerbaijan, in contrast, the full ownership of the Tbilisi water supply and wastewater utility, together with installations in Rustavi and Mtskheta, was fully transferred by the Government to a private, Swiss-based company in 2007 (GWP); in the rest of the country, however, water supply and sanitation facilities are managed by the Government through the United Water Supply Company of Georgia, founded in 2008. In Azerbaijan, most water and sanitation services are provided by Azersu JSC, a state-owned company. Beside the case of Tbilisi, it can therefore be observed that in the region drinking water and wastewater services are mostly relying on public finances, both in the form of direct investment or subsidies.

A common issue in the three countries is represented by the poor conditions of the water supply infrastructures. Water losses are estimated to be around 40-60% in Georgia depending on cities (although the situation is improving), while Armenia also reported high conveyance loss figures (water loss from irrigation is roughly 40%, while water losses from the five drinking water supply companies amounted to 81.6% in 2011) and a poor quality of the existing water infrastructure. In Azerbaijan, there is no general information available. In Baku, domestic water losses amount to only 5-6% because of recent significant rehabilitation that has taken place for the distribution network. However, this does not represent the overall situation in the country as significant higher water loss rates as high as in other neighboring countries are reported.

Irrigation water tariffs

Irrigation water tariffs are applied in different ways in the three countries: while in Armenia they are applied per m^3 of water consumed or in some places according to irrigated hectares, in Georgia and Azerbaijan they are calculated according to irrigated hectares. Targeting actual consumption, tariffs by m^3 are expected be more efficient. Revenues from irrigation water tariffs amount to 54% of operation and maintenance costs in Armenia, while in Azerbaijan revenues cover only up to 1.8% of O&M costs. Not surprisingly, this level of cost recovery is lower than cost recovery levels for drinking water and wastewater services – even much lower in the case of Azerbaijan- as a result of very low irrigation water tariffs applied in all countries and that are significantly lower on average than tariffs applied to domestic consumption.

Irrigation tariffs and the related infrastructures are managed by ad-hoc public companies. These companies are subsidized by the government.

In general, the quality of irrigation services is rather poor, with high conveyance losses and uncertain and unreliable water supplies. And there is a large demand for modernization which, if put in place, could lead to significant changes (increases) in irrigation water tariffs.

Environmental charges: abstraction and pollution fees

Abstraction fees are applied in all countries, although in different manners as they can cover groundwater only or all water types, and they can be applied to effective abstraction or to abstraction permits.

The same can be said about pollution fees, as different types of pollutants are concerned. Pollution fees, however, are applied today only in Armenia and Azerbaijan, similar fees being abolished in Georgia in 2005 following an attempt to simplify the system of environmental taxes and to reduce corruption.

Revenues from environmental charges are fed into the state budget in Armenia and into an environmental fund in Azerbaijan. For the three countries, however, abstraction and pollution fees to not provide any incentive for users to reduce pressures on water resources, as charges are significantly too low and have limited influence on users' behavior. Another issue, in this respect, is the level of enforcement of pollution fees, as due to budget constraints is generally low both in Armenia and Azerbaijan.

Fines and penalties

Fines exist in the three countries but they show a high degree of variability, ranging from very low to very high fine levels (in Azerbaijan in particular). Regardless of the amounts charged, there are questions on their effective enforcement which seems to be low in the three countries. Moreover, fines and penalties are generally low, and therefore their impact on polluters' behavior is limited.

3.2. Comparative performance assessment of existing instruments

Following this first description of the application of economic instruments in the three neighboring countries, it is important to have an overall picture of how these instruments perform in with respect to the principles established by Article 9 of the Water Framework Directive, namely:

- "User (or polluter) pays" principle
- Incentiveness for a more efficient use of water resources
- Recovery of the costs of water services.

In addition to these three issues, some attention was given to affordability concerns.

Tableau 1 provides a synthetic overview of the performance of the existing instruments in Armenia, Georgia and Azerbaijan. For each of the elements considered, a preliminary assessment is also attempted, based on the following scale.

	The principle is fully (or almost fully) satisfied
	The principle is partly satisfied
	The principle is poorly satisfied
	The principle is practically not satisfied
	No information / not applicable / not relevant

As seen also in the previous section, tariffs and fees are generally low to very low in the three countries. This creates an issue with respect to the financing of the water sector and cost recovery of water services. As it is evident in the table, the level of cost recovery proved indeed to be partial or low. And this reveals that much of the finances come from "elsewhere, be it tax payers (i.e. state

budget) or external financing agencies. Higher water tariffs would therefore be required to cover for at least operation and maintenance costs.

The low level of tariffs and fees also implies that the “user pays” principle is only partially or poorly applied depending in the cases, as users only contribute to a part of the costs of water services. Along similar lines, low tariffs and fees obviously have a limited impact on users’ behavior, thus providing little incentive for a more efficient use of water resources.

Although at present no issue of affordability is reported with respect to existing instruments, an increase in tariffs and abstraction fees would need to take into account affordability concerns and distributional effects.

Fines and penalties also show a weak performance in terms of “polluter pays” principle and incentiveness for a less polluting behavior: in this case, however, the cause is not to be looked for in the level of existing fines, which in principle could be acceptable in most cases, but rather in the level of enforcement, which was reported to be weak in all countries.

On a more general level, this review highlighted the basic difficulty of undertaking a comparative assessment of existing economic instruments (and their performances) in three different countries: besides the differences between instruments, rates and applications, the information base is in fact generally weak. Furthermore, it is also difficult to find simple & comparable information for building the overall picture at the river basin level. With the view of developing a common approach to economic instruments at the regional scale, therefore, the improvement of the information base for the water sector is seen as a top priority.

Tableau 1. Comparative performance assessment of existing economic instruments in the three countries

Economic instruments and performance criteria	Armenia	Georgia	Azerbaijan
Tariffs for drinking water and wastewater			
'User pays' principle	Partial application	Partial application, especially in households without water metering	Partial application
Cost recovery	93% of O&M costs	75% of O&M costs	71% of O&M costs
Incentiveness for a more efficient use of water resources	Unclear, especially because it is difficult to understand the relationship between changes in water prices and consumption	Higher for organizations than households, as tariffs are applied on actual consumption. Incentiveness is an issue especially in households without water metering, which are the majority, as tariffs do not target actual consumption	Need for improvement: although the collection rate has increased, tariffs are still low and incentiveness is still an issue in households without water metering, which are the majority (77.5%)
Affordability	0.9-2.1%	2.2% in Tbilisi	2%
Irrigation water tariffs			
'User pays' principle	Tariffs are so low that 53% of the total costs are covered by state subsidies: therefore, users have little contribution	Tariffs are applied by hectare and not to actual water consumption: therefore, the principle is only partly satisfied	Tariffs are so low that users' contribution to O&M costs is negligible: therefore, the principle is practically not satisfied
Cost recovery	53% of O&M costs	No information available, but revenues are generally much lower than expenses	1.7% of O&M costs
Incentiveness for a more efficient use of water resources	Irrigation fees are particularly have a significant impact on farmers growing mainly wheat, as they represent about 7% of gross output sales: in this case, therefore, tariffs may provide a good incentive for efficient water use.	As the tariff is not applied to actual consumption, there is no incentive for a more efficient water use	The real cost of water distribution is not recovered to avoid making agriculture uneconomic and this does not promote efficient use
Affordability	It might be a problem for wheat producer only	No information	2%
Abstraction fees			
'User pays' principle	Applied in an un-equitable manner, as	In case of freshwater abstraction and non-	The principle is generally not properly

	hydropower production and irrigation are in practice not subject to these tariffs	consumptive uses, users do not pay at all; the principle is partly applied for groundwater abstraction, as fees are very low.	applied in the Country, but there are not specific information on abstraction fees
Cost recovery	Not applicable	Not applicable	Not applicable
Incentiveness for a more efficient use of water resources	It is unlikely that water abstraction fees play any incentive role at all, as they represent a minimum percentage of total water tariff	Fee rates are too low for promoting a sustainable use of water resources.	No information
Affordability	0.03% of total tariff paid	No information	No information
Pollution fees			
'Polluter pays' principle	Pollution fees are a direct application of the 'polluter pays' principle; due to a weak enforcement, however, this principle is only partly satisfied.	Abolished in 2005	The principle is generally applied in the Country, but efficiency should be raised.
Incentiveness for a more efficient use of water resources	The weak level of enforcement may limit the impact on polluters' behavior		No information
Cost recovery	Not applicable		Not applicable
Affordability	Not relevant		Not relevant
Fines and penalties			
'User pays' principle	Fines and penalties are a direct application of the 'polluter pays' principle; due to a weak enforcement, however, this principle is only partly satisfied	Fines and penalties are a direct application of the 'polluter pays' principle; due to a weak enforcement and lack of effective monitoring, however, this principle is only poorly satisfied	The principle is generally in the Country, but efficiency should be raised
Incentiveness for a more efficient use of water resources	Impact on polluters' behavior may be limited due to a weak enforcement	Due to the above mentioned reasons, the incentive for companies to abstain from violation is very low	Impact on polluters' behavior may be limited due to weak enforcement
Cost recovery	Environmental costs of accident pollution are not covered by the fines, as the current methodology only accounts for the economic damage caused to water bodies	Due to the above mentioned reasons, environmental costs might not be covered by fines and penalties	No information
Affordability	Not relevant	Not relevant	Not relevant

4. Water management issues not addressed by existing economic instruments: a comparative analysis

The comparative assessment of the existing economic instruments in the three countries revealed some gaps in their application and illustrated water management issues not addressed by existing economic instruments. The present chapter presents first a comparative assessment of water management issues seen from the different national perspectives, and then gives some attention to its trans-boundary dimension. To complete this information, an overall representation of water management issues at the river basin scale, according to the DPSIR framework, is provided in Annex III.

4.1. Water management issues at the national level: commonalities and discrepancies

At the national level, several water management issues were identified; as summarized in Table 2, many of them are shared by two countries and in one case they concern the whole basin.

Table 2. Water management issues not addressed by the existing economic instruments at the national level

Water management issue	Armenia	Georgia	Azerbaijan
Overuse of biological resources (including fish)	X		
Illegal waste dumping into the rivers	X	X	
High water losses due to poor infrastructure	X	X	X
Water pollution from municipal wastewater, mining and industry, agriculture	X	X	X
Soil erosion due to overgrazing and deforestation, resulting in excess sedimentation and mudflows	X	X	
Flood events	X	X	X
Non-consumptive water use: hydroelectric power		X	
Excess surface water abstraction	X	X	
Inefficient water use (domestic, industrial and agriculture)		X	X
Modified (decreased) river flows as a result of climate change	X	X	X
Seasonal water scarcity		X	X

Water pollution from municipal, industrial and agricultural sources can be defined as the major water management issue in the Kura river basin, as it concerns all three countries involved. In particular, **urban and rural wastewater** is probably the most important pollution source, as wastewater treatment plants are generally rare or do not work properly. In Armenia, for example, no proper wastewater treatment plant is currently operational, and only the WWTP in Yerevan performs partial mechanic treatment. A similar situation can be found in Georgia, where only one WWTP is in operation, but performs only mechanic treatment; on average, only 70% of the urban population is connected to sewerage collecting systems, while rural households are rarely connected to sewerage

networks. In Azerbaijan, municipal pollution is also having a negative impact on drinking water quality. Besides, water pollution caused by industrial activities, especially mining, proves to be another major concern in Armenia and Georgia.

A second major issue affecting water quality in the basin is represented by the **illegal waste landfills and dumpsites**, which is widespread in the whole basin. Illegal waste landfills (and sometimes even official ones) are not equipped with any bottom sealing or leachates collection system: as a result, hazardous substances contained in the leachates affect groundwater resources. A similar problem is related to the numerous illegal dumpsites on riverbanks, as leakages contaminate surface waters; moreover, the waste disposed on riverbanks is flushed away during flood events, resulting in high river pollution by organic materials, hazardous substances and great quantities of plastic waste.

Flood events and the resulting adverse social and economic implications are also a wide-spread, recurring major issue in the three countries. To some extent, the high occurrence of floods is partly due to the mountainous morphology and the climatic conditions typical of the area. The frequency and magnitude of these events, however, is also strongly related to land use and, in particular, to **soil erosion** phenomena due to overgrazing and deforestation, which aggravates flood events reducing the water retention capacity of the soil against strong meteorological events and, in addition, gives rise to mudflows. Another consequence related to soil erosion is an excess sedimentation of rivers and reservoirs, which in turn reduces their storage capacity and further increase flooding risks.

Water availability for human use and consumption is also infringed, in the three countries, by **poor supply infrastructures resulting in high water losses**, both in the domestic and agricultural sectors, as also mentioned in chapter 3.1.

While talking about water quantity, the high-priority water management issue in the Kura river basin (according to GEF/UNDP) is represented by **increased periods of water scarcity** due to a reduction in river flows resulting from climate change. In this respect, the Country reviews showed indeed that this is a major issue in Armenia and Azerbaijan, where widespread flow reduction results in increased water scarcity as pressures on water resources –from domestic, industrial and agricultural consumption- are generally high: for example, the water exploitation index (WEI) reaches up to 45% in Armenia and 48% in Azerbaijan (OECD estimate) where countries with a WEI higher than 40% are considered to be under severe water stress. High variability of water resources between seasons and years is also a factor to be taken into consideration, as in dry periods water scarcity situation are exacerbated. Georgia, on the other hand, was reported to have plentiful water resources, thanks to its geographical position and a somewhat different climate.

Other issues were also reported at the national level which are not shared by others, such as excess abstraction for non-consumptive uses (Georgia) and over-use of biological resources (Armenia); in this respect, further research could be useful to clarify whether these issues, too, are also affecting the other countries in the basin.

4.2. The trans-boundary dimension of water management issues in the Kura river basin

The trans-boundary dimension of water management issues in the Kura-Aras river basin was investigated in 2006-2007 through Trans-boundary diagnostic analysis (TDA) by the UNDP/GEF funded project Reducing Trans-boundary Degradation in the Kura-Aras River basin. At a general level, four high-priority issues were identified, namely:

- Variation and reduction in hydrological flow
- Deterioration of water quality
- Ecosystem degradation
- Flooding and bank erosion.

Comparing this list with the issues reported at the national level (see previous section), it is evident that unaddressed issues shared by the three countries have strong trans-boundary implications; actually, ecosystem degradation was not reported by the three countries as an issue related to water management, but it is clearly the result of all the other mentioned problems (e.g. reduction in river flows, excess exploitation, water pollution etc.).

At this stage, however, the type and magnitude of trans-boundary issues is still poorly understood: while it can be inferred that pollution in an upstream country is very likely to affect downstream countries, no actual measurement has been undertaken at the borders so far. Thus no actual data is available, for example, on the type and quantities of pollutants passing from one country to the other, nor on the actual contribution of erosion in an upstream country to flooding events in downstream countries.

Nevertheless, to give a more detailed overall picture it is possible to provide some actual examples of trans-boundary water bodies in the Kura-Aras river basin where specific trans-boundary issues are well evident, although no quantitative parameters are available:

- Kura River: in Georgia, one major hotspot with respect to trans-boundary water management is represented by the wastewater treatment plant in Gardabani, located close to the border with Azerbaijan. It is the only operating WWTP in Georgia and collects and treats municipal wastewater from Tbilisi and Rustavi, although it ensures only mechanical treatment and discharges partially untreated wastewater in the Kura river, which flows in Azerbaijan;

- Alazani (Ganikh) river: the river flows for a substantial part of its length along the Georgia-Azerbaijan border, and discharges into the Mingachevir reservoir, located in Azerbaijan, which expressed concern about trans-boundary pollution from municipal wastewater (e.g. BOD, COD, nitrogen, phosphorous) and pollution from agriculture (e.g. nitrogen, phosphorous, pesticides), as monitoring in Azeri territory showed high levels of several pollutants;

- Debed river: the Debed river basin is shared by Armenia and Georgia. In the Armenian part of the basin, heavy metal (V, Mn, Cu, Fe) concentrations are high because of ore deposits; recent improvements in ore processing facilities have decreased water pollution by wastewaters from the ore enrichment and processing industry, but the impact of tailing dam of the Akhtala ore processing factory is still a concern

- Lake Jandari and Alazani-Agrichay aquifers: these two water bodies are shared by Georgia and Azerbaijan, and both countries extensively abstract water for several uses, especially irrigation, but no official coordinated management approaches are in place at the moment.

Against this background, although no monitoring data exist on trans-boundary water management issues, the relationship between issues at the national and trans-boundary levels appears quite evident: as it will be discussed more extensively later in this report, this suggests that trans-boundary water management issues could already be controlled and addressed at the national level, by assuring a more coordinated and effective approach to water management. In any case, this quick review highlighted the need for building a strong information base on water status and water management issues, both at the national and trans-boundary level.

5. Potential new (innovative) economic instruments for the Kura river basin

5.1. Review of the potential new instruments proposed for the three countries

The performance assessment of the existing economic instruments allowed the identification of current gaps, which in turn lead to unaddressed water management issues both at the national and trans-boundary level. Therefore, the main question to be asked at this point is as follows: how to address current gaps and water management issues? Or, in other words: how can existing economic instruments be reformed towards an increased effectiveness? And beyond this, which new (innovative) economic instruments could be implemented at the national and trans-boundary scale?

In the country reviews, each national expert answered to these questions by proposing options for reform of existing instruments as well as new (often innovative) economic instruments both at the national and trans-boundary level which would suit the regional context. Although economic instruments are rarely applied at trans-boundary scale, their application even in a single country can have trans-boundary impacts and benefit countries other than those where the instrument take place. They are expected to lead to positive outcomes so benefits in a given country from instruments. The potential for actual trans-boundary cooperation and, in turn, the development of trans-boundary economic instruments, would obviously be the ultimate result of a coordinated approach to water management, and it is essential that this dimension is taken into account.

Table 3 summarizes all proposals from the three countries: for each potential economic instrument, a short description is provided, as well as an indication of which countries are interested in each instrument[2] and the potential for application at the trans-boundary scale.

Table 3. Potential new (innovative) economic instruments proposed for the three countries

Potential economic instruments	Description	Country		
		AM	GE	AZ
Adaptation / improvement of existing water abstraction fees	Application of different water abstraction fee levels for industry and households (Armenia) Enforcement of existing legislation: charges would be imposed not only on groundwater abstraction but also on surface water abstraction (Georgia)	X	X	X
Charge for non-consumptive water use (hydropower)	Extension of water fees to hydropower companies, which at the moment are exempted	X	X	X
Reform of existing water tariffs	Differentiation of tariffs according to season, to cope with seasonal water scarcity (Armenia) Higher tariffs and differentiation of tariffs according to flow variation and water availability (Azerbaijan)	X		X
Introduction / reform of existing pollution fees	Pollution fees would be applied at permit level and not to the actual pollution, saving on administrative costs (Armenia)	X	X	X

[2] The proposals for Armenia build on the results of a parallel OECD initiative in this river basin.

	On a general level, the re-introduction of pollution fees is desirable. Fees should target industrial wastewater discharge, municipal pollution, BOD and nutrients discharge (Georgia)			
Adaptation / improvement of existing fines	In general, both in Azerbaijan and Georgia adaptation and enforcement of existing legislation needs to be ensured. In Georgia, fines would be applied also to illegal waste dumping		X	X
Innovative pollution fund	Polluters polluting above an authorized limit pay a fine (or higher pollution rate) that is sufficiently high. The revenues from the fines or higher rate are then put in a fund, and existing polluters can submit proposals for pollution reduction: the most cost-effective ones are selected for receiving subsidies and putting new treatment or new industrial processes in place.	X		
Extra / product tax for polluting substances	Creation of an extra/product tax on hazardous chemicals, and establishment of "deposit-refund system" under which the tax/duty is returned in exchange for returning unwanted products	X		
Charges on fertilizers	Imposition of charges on the import and production of chemical fertilizers and pesticides used in agriculture	X	X	
Reducing taxes on water saving technologies	Tax reduction (e.g. VAT) for those companies introducing water saving technologies in the production cycle	X	X	
Environmental insurance system	Liability for environmental damage or cleanup costs may lead to the creation of a market for environmental insurance. In a well-functioning market, insurance premiums would be expected to reflect the probable damage or cleanup costs and the likelihood that the damage will occur. This would create an incentive for polluters, as they would enjoy lower industrial premiums for industrial processes that have a lower risk of pollution or accidents		X	
Payment for ecosystem services	Soil erosion due to overgrazing and deforestation are causing flooding and mudflows in many settlements in the region. Erosion can be reduced through reforestation and other activities, where the upstream community inhabitants and farmers convert part of their land to forests or floodplain areas. For these services, downstream communities pay upstream communities to compensate for the lost opportunity of using their land for agricultural purposes. This instrument could also be applied at the trans-boundary level: for example, it was suggested that Georgia and Azerbaijan undertake joint investments for improved land management in Georgian territory	X	X	X
Beneficiary pays principle	Georgia and Azerbaijan undertake joint investments for improved wastewater treatment on the territory of Georgia (e.g. Gardabani WWTP).		X	X

Potential for trans-boundary application

This comparative synthesis stresses the common interest in the reform of the existing instruments –abstraction and pollution fees in particular, while only two countries are interested in adapting water tariffs and fines- although different mechanisms / solutions for adaptation were proposed in

each countries. This reveals a shared interest in improving the existing instruments which might give way to the construction of a common approach.

Besides existing instruments, the extension of water fees to non-consumptive uses, namely hydroelectric power production, can be identified as a regional priority, since all three countries are interested in this instruments. Indeed, the hydroelectric sector is already strong in the region, and more power plants are planned for the future (e.g. in Georgia), and the regulation of water use for energy production is thus becoming an essential component of a sound water management in the basin.

The different proposals included not only the adaptation or extension of existing instruments, but also innovative instruments such as pollution fund, environmental insurance scheme and payment for ecosystem services. These will deserve further attention and research in the future as in principle they present a good potential for improving water management in the area.

Furthermore, it is also interesting to note that most of the proposed instruments are meant to be applied at the national scale. Two instruments only could in fact have a potential for trans-boundary application, namely payments for ecosystem services and the application of the beneficiary pays principle.

Undoubtedly, the gaps reported in the existing economic instruments reveal that, at the moment, the reform and adaptation of the existing instruments is a priority; nevertheless, the main focus on instruments to be applied in the national contexts offers some hints for reflection, which will be further developed in Chapter 7 while discussing the potential for developing a common approach to water management in the Kura-Aras river basin.

5.2. Pre-feasibility assessment of the proposed instruments

After potential suitable new economic instruments were identified, it was essential to understand which ones, among them, are the most promising ones in the different national contexts. To achieve this, a preliminary feasibility assessment of the proposed instruments was therefore carried out for the three countries, taking into account the following criteria:

- Pre-conditions for implementation: each instrument requires that some specific conditions are met before it can be implemented, for example in terms of legal requirements and institutional and governance structures needed. Therefore, the question to be answered is: are these conditions already in place in the Country?

- Social, economic and political acceptability: how would the instrument be received in the Country?

- Affordability: some instruments (e.g. increase of existing water tariffs) might involve some issues of affordability for water users, which has to be addressed.

- Time horizon: considering the previous conditions, when could the instrument be actually implemented? (Short, medium or long term).

To give an overall, synthetic overview of the expected feasibility of each instrument, scores were assigned first to the single criteria, and building on this an overall feasibility score for the instruments was derived. Scores were given according to the following qualitative scale:

- ++ High feasibility
- + Feasible, with minor issues to be tackled
- 0 Feasible, provided that existing constraints to implementations are addressed
- - Implementation would be, in principle, possible, but major constraints are existing
- -- Not feasible at current conditions

It is important to point out, however, that the aim of this exercise is not to provide an exhaustive feasibility assessment, but rather to undertake a preliminary, qualitative screening of proposed economic instruments aimed at identifying the potential most promising instruments on which further investigations and research will be needed.

The results of the pre-feasibility assessment are presented in Table 4.

Table 4. Pre-feasibility assessment of the proposed new (innovative) economic instruments

Potential economic instruments	Specific criteria to be satisfied	Country					
		Armenia		Georgia		Azerbaijan	
		Specific criteria	Overall feasibility	Specific criteria	Overall feasibility	Specific criteria	Overall feasibility
Adaptation / improvement of existing water abstraction fees	Pre-conditions for implementation	++	++	0	+		+
	Social, economic and political acceptability	++		++			
	Affordability	++		+			
	Time horizon	Short		Short			
Charge for non-abstractive water use	Pre-conditions for implementation	+	0	+	0		+
	Social, economic and political acceptability	--		0			
	Affordability	0		0			
	Time horizon	Medium		Medium			
Reform of existing water tariffs	Pre-conditions for implementation	++	+				+
	Social, economic and political acceptability	+					
	Affordability	0					
	Time horizon	Short					
Adaptation of existing pollution fees	Pre-conditions for implementation	+	++	-	0/-		+
	Social, economic and political acceptability	++		0			
	Affordability	++		0			
	Time horizon	Short		Long			
Adaptation / improvement of existing fines	Pre-conditions for implementation			-	+		++
	Social, economic and political acceptability			+			
	Affordability			++			
	Time horizon			Medium			
Innovative pollution fund	Pre-conditions for implementation	-	+				
	Social, economic and political acceptability	++					
	Affordability	++					

	Time horizon	Short					
Extra/product tax for polluting substances	Pre-conditions for implementation	+	+				
	Social, economic and political acceptability	+					
	Affordability	+					
	Time horizon	Short					
Charges on fertilizers	Pre-conditions for implementation		+	-	-		
	Social, economic and political acceptability			-			
	Affordability			-			
	Time horizon			Long			
Reducing taxes on water saving technologies	Pre-conditions for implementation	+	+	-	-		
	Social, economic and political acceptability	+		0			
	Affordability	+		+			
	Time horizon	Short		Medium			
Payment for Ecosystem Services	Pre-conditions for implementation	+	+	--	-		
	Social, economic and political acceptability	++		-			
	Affordability	+		+			
	Time horizon	Short		Long			
Environmental insurance system	Pre-conditions for implementation			-	0		
	Social, economic and political acceptability			++			
	Affordability			0			
	Time horizon			Medium			

Pre-conditions for implementation

Not surprisingly, the adaptation/reform of existing instruments performs generally well under this criterion, as normally the legal requirements and the necessary governance structures are often already in place. In this respect, an exception is represented by the introduction of pollution fees and the extension of fines in Georgia, as the proposed solutions would require the establishment of a well-functioning monitoring network and enforcement mechanisms, which could be costly and take a lot of effort. Monitoring networks, however, would need to be upgraded and/or put in place in the other countries as well

Concerning innovative economic instruments, on the other hand, the pre-conditions for implementation are generally met in Armenia with respect to extra/product tax, tax reduction for water saving technologies and payment for ecosystem services, as the Water Code of Armenia, to some extent, already provides opportunities for the development of such instruments, and only some adjustments will be needed; different is the case of the innovative pollution fund, as its creation would require specific new regulations and governance mechanisms. In contrast, the pre-conditions for implementation of innovative instruments in Georgia appear to be hardly met, as: tax reduction for water saving technologies would require specific monitoring and enforcement systems; and, an environmental insurance scheme would involve the creation of a specific mechanism. Moreover, the type of payment for ecosystem service scheme proposed for Georgia would involve joint investment between this country and Azerbaijan, an option for which there is today no formal agreement in the field of water management. And the willingness of the Azeri Authorities to be involved on the Azeri side would need further investigation.

Social, economic and political acceptability

In Armenia, the proposed instruments generally obtained a good score with respect to their acceptability: water abstraction fees, for example, are currently so low that their reasonable increase is unlikely to cause opposition, while other instruments targeting polluters would be directed towards a well-defined group, thus encountering the favors of the majority. The only instrument which is likely to be faced with opposition is the extension of water abstraction fees to hydroelectric power production, as the Government is currently aiming at maximizing the use of alternative sources of energy.

In Georgia, on the other hand, the major concern with respect to the extension of abstraction fees to hydropower companies is related to the risk that fees could affect electricity prices, thus encountering opposition from population and firms. In contrast, one innovative instrument which is likely to be very well accepted is the environmental insurance scheme, as it would rely mainly on free market mechanisms and would act as a positive incentive for investing in 'cleaner' production processes. The same cannot be said for the creation of a payment for ecosystem services scheme: from a political perspective, in fact, it might not be easy to reach a joint solution among Georgia and Azerbaijan, at least in the short term.

In any case, as it is for the rest of the assessment, the acceptability of the proposed instruments is here assessed in a preliminary way, and more thorough investigation is needed on this topic.

Affordability

Affordability does not appear to be a major issue with respect to the implementation of the proposed economic instruments, as scores on this criterion are generally high. As previously mentioned, some concerns might rise when it comes to abstraction fees for energy production from hydroelectric sources, as fees could affect electricity prices thus having a negative impact on consumers.

Time horizon

The implementation of the existing instruments is expected to be possible, generally speaking, on the short term in Armenia and medium/long term in Georgia and Azerbaijan: this difference is probably due to the fact that in Armenia a national dialogue on existing economic instruments is already taking place, and therefore the ground for implementation is currently more fertile in this country. This does not mean, however, that in Georgia implementation will be more difficult: in fact, it is simply expected that the path toward the introduction of existing instruments will likely require more preliminary dialogue at the national level.

5.3. Implementation of new (innovative) economic instruments: overall considerations for the Kura-Aras river basin

The analysis conducted so far revealed quite clearly how, even before thinking about innovative instruments, a significant improvement can take place in the implementation of existing instruments (e.g. structure, level, performance and cost recovery in particular). In this respect, some initiatives are already on-going in the basin, namely:

- Armenia: the Ministry is currently examining possibilities for reforming abstraction and pollution fees, within a general reform of the financing of the water sector. It is also taking into considerations possible ways to address water quality and illegal water

abstraction. A national dialogue is currently on-going in the country, and in this context more specific discussions were be held in April, when the steering committee of the on-going study on economic instruments involving all relevant water stakeholders met.

- Azerbaijan: A new pollution fee system was developed last year. But it is not yet implemented. Furthermore, the country has a specific boy taking care of water tariffs, which provides guidance on water prices for irrigation and for drinking water following a well defined method for price setting. Water tariffs –and their reform- are currently the main national focus with respect to economic instruments.

It is not clear, however, whether adaptation and reform of existing instruments alone will be sufficient to provide a) the financial revenues required for investing in water management and b) the necessary incentives for promoting water efficiency and reducing pollution and abstraction.

To integrate the 'traditional' economic instruments, many alternatives are available, with options targeting different management issues, different sectors etc; furthermore, the pre-feasibility assessment suggested that the ground would be fertile for the implementation of innovative instruments. The options proposed for the three countries represent a toolbox that could be the basis for further thinking and discussions in each country.

In particular, one instrument is raising great attention and great concern (due to the possible involvement of two countries) at the same time, both from a national and trans-boundary perspectives, namely Payment for Ecosystem Services (PES). It would therefore make sense to have more exchanges between the three countries on the subject. At present, PES are being discussed in Armenia, and there is an increasing interest for PES in Georgia and Azerbaijan. As PES implementation might be complex, it is important to assess whether PES are a real priority in the three countries or whether it would be more useful to review and improve existing economic instruments first.

In addition to working on "negative" instruments such as fees and fines, it is important to work on "positive" instruments, i.e. providing incentives for water savings and efficiency improvements, as for example tax reductions for water-saving companies.

Also, further work would be required for assessing the importance and impact of so-called "harmful subsidies", i.e. subsidies given to sectors such as agriculture, energy, industry for supporting their economic development but with a negative impact on water resources and on the status of aquatic ecosystems.

In summary, the analysis of possible options for innovative economic instruments or reform of existing ones highlighted different key messages, which could serve as guidance for further efforts on the topic:

- The introduction of new (innovative) economic instruments should better come after the reform and adaptation of the existing instruments, as they showed large room for improvement. These traditional instruments, however, are unlikely to provide all necessary revenues for investing in the water management sector, nor they are expected to provide sufficient incentives for a behavioural change, and it is here that innovative

economic instruments could play a fundamental role in integrating traditional instruments.

- To ensure a successful implementation, the design of new economic instruments in the three countries must necessarily be socially, politically and economically accepted. At present, more efforts are needed to investigate the acceptability of the proposed new instruments.

- After this preliminary screening and assessment of potential new economic instruments, the main question to be answered by further work on the topic is: which processes can be followed in the three countries for defining and implementing new economic instruments? At this stage, in fact, a full understanding of possible innovative economic instruments is still not widespread. It is therefore fundamental that national dialogues on the topic are established or continued (where such dialogue is already on-going, like in Armenia).

Regardless of the instruments which will be reformed or chosen and applied, however, in order to collect sufficient financing for an improved water management it will be crucial that all revenues coming from these instruments and managed by central governments are properly earmarked and re-invested in the water sector: at present, in fact, revenues from these instruments are usually absorbed in the general state budget without a proper distinction among sources of revenues, making it difficult to target re-investment to the water sector.

5.4. The benefits of the implementation of new economic instruments for an improved water management

As mentioned in the introductory chapter, the identification and quantification of benefits is often neglected when about economic instruments for an improved water management. Due to time constraints combined with the lack of information on the topic, the quantification and valuation of expected benefits is out of the scope of the present study. It was crucial, however, to provide a qualitative overview of the expected benefits deriving from the implementation of the proposed new economic instruments both at the national and trans-boundary level.

In the country reviews, each of the proposed instruments was linked to a specific objective of improvement of current water management practices, and this relationship allowed the identification of the benefits linked to the implementation of the instrument. Table 5 presents a synthetic overview of all possible benefits which can be obtained at the national level -as benefits can often be common to the three countries, all benefits connected to a specific instruments were aggregated at the river basin scale, without distinctions among the single countries. Furthermore, the analysis of expected benefits revealed that the proposed instrument can be divided in three groups, as they are directed at three main water management objectives and thus deliver the same types of benefits, namely: (i) instruments directed at improving water quantity and water availability; (ii)

instruments aimed at ensuring good water quality; and (iii) instruments aimed at improving land-use practices.

Table 5. Overview of expected benefits at the national level

Potential economic instruments	Objectives of improvement	Expected benefits
Quantity-related instruments		
Adaptation / improvement of existing water abstraction fees **Charge for non-abstractive water use** **Reducing taxes on water saving technologies** **Reform of existing water tariffs**	Ensure rational water use and reduce water losses Ensure sustainable water supply Increase efficient water use Reduce vulnerability of water resources due to climate change	Increased productivity of agricultural land Increased crop productivity and income from agricultural activities Increased industrial production Increased capacity of hydropower generation Improved ecosystem functioning and integrity Benefits of avoiding water quantity reduction from climate change
Quality-related instruments		
Adaptation of existing pollution fees **Adaptation / improvement of existing fines** **Innovative pollution fund** **Extra/product tax for polluting substances** **Charges on fertilizers** **Environmental insurance system**	Ensure good qualitative status of surface and ground waters	Reduced risks for public health through contaminated drinking water, contaminated agricultural products and water borne diseases Regeneration of biological resources, including fish stocks Healthier river ecosystems Increased income from improved recreational value of river ecosystems Increased income from sustainable fisheries
Instruments targeting land-use		
Payment for Ecosystem Services	Reduce erosion upstream through reforestation and other activities Reduce flood risks by converting some agricultural and other lands upstream to floodplain areas	Increased soil quality and soil productivity Increased income from agricultural activities Reduced damages to national economies and human lives due to flooding and mudflows Reduced damage to harvest, livestock and landscape

At present, only a preliminary screening of the benefits of a common / trans-boundary approach was possible, as information on the trans-boundary dimension of water management is currently lacking. On a general level, however, it can be said that a common or even trans-boundary approach to economic instruments for water management would maximize the obtainable benefits. In addition, it would improve the efficiency of the measures; in particular, the following aspects were identified:

- Increased overall cost-effectiveness of water management measures and instruments: often, separate solutions to common water management problems can be more costly for each country than a common, coordinated approach;

- More efficient planning and implementation of solutions to ensure ecologic and river continuity throughout the river basin;

- Pollution can be controlled in an easier, more effective way.

It is clear, however, that this type of benefit information is way too general and further research on trans-boundary issues, possible options and benefits of a common / trans-boundary approach to water management is recommended.

6. The potential for a common approach to water management in the Kura-Aras river basin

6.1. A coordinated approach to economic instruments for water management: opportunities and constraints

Before exploring opportunities and constraints of a more coordinated approach, it is useful to define the different dimensions on which cooperation could take place. As briefly mentioned at the very beginning of this report, in fact, cooperation between the three countries on water management issues can be developed at two levels:

- At the national level, measures and instruments for water management can be tailored to pursue common water management objectives (e.g. qualitative and quantitative standards) at the river basin level, agreed upon by the three countries. In other words, the question to be answered would be: "How can economic instruments be applied at the national level to address effectively trans-boundary water management issues?"
- As indicated above, the potential for actual trans-boundary cooperation and, in turn, for the development or trans-boundary economic instruments would obviously be the ultimate result of a coordinated approach to water management, and it is essential that this dimension is taken into account.

The establishment of economic instruments for trans-boundary water management is likely to be the most challenging aspect of cooperation among the three countries, as it remains a totally new topic for the region: past and on-going studies on trans-boundary water management rarely deal with the application of economic instruments or of economic methods and tools, and the current OECD project represented a first opportunity for discussing economic issues in this trans-boundary context. In general, due to the complexity of the trans-boundary dimension the creation of trans-boundary economic instruments seems unrealistic in the short term, as it is likely to encounter limited political acceptability and thus have low feasibility, and a good deal of discussion and negotiation would be required before this could happen. Starting a dialogue at the river basin level, however, is the first step to towards trans-boundary cooperation, which could indeed be achieved on the medium term.

In addition, as it emerged in the course of this synthesis report, limited information is currently available on the specific water conditions and issues that exist at the borders between the three countries (e.g. actual pollutions levels at the border); in the same way, common quality and quantity standards are also missing.

Therefore, to facilitate the regional dialogue on the topic, it will be crucial to review on-going experiences on the application of economic instruments for trans-boundary water management issues in other geographical areas, such as for example the European Union. These experiences will in fact help identifying good practices and suitable models for cooperation among countries, along with possible problems faced in trans-boundary cooperation and corresponding solutions.

On a more operational level, single trans-boundary water bodies (such as sub-basins of the Kura basin) could be selected as pilot projects to assess actual, specific trans-boundary issues on the field, and then explore possible targeted trans-boundary economic instruments. In the context of the Kura river basin, two concrete examples of possible cooperation involving Georgia and Azerbajan were discussed:

- A case dealing with flooding events and erosion problems which could be addressed applying a trans-boundary PES scheme aimed at ensuring good land use practices (e.g. reforestation) upstream (i.e. in Georgia) with Azerbaijan benefiting from improved land use practice. The same could also apply to Armenia with respect to Georgia.

- A case focused on the enhancement of the wastewater treatment plant in Gardabani (close to the border) that would benefit Azerbaijan. This plant could be financed by joint investments from different sources, including donor support, so the region would collect the highest possible benefits.

Undoubtedly, different assessments on the costs, benefits, providers of services and beneficiaries of these services would be required before any robust PES is developed and implemented. Case studies from the US and Sweden could provide useful lessons for implementation in the South Caucasus. Besides PES, however, it is clear that Georgia and Azerbaijan share some important water trans-boundary management issues, such as pollution with municipal wastewater, flood prevention, management and early warning, and an agreement between the two countries targeted at addressing these issues would be desirable.

The PES would clearly have transaction costs. And it is unlikely it would have "political acceptability" from both countries. What could be proposed instead would be the application of sound economic assessments that could stress the transboundary implications of decisions taken in one country. This would for example mean: applying the ecosystem goods and services (EGS) framework for performing cost-benefit assessments on possible projects/options; showing via these economic assessments that the costs and the benefits are allocated to different sectors/users and from different countries. The same approach could be applied to the wastewater treatment plant in Gardabani, i.e. applying a rigorous economic assessment building on the EGS framework for supporting the investment and stressing where (in which country) costs and benefits take place. This information could then be the basis for justifying joined investment/financing from the donors' community.

While trans-boundary water management is likely to be achieved in the medium term, the review of existing economic instruments in the three countries revealed that significant improvements can be achieved in the water sector at the national level, and on-going initiatives in the three countries suggest that efforts are already being made in this direction. The reform of economic instruments at the national level represents a valuable opportunity towards an improved water management in the area, and in particular it can act as a fertile ground for:

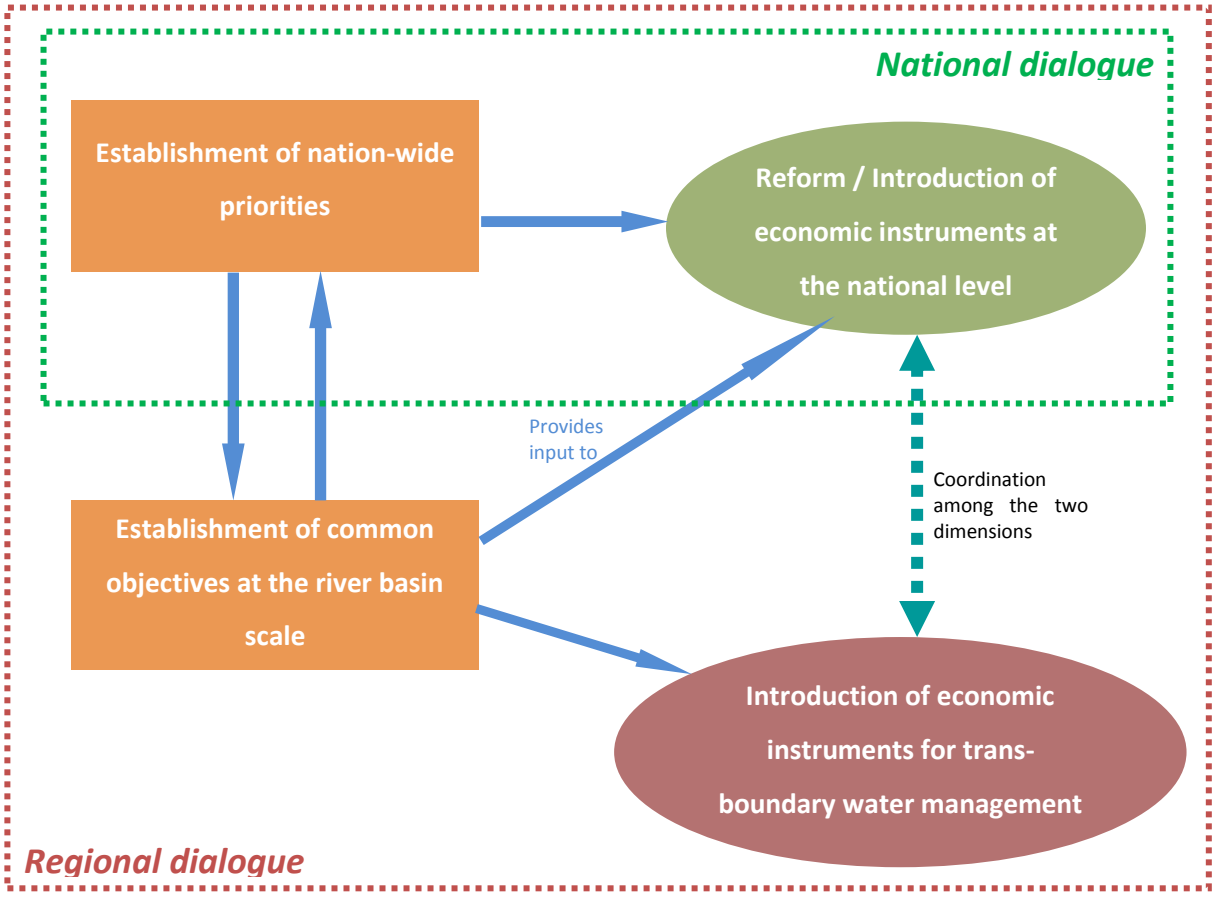
- The introduction of innovative economic instruments as a support to traditional ones;
- The development of national priorities for water management, which in turn could be discussed and harmonized at the river basin level.

The national level, if properly coordinated among the three countries, presents therefore good opportunities for actions in the short term, prior to interventions at the trans-boundary level. The following section will propose an approach to cooperation in the water sector in the three countries which builds on these considerations.

6.2. The way forward: suggestions on further steps for continuing the regional dialogue on innovative economic instruments at the river basin level

Based on the opportunities and constraints highlighted in the previous section, some further steps are proposed to continue a coordinated regional dialogue on economic instruments for water management at the river basin level, as presented in Figure 2.

Figure 2. Proposed approach to continuing a regional dialogue on economic instruments for water management



In the proposed iterative approach, national and regional dialogues are seen as components of the same process. They are indeed highly interdependent, as the outcomes obtained at one level are envisaged to feed the other level, and reciprocally.

Nevertheless, the first step for the development of a common approach to water management is represented by the **definition of nation-wide priorities** for the design and implementation of new economic instruments (at the national level in priority), through the establishment of a national consultation process, which already takes place in Armenian.

This will allow for the design and implementation of new economic instruments at the national level (or reform of existing ones). It will also build the basis for discussions on the **definition of common or comparable water management objectives at the river basin scale**, commonly understood and shared by the three countries. This could involve, for example, the definition of common assessment standards for water quality and quantity, as it is being done in the context of the EU Kura River Phase III project, or the establishment of common methodologies for each country to set water tariffs. The identification of common or comparable & shared objectives is considered as a crucial step, as it will set the targets to be achieved:

- At the national level: the development and implementation of new economic instruments, as well as the reform of existing ones, can be targeted towards both national priorities and common objectives at the river basin scale;

- At the trans-boundary level, shared objectives for water management will be the basis for the development and implementation of coordinated water management actions including economic instruments. In the longer term, common instruments might be proposed and implemented more easily, although transboundary economic instruments are clearly not "the" solution that will need to be implemented.

At the same time, the constant communication between the national and regional level will ensure the coordination of the implementation of economic instruments and economic thinking at the national and trans-boundary level.

It is important to stress that the proposed approach can be successful only if it is supported by the creation of a **solid, extensive data and information base on *water-cum-economics* issues**. Today, no comprehensive monitoring system is in place. And water-related data are generally difficult to retrieve; this is true at the national level but it is even more relevant at the trans-boundary level, as at present the conditions of water bodies at the border are not well known.

7. Conclusions

The overview and analysis of the economic and financial dimension of water management in the Kura-Aras river basin, presented in this report, provides the basis to key messages for continuing the dialogue on a coordinated approach in the region:

- A stronger **information base** needs to be built with respect to water status, water uses, water management issues and existing economic instruments, as at the moment data and information are incomplete and difficult to retrieve.

- **Cooperation** in the water sector at the river basin scale should happen at **two levels**:
  - Development of economic instruments at the **national level** to meet national and trans-boundary requirements;
  - Development of **trans-boundary** economic instruments.

  Given the current conditions, the coordinated development of economic instruments at the national level is seen as a priority, being more feasible in the short term.

- The reform of **traditional economic instruments**, although necessary, is not expected to raise all the revenues needed for financing the water sector: the gap that would be left could then be filled by **innovative instruments**, which would therefore complement traditional instruments in raising financial revenues, in addition to providing incentives for more efficient water use. It is important to stress, that reforms of existing economic instruments, or the introduction of new instruments, will need to account for affordability concerns in particular for low income social groups.

- The design and implementation of innovative economic instruments would require a thorough **assessment of their feasibility** in the national contexts, in particular concerning their social, political & economic acceptability. Specific attention needs to be given to legal issues and the assessment of the adequacy of the existing legal and institutional framework;

- The reform of existing economic instruments as well as the implementation of innovative ones must be accompanied by the implementation of mechanisms aimed at earmarking revenues from water management instrument, to allow their re-investment in the water sector;

- The process for building a common approach could involve the establishment of **regional and national dialogues** on the economic dimension of water management, which are envisaged as interdependent and providing input to one another. In particular:
  - In the context of national dialogues, priority should be given to the definition of nation-wide priorities, which in turn would serve as a basis for the design of new economic instruments;
  - The definition of nation-wide priorities would be the basic input to the regional dialogue, so coordinated water management at the river basin scale can be discussed and put in place. This might imply defining common water quality assessment systems, adopting the same analytical framework, putting a common or coordinated water quality monitoring system in place; etc. It might also lead to economic

instruments in a given country being designed accounting for possible benefits in the neighboring country;

- Benchmarking of economic instruments put in place by the three countries could also take place. This would help each country to improve the design and implementation of its own economic instruments by comparison with neighbors' current practice.

- Trans-boundary economic instruments are quite a new topic in the region: therefore, the regional dialogue could be supported by case studies and examples of such instruments applied in other regions of the world.

Annexes

Annex I. Information sources for the three countries

Armenia

Table 6. List of experts and stakeholders contacted in Armenia

Name	Position	Location
Vardan Malakyan	Chief Specialist, Division of Nature Protection, Department of Agriculture and Nature Protection, Lori Regional Administration	Vanadzor , Armenia
Gagik Aloyan	Deputy Director of Lori Water and Sewerage Company	Vanadzor, Armenia
Volodya Narimanyan	Water Resources Management Agency of the Ministry of Nature Protection	Yerevan, Armenia
Benyamin Zakaryan	Director of "Geoinfo" LTD	Yerevan, Armenia
Ashot Harutyunyan	Financial-Economic Department, Ministry of Nature Protection of Armenia	Yerevan, Armenia
Mher Mkrtumyan	State Committee on Water Systems of the Ministry of Territorial Administration	Yerevan, Armenia
Seyran Minasyan	Environmental Impact Monitoring Center, Ministry of Nature Protection	Yerevan, Armenia
Marzpetuni Kamalyan	State Environmental Inspectorate, Ministry of Nature Protection	Yerevan, Armenia
Aida Petikyan	State Hygiene and Anti-Epidemiological Inspectorate, Ministry of Health	Yerevan, Armenia
Lilit Harutyunyan	USAID Clean Energy and Energy Program in Armenia	Yerevan, Armenia
Diana Harutyunyan	UNDP Armenia Climate Change Projects Manager	Yerevan, Armenia
Khachatur Gharabaghtzyan	Hydro-Geological Monitoring Center, Ministry of Nature Protection	Yerevan, Armenia
Aram Gevorgyan	EU Kura River phase II expert	Yerevan, Armenia

Table 7. Data and information sources mobilized for the Armenia Country review

Variable	Data source
Access of rural population to drinking water	World Bank Armenia Office
Annual financial allocation to water sector of Armenia	Ministry of Finance
Annual revenues of WUAs and drinking water supply companies	State Committee on Water System of the Ministry of Territorial Administration (SCWS MTA)
Annual subsidies given to water supply companies	Ministry of Finance of Armenia
Average monthly household revenue	National Statistical Service of Armenia
Drinking and irrigation water supply tariffs	Public Services Regulatory Commission
Drinking water balance, and drinking water supply and system and payments	Public Services Regulatory Commission
Environment CO_2 emissions	World Bank Armenia Office
Forest cover	World Bank Armenia Office, Ministry of Agriculture
GNI per capita, GDP growth	World Bank Armenia Office
Income from 1 ha of land processing	Millennium Challenge Corporation Water to Market Activity "High-Value Crop Agriculture Component"

Variable	Data source
Irrigation system water balance, and irrigation water supply systems and payments	Public Services Regulatory Commission
Losses in drinking water sector	Public Services Regulatory Commission
Potable water discharge information	Public Services Regulatory Commission
Revenues generated by hydropower	Water Resources Management Agency
Share of irrigation water-related costs	Lori regional administration
Statistical information on industrial water use and discharge	Water Resources Management Agency
Statistics on drinking water supply	SCWS MTA
Tariffs, revenues, O&M costs for drinking water supply	SCWS MTA
Total fees, charges, fines and penalties collected from water abstraction and discharge	Ministry of Nature Protection
Total irrigated area	SCWS MTA
Water exploitation index	Organization for Economic Cooperation and Development
Water users (irrigation, hydropower, industrial fisheries, drinking-household)	National Statistical Service of Armenia
WUA subsidies	SCWS MTA

Georgia

The national review extensively relies on the Second Environmental Performance Review for Georgia, document produced by the UNECE in 2010, which contains most up-to-date and complete data and information on to water resources management and economic instruments applied in the country.[3] For describing transboundary water management problems in the Kura basin the study has used the, UNECE document *Second Assessment of Transboundary Rivers, Lakes and Groundwater* (2011).

Some statistical data and other types of economic information was found on the internet sites of the Georgian Statistical Service, Ministry of Environmental Protection, Ministry of Finance, Ministry of Regional Development and Infrastructure, Georgian United Water supply Company (GUWSC) and Georgian Water and Power (GWP) company. Some other information was obtained directly from local governments.

Legal documents related to water management and economic instruments in Georgia have been extensively explored for developing this report.

However, it was reported that neither economic nor environmental data is regularly collected in the Country at the river basin level, and obtaining all required up-to-date data specific for the Kura river basin was practically impossible because of time constraints. Therefore, the Country review builds on data and information available in documents related to environmental management in Georgia at different times.

[3] Environmental Performance Reviews: Georgia, Second Review. United Nations Economic Commission for Europe (UNECE). United Nations. New York and Geneva, 2010.

Azerbaijan

The Country review was prepared based on assessment of existing information on water resources, their use and management by different sectors and also on economic instruments to sustain needed water use through analyze of published sources, including web pages, interviews and etc.

In Azerbaijan, the basic governmental Departments from which the information on water resources use and protection and economic instruments for their management in the country and at the level of the Kura river basin Kura has been used in report, and the type of information they have are the followings:

The Ministry of Ecology and Natural resources (< http: // www.eco.gov.az >) owns the information on state of water resources, discharge of polluted waters to water bodies, ground water use permits, environmental quality requirements and compliance with environmental requirements.

Amelioration and Water Resources Joint Stock Company_ has information on use of water resources in agriculture, norms of water use, surface water use fees and etc.

Joint-stock company "AzerSu", drinking water and sanitation coverage, fees and payments in this area, investments forimprovement of water and sanitation in Azerbaijan and others(www.azersu.az)

Ministry of Health owns the data about condition of drawing up of standards and realization of monitoring of potable water quality (http://www.sehiyye.gov.az) There is a report on quality of water in Azerbaijan, prepared at financial support of the World Organization of Health.

Data about water use for the power purposes are in **the Ministry of Fuel and Power**. It is possible to get familiar with the circuits of exploitation of large water basins in the power purposes, agreed by Agency of Melioration and Water Economy which is interested in a water intake of Yukhari Karabakh and Yukhari Shirvan channels with a purpose of irrigation (http://www.mie.gov.az)

The Ministry of Justice also owns data about accepted and carried out statutory acts, being of legal base in sphere of water resources.

The State Committee on statistic has annual reports and also archive on the stae of water resources, their use, ecological status and etc (www.azstat.org).

Some economic instruments and future investment plans of government are described in the State Regional and Socio=economic development programs located on the web page of **the Ministry of Economic Development (www.economy.gov.az)**

Local enforcement authorities own data about carried out policies on a water-intake and water supply, about a condition of supply of the population with the qualitative potable water, and about their clearing, about developed norms of water use.

Some reports on implemented water project used in this work are taken form Arhus centre. Reports of WB, ADB , KFW , JICA founded water supply and sanitation projects were taken form their web sites.

There is also the Second Environmental Performance Review for Azerbaijan, report produced by the UNECE in March 2011, contains many information on social, economical and environmental aspects of water management (www.**unece**.org/env/epr/epr_studies/**azerbaijan**.pdf)

In the report was used information on benefit of improved water management from the project 'Analysis for European Neighbourhood Policy Countries and the Russian Federation on the Social and Economic Benefits of Enhanced Environmental Protection', which is closed, are published on the project's website http://www.environment-benefits.eu. The executive summary of Azerbaijan country benefit assessment report prepared by Rafig Verdiyev and James Spurgeon is in both in English and in the national languages.

Annex II. Overview of the existing economic instruments in Armenia, Georgia and Azerbaijan

Table 8. Comparative summary of tariffs for drinking water and wastewater treatment in Armenia, Georgia and Azerbaijan

Main features	Armenia		Georgia		Azerbaijan	
	Drinking water	Wastewater	Drinking water	Wastewater	Drinking water	Wastewater
Average unitary rates (USD/m^3)	0.38 – 0.47	0.03	Households with water meters: 0.12 in Tbilisi 0.25 in other cities Households without water meters: 1.9 USD/person /month in Tbilisi 0.47 USD/person /month in other cities Legal entities: 2.12 in Tbilisi 2.05 elsewhere	Households with water meters: 0.04 in Tbilisi 0.05 in other cities	0.35-0.4 0,0254 for Jeyranbatan reservoir waters	0.08
Total revenues (USD)	About 40 millions (it includes both drinking water and wastewater treatment)		70 millions (estimation) GWP: 50 mln (estimation) GUWSC: 20 millions		92.7 millions	18 millions
Total expenditures for providing the service (USD)	42.8 millions		<34 Millions (data referring to GUWSC only)		127 millions	24 millions
Cost recovery (%)	93% of O&M costs		75% of O&M costs	Partial: revenues are generally much lower than expenditures	73% of O&M costs	73% of O&M costs
Affordability: water bills/income (%)	0.9 – 2.1%		2.2% in Tbilisi (it includes both drinking water and wastewater bills)		2%	2%

Table 9. Comparative summary of irrigation water tariffs in Armenia, Georgia and Azerbaijan

Main features	Armenia	Georgia	Azerbaijan
Average unitary rates (USD)	Gravity-fed irrigation: 0.002 – 0.005 /m^3 Pumped water: 0.01 – 0.09	45 /ha/year	Data not available
Total revenues (USD)	Tot. revenues for Water User Associations (WUAs), which supply water to farmers: 9.64 Million USD	7.5 Millions (estimation)	3.36 millions
Total expenditures for providing the service (USD)	17.85 Millions		195 millions
Cost recovery (%)	54% of O&M costs	No info: revenues are generally much lower than expenses	1.8% of O&M costs
Affordability: irrigation bills/agricultural revenues (%)	Affordability might be a problem for wheat producers only		2%

Table 10. Comparative summary of pollution fees in Armenia, Georgia and Azerbaijan

Main features	Armenia	Georgia	Azerbaijan
Unitary value (USD/ton)	Suspended particles: 13.59 - Ammonium nitrogen: 13.08 Biological oxygen demand: 47.18 - Oil products: 524.62 Copper and Zinc: 2,625.39 - Potassium: 0.26 Chloride: 0.08 - Nitrites: 1,311.54 - Nitrates: 2.82 Total phosphorous: 102.56 - Detergents: 262.31 Heavy metal salts: 1,311.54 - Cyan and cyanide compound: 1,311.54	Abolished in 2005	0.020 /m^3 Kura river 0.015 /m^3 other rivers
Pollutants considered	16 pollutants		No information
Total revenues (USD)	695,000		254,000
Total expenditures (e.g. monitoring costs	454,000 – Overall water resource management costs (water resource management, basin management organization, surface		No info

etc.) (USD)	water quality and quantity monitoring, hydro-geological monitoring, compliance assurance)		
Level of enforcement	Due to under-funding and lack of technical expertise of the compliance assurance organization, the level of enforcement is weak and needs significant improvement		No info

Table 11. Comparative summary of abstraction fees applied in Armenia, Georgia and Azerbaijan

Main features	**Armenia**			**Georgia**			**Azerbaijan**		
	Drinking	Industrial	Irrigation	Drinking	Industrial	Irrigation	Drinking	Industrial	Irrigation
Unitary rates (USD/m^3)	Surface water: 0.0013 Surface water from Sevan lake: 0.0039 Groundwater: 0.0026	Surface water: 0.0013 Surface water from Sevan lake: 0.0039 Groundwater: 0.0039	0 This rate is what irrigation water intake companies pay (or do not pay); bur WUAs purchase water from irrigation intake companies according to the tariffs previously illustrated.	Only for groundwater abstraction – Charges for freshwater abstraction and non-abstractive uses in principle exist, but they are not enforced because of contradictions with other laws. Bottling water: 0.024 Households: 0.3 Municipal and rural drinking water: 0.006			Surface water: 0.40 - 0.42 from Kura river 0.30 – 0.31 from other rivers 0.03 from Jeyranbatan reservoir Groundwater 0.88 0.30 in Nakhichevan	Surface water: 0.31 – 0.35 from Kura river 0.25 – 0.27 from other rivers	Surface water: 0.35 – 0.37 from Kura river 0.28 – 0.29 from other rivers
Total revenues (USD)	450,000 (including fisheries)			No information			6.4 Millions	No information	No information

Affordability %)	0.03% of total tariff paid	0.3 – 1.4% of water-related costs (Marmarik RB)	3% to7% of total production costs and 2% to 7% of gross output sales (Debed RB)						

Table 12. Comparative summary of fines and penalties applied in Armenia, Georgia and Azerbaijan

Main features	Armenia	Georgia	Azerbaijan
Fine range (USD)	Violations of the Water Code: 137 – 410 Damage to water bodies: contingent upon the size of the damage caused	Protection of freshwater resources: 60 – 364 Protection regime for sanitary zones: 2,265.65	Discharge fines: 3,000 – 5,000 officials 9,500 – 15,500 for legal entities
Actions object of fines and penalties	Penalties for violating the requirements of the Water Code: water abstraction without water use permit, different locations, water discharge without permits, etc) Compensation for the damages caused to water bodies: wastewater discharge above the limits, set in the water use permit.		
Total revenues (USD)	264,000		267,000
Cost recovery: are current revenues able to cover for the environmental costs of accidents?	Environmental costs of accident pollution are not covered by the fines, and the current methodology only accounts for the economic damage caused to water bodies		
Level of enforcement	Need for a better enforcement	98 cases of violation in 2008, for a total of 4880 USD	No real legal basis for enforcement

Annex III. Water management issues in the Kura river basin according to the DPSIR framework