USAID FROM THE AMERICAN PEOPLE

Global Water for Sustainability PROGRAM

Integrated Natural Resource Management Plan, Lower Rioni Pilot Watershed Area

Republic of Georgia

Integrated Natural Resource Management Plan Series

care Defending dignity. Fighting poverty.

CENN Caucasus Environmental NGO Network

UNESCO-IHE Institute for Water Education

WINROCK INTERNATIONAL

FIU Florida International University Miami's public research university

Integrated Natural Resources Management in the Republic of Georgia Program

Integratd Natural Resources Management Plan, Lower Rioni Pilot Watershed

Republic of Georgia

Funding for this publication was provided by the people of the United States of America through the U.S. Agency for International Development (USAID) under Agreement No.CA # AID-114-LA-10-00004, as a component of the Integrated Natural Resources Management for the Republic of Georgia Program. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Agency for International Development of the United States Government or Florida International University.

Global Water for Sustainability Program

Florida International University

Biscayne Bay Campus 3000 NE 151 St. ACI-267

North Miami, FL 33181 USA

Email: glows@fiu.edu

Website: www.globalwaters.net

For bibliographic purposes, this document should be cited as:

GLOWS-FIU. 2011. Integrated Natural Resources Managemen Plan, Lower Rioni Pilot Watershed, Republic of Georgia. Global Water for Sustainability Program, Florida International University, p.78

ISBN:

CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS 2

1.*BACKGROUND* *3*

2. METHODOLOGY AND LIMITATIONS 7

3. INTEGRATED WATERSHED MANAGEMENT PLAN 10

3.1 Goals and Objectives **10**

3.2 Planned Actions **10**

3.2.1 Priority Measures *10*

3.2.2 Management and Funding Mechanisms *35*

ANNEXES *36*

LIST OF ACRONYMS AND ABBREVIATIONS

ADB – Asian Development Bank
CARE International - Cooperative for Assistance and Relief Everywhere International
CBO – Community-based Organization
CENN – Caucasus Environmental NGO Network
EBRD – European Bank for Recunstruction and Development
EU – European Union
GLOWS – Global Waters for Sustainability
GIZ - Deutsche Gesellschaft für Internationale Zusammenarbeit, the German Society for International Cooperation
GNERC - Georgian National Energy and Water Supply Regulation Commission
INRMW – Integrated Natural Resources Management in Watershed
IWMP – Integrated Watershed Management Plan
KfW – Kreditanstalt für Wiederaufbau, German Development Bank
km^2 – square killometer
Ltd – Limited Liability Company
MDF – Municipal Development Fund
MIA – Ministry of Internal Affairs of Georgia
MoA – Ministry of Agriculture of Georgia
MoENRP – Ministry of Environment and Natural Resources Protection of Georgia
MES – Ministry of Education and Science of Georgia
MESD – Ministry of Economy and Sustainable Development of Georgia
MoF – Ministry of Finance of Georgia
MoH – Ministry of Health of Georgia
MRDI – Ministry of Regional Development and Infrastructure
NEA – National Environment Agency, MoE
NGO – Non-governmental Organization
PAs – Protected Areas
Sida – Swedish International Development Cooperation Agency
WEAP – Water Evaluation and Planning System
UNDP – United Nations Development Program
UNESCO-IHE – UNESCO Institute for Water Education
USAID – US Agency for International Development
UWSCG- United Water Supply Company of Georgia
WB – World Bank
DEMO – demonstration projects

1. BACKGROUND

The Rioni River is a major watercourse in Western Georgia. Being the largest water body of the region, it has a total catchment area of about 13,400 km^2 that makes up approximately 20% of the whole Georgian territory. The lower Rioni pilot watershed area, for which the given Natural Resources Integrated Management Plan (hereafter Integrated Watershed Management Plan - IWMP]) is developed, encompasses the territory for about 419.8 km^2 area (total area of the Khobi municipality is 676 km^2, of which 27.0 km^2 belongs to the lower Rioni pilot watershed area; and the total area of the Senaki municipality is 520.7 km^2, of which 392.9 km^2 belongs to the lower Rioni pilot watershed area). The pilot area is more densely populated compared to the upper Rioni and Alazani - Iori pilot watershed areas; it also has comparatively a higher degree of urbanization and industrialization. Therefore, the utilization of health protection and economic functions/values of these ecosystems and their resources overweigh the utilization of their ecological, aesthetic, and recreation values/functions.

The extreme lower reaches of the basin, including the Rioni delta and coastal zone, have very high ecological value in terms of richness and complexity of endemic and rare species. A big part of Kolkheti National Park lies within the Khobi and Senaki Municipalities. The wetlands here have an important function in purifying waters as well as in regulating groundwater level. They also mitigate the negative impacts of floods, absorb surface waters and thus diminish land erosion processes.

The lower Rioni pilot watershed area is rich in fresh and brackish waters, which are not utilized for irrigation purpose. Hydropower potential of the rivers in this area is also very low. The Tekhuri River has higher hydropower potential than the other rivers of the pilot watershed area.

According to "Evaluation of the vulnerability of the lower Rioni pilot watershed area river runoff to climate change"[1], in the lower courses of the Rioni River, from Gumati to Sakochakidze gauging site, 6% increase in stream flow is expected by 2050. The runoff mainly will increase during the winter and autumn season. Though, in accordance with CENN climate change and disaster vulnerability and risk assessment[2], climate change will have an impact on the seasonal and annual regime of precipitation. Specifically, annual atmospheric precipitation in the target area, compared to the baseline period (1956-2006), may increase by 9-22%. Furthermore, increase in the maximal values of daily precipitation is expected (237 mm instead of 183 mm in the baseline period) together with average daily maximums. Therefore, we can assume that during the period of 2020-2050, in the lower Rioni pilot watershed area, mainly on the lower courses of the Rioni and Techuri rivers, risks of strong catastrophic floods and flashfloods will be maintained or increased. In addition, rise in the sea level caused by global warming will contribute to washing off of the land directly adjacent to the coastline (marine and terrestrial touchline) of the target area and will enhance the retreat process. This process has been going on for several decades, and, together with natural factors, is caused by the negative impacts of anthropogenic factors(various engineering measures such as modernization of the old port, construction of a new port, construction of wave barriers and dams for protecting their domestic waters, removal of bank feeding inert materials from the beaches, etc.) on the surface of the seashore.

[1] The study - Detailed Assessment of Natural Resources of the Lower Rioni Pilot Watershed Area was developed under INRMW project. http://www.globalwaters.net/wp-content/upl oads/2012/12/UpperRIONIdetailedAssesment04 -08-13.pdf

[2] Lower Rioni pilot watershed area -Assessment of the Vulnerability to Natural Disasters and Climate Change. Plan of Mitigation and Adaptation Measures. May 2013

Apart from mineral resources, ground and thermal hot waters are abundant in the lower Rioni pilot watershed area that is underutilized. Groundwater is used for drinking and other household needs, while the thermal hot waters are only utilized in green houses. Sand, gravel, brick clay and limestone are extracted for construction activities. In the Khobi Municipality, peat is extracted for the production of fertilizers. Rioni delta is used for light-cargo ship navigation. Local population utilizes timber and non-timber (mushrooms, berries, medicinal plants, etc.) resources, peat and land resources for subsistence.

Regarding the aesthetic and recreational values of the lower Rioni pilot watershed area, Kolkheti National Park (KNP) administration offers a variety of tours for visitors to see the natural landscapes and caves, as well as for bird watching. This creates a solid foundation for PA based tourism development. Moreover, the Khobi and Senaki municipalities within the boundaries of the Rioni River Basin have the potential for the development of spa resorts. The lower Rioni pilot watershed area has high cultural value since there are numerous cultural and historical sites of ancient and medieval epochs.

Overall, the ecosystems and natural resources of the lower Rioni pilot watershed area may provide the following services based on their functions: maintaining human health (fresh air, water and food base); provision of drinking water; maintaining ecosystem integrity and high conservation value; DRR (Disaster Risk Reduction) including flood and erosion control; hydropower generation (in the Tekhuri River Basin); provision of fuel wood; provision of inputs for agricultural activities (land resources, water resources, climate, agrobiodiversity, etc.); provision of reserves of mineral resources; provision of cultural resources; provision of tourism resources; provision of spa-recreational resources; and small cargo navigation.

Regardless of the positive impacts of utilization of local natural resource base on the economic development of the pilot watershed area, such activities have a negative influence that causes the degradation, fragmentation and depletion of the natural ecosystems and particularly on ecosystems and natural resources of the Kolkheti National park. Only a small area of the unique wetlands relative to the original area is retained, which is now protected by the government. However, pressures at lower rates continue to be imposed by the local population in terms of illegal timber harvesting, fishing, hunting, grazing and artificial fires, and peat extraction within and outside the Kolkheti National park. Pollution loads from urban and agriculture areas rich in nutrients are discharged into the delta area and ultimately into the sea. Infrastructure projects also have impacts on the ecosystems of the Kolkheti National Park in terms of their fragmentation, disturbance of habitats and pollution of natural environment. In addition, the new road from Poti to Anaklia is supposed to cross a part of the Park that will have serious impact on it. Peat extraction within the Kolkheti National Park and its buffer zones also have considerable negative impacts on the wetlands, transforming the natural ecosystems into significant sources of chemical and organic pollution.

Among natural factors, climate change and eustasy dramatically affect the Rioni Delta and the coastal zone through rise in sea level , flooding and sea surges, thus leading to the loss of the delta and coastal area and sinking of the land. Coastal erosion is very intensive along the coast line of the city of Poti, which is partially attributed to natural factors, but mostly induced by human interventions, particularly by river bed diversion and flow regulation.

In the lower Rioni pilot watershed area, provision of drinking water to the rural communities is imperfect; poor quality and shortage of drinking water is caused by the dilapidated

infrastructure. There is a very weak monitoring system of water quality in the region that does not allow obtaining full information on drinking water conditions.

The absence of a sewerage network causes discharge of wastewaters on the earth's surface or into the nearby streams and rivers and ravines that result in the pollution of the soil and surface waters. The Ground water is also polluted by the waters leaked from cesspools. Even in the municipal centers where water supply is centralized and the territory is covered with a sewerage network, there are no treatment plants for wastewater. The main point source of pollution is the sewerage system of the city of Senaki. Wastewater discharges from small size enterprises and municipal buildings such as hospitals and car wash facilities add to this pressure as well. Non-point source of pollution is imposed by diffused sources of pollution from landfills and agricultural and urban surface runoff. Furthermore, pollution of downstream waters from upstream economic activities, including industrial and agricultural activities, is high.

Waste management is also very poor in the pilot area; legal and illegal waste disposal sites do not meet any sanitary requirements and represent one of the major sources of pollution for the waters and the overall ambient environment.

Ambient water quality monitoring is very weak in the targeted watershed area. There is no ground water monitoring system and surface water quality is measured only at two points. Therefore, it is very difficult to judge the exact state of the surface and ground waters.

In addition, impacts from the upstream water users (hydropower) are significant on sediment flow in the downstream waters that result in intensification of coastline erosion and loss, and escalation of floods.
Pressures are also high on the land resources from overgrazing, uncontrolled timber harvesting and poor land drainage.

It is expected that in the future, anthropogenic pressures will accelerate due to rapid infrastructural development in the downstream areas of the Rioni and Techuri river basins as well as within the entire Tsiva River Basin. The development of the free industrial zone in Poti will result in the increase of negative influences on local ecosystems and natural resources. Furthermore, construction of large sized regulating HPPs will affect river sediment flow and delta formation that will heighten the risk of floods in the pilot watershed area. As a consequence of climate change, rise in sea level will intensify and river runoff in the downstreams of the Rioni Basin will increase, which will also contribute to the reduced flood and erosion control capacities of the Kolkheti riverine and wetland ecosystems.

In order to address the above issues, the Integrated Natural Resources Management Plan for the lower Rioni pilot watershed area (hereafter, Lower Rioni Watershed Management Plan) was developed under the USAID/GLOWS program INRMW- Georgia and implemented by GLOWS consortium led by Florida International University in a partnership with CARE International, Winrock International UNESCO-IHE and CENN.

2. METHODOLOGY AND LIMITATIONS

The integrated watershed management planning process included the following stages: 1. Identification of priority problems by the target communities; 2. Identification of priority problems by local experts hired under the INRMW program; 3. Synthesis of the problems identified by experts and local stakeholders and their validation by local stakeholders; 4. Identification of priority interventions by INRMW program experts, local communities and authorities; and 5. Compilation of watershed issues, needs, opportunities and interventions into one document – IWMP by the INRMW program team.

In order to identify the priority watershed issues, needs and opportunities as well as to define the priority interventions at the community and/or watershed level, a holistic approach was utilized to incorporate the specific problems recognized in the larger context of the watershed and to achieve cooperative, integrated watershed resource planning and management. Another conceptual idea in the designing of the planning process was a participatory approach to ensure the engagement of all interested parties in the course of action. The specific steps designed to employ these methods into the process of developing the watershed plans are described below.

Based on these major principles, the planning activity was conducted by means of: 1. Intensive partnership with the identified stakeholders, with the engagement of local communities and authorities in the process, achieved through a number of meetings and workshops with them; and 2. The work of the expert team, composed of local experts, scheduled to characterize and assess the overall condition of the watershed and its water bodies, including various geographic, geologic, hydrologic, socio-economic, ecological and other considerations. Land and forest use, as well as water body conditions were also assessed, including pollutant sources and monitoring data, although very limited due to weakness of the monitoring system. Next, based on the expert analysis and recommendations, as well as the stakeholder input, ensured by the participatory meetings conducted in Senaki and Khobi, the priority problems were identified and the recommendations for a solution were developed.

Based on the two major principles described above, the planning activity was conducted by means of: 1. Intensive consultations with and engagement of the local stakeholders (members of 15 target communities, selected through the application of multiple criteria[3], well-representing the rural population of the lower Rioni pilot watershed area and representatives of local authorities) achieved through conducting community quesionnaires and a series of stakeholder meetings and workshops; and 2. The work of the expert team, composed of local experts, tasked to characterize and assess the overall condition of the watershed and its resources, including various geographic, geologic, hydrologic, socio-economic, ecological and other considerations. Land and forest use, as well as water body conditions were also assessed, including pollutant sources and monitoring data, although very limited due to the weakness of the monitoring system. Next, based on the expert analysis and recommendations, as well as the stakeholder input ensured by the participatory meetings conducted in Khobi and Senaki, the priority problems were identified and the recommendations for the solution were developed.

[3] Detailed description of the entire process, methodology and outcomes of the selection of target communities is included in the following documents Technical Report 5. Selection of Target Communities in Pilot Watersheds (Khobi, Senaki, Dedoplistskaro Municipalities, October 2012. http://www.globalwaters.net/wp-content/uploads/2012/12/INRMW-Lower-Pilot-Watersheds-Community-Selection-Report.pdf

Along with a number of meetings with local authorities, several workshops hosting the representatives of the local target communities were conducted. The goal of the first workshop was to identify the priority issues of the targeted villages and communities. The priority issues revealed through this collaborative and participatory process were based on the extent of their impact on key ecosystem functions and the services as well as on their economic and health impacts (see Annexes 2 and 3). More specifically, the watershed issues were listed with maximum attainable scores assigned to them as per specially elaborated environmental and socio-economic criteria: 1. Negative impact on the health status of villagers; 2. Negative impacts on the environment of the targeted villages and their surroundings; and 3. Negative socio-economic impacts on the local population. Based on those criteria, target community members and INRMW experts assessed watershed issues to meet the following objectives : Protection of human health; Improvement of environmental quality/natural ecosystem integrity; Promotion of sustainable and effective utilization of natural resources; Disaster risk reduction; Maintaining exsisting reserve of water resources storage; Maintaining biodiversity; Promotion of organic agriculture and reduction of land degradation; and Development of tourism potential. In accordance with an issues prioritization exercise, at least three major issues were identified as top priorities for each community. On the following workshop, the final list of issues was presented to local stakeholders in order to build a common understanding and secure the agreement of the interested parties on the priority issues. The next step was the synthesizing of the prioritized issues, identified by local communities and experts, by the INRMW program team and its final assessment; during this process, among various evaluation criteria, ecosystems values, functions and services impacted by the issues were analysed (Please see Annex 4).

Issues identification and prioritization exercises were followed by the development of recommendations on potential interventions to tackle watershed issues and manage its resources more sustainably. These suggestions were made by INRMW experts. Based on these recommendations, the INRMW program team elaborated a menu of potential structural and non-structural measures to present to target communities and authorities and prioritize these interventions through active participation of the local stakeholders. Potential interventions were prioritized based on the expected impact of the recommended measures on the environment, local economy and people's health. In the workshop that was conducted, the participants filled in the pre-preparedquestionnaire (Annex 5), grading the suggested measures by points (maximum possible points of 5 were given to public health; maximum points of 3 were given to impact on the environment; and maximum Points of 3 were given to socio-economic impacts). The list derived out of this exercise was finally merged with the recommendations made by the local experts. The combined list of potential interventions was presented to the local stakeholders, who confirmed the validity of the presented measures (see Annex 6 for the workshop agenda and lists of participants).

Based on the priority issues, needs, opportunities and interventions identified through the stakeholder participation and the experts' assessments, the IWMP for the lower Rioni pilot watershed area was developed. Geographically, the plan covers the area located in the west part of Georgia and encompasses the two municipalities of Khobi[4] and Senaki under the Samegrelo and Zemo Svaneti regional administration. More specifically, the focus is directed on 15 pilot communities (11 in the Senaki municipality and 4 in the Khobi municipality), selected within the INRMW program (please see Annex 1), as well as the urban areas of the pilot territory.

[4] The pilot area covers only Rioni river watershed area

The final plan consists of feasible and time bound structural and non-structural measures that address priority watershed issues at the community, municipality and/or watershed level. Their prioritization is based on the number and quality of the ecological functions/services that they support, critical importance assigned to the measures by local stakeholders and experts, and the cost of the activity.

During the detailed assessment conducted for developing the IWMP, certain limitations were noted with reference to many historical and current socio-economic and environmental data. There is a very limited network for water quality monitoring and no comprehensive database on environmental quality exists in the country. Furthermore, various studies differ in terms of completeness of data and inconsistencies between reports are common, which can be considered as limitations of the present assessment. Thus, in many cases, expert analysis and extrapolations of the accessible information were employed to fill the existing gaps in the data.

3. INTEGRATED WATERSHED MANAGEMENT PLAN

3.1 Goals and Objectives

The long-term development goal of the Integrated Natural Resources Management Plan for the lower Rioni pilot watershed area is the sustainable development of the pilot watershed through the protection and integrated management of its ecosystems and resources.The development goal of the plan will be attained by achieving the following specific objectives: 1. Reduction of the environmental pollution and improvement of environmental quality; 2. Protection of human health through provision of safe drinking water; 3. Maintaining the existing reserves of water resources through sustainable and efficient utilization; 4. Disaster risk reduction; 5. Conservation, recovery and sustainable use of natural ecosystems, including maintaining biodiversity within and outside the protected areas (PAs); 6. Sustainable utilization of renewable energy resources; 7. Reduction of land degradation through application of sustainable land management practices; 8. Promotion of organic/traditional agriculture; and 9. Development of eco-agro and cultural tourism potential.

3.2 Planned Actions

3.2.1 Priority Measures

Findings of the watershed assessments as well as the priority setting exersices indicate that for both Senaki and Khobi municipalities in the lower Rioni pilot watershed area, the measures dealing with the improved quantity and quality of drinking water, wastewater collection and treatment, improved municipal waste collection and condition of the landfills, disaster risk reduction, reforestation and reclamation of agricultural lands, pastures and grasslands, establishment of organic farms, energy efficiency, the development of local renewable energy resources and the application of clean energy technologies, and development of ecotourism potential of the region are important.

Priorities set by target communities are reflected in the IWMP and the synergic effect of multiple practices was considered when determining the measures directed towards attaining each objective.

Specific activities suggested for solving the prioritized issues include:

***a) Structural measures*:** These measures are those intended for intervention at the village/community/ municipal/watershed level to address and solve the problems especially acute for the lower RIoni pilot watershed area, e.g. the improvement of waste management system, urban and rural water supply systems, construction of gabions along the river beds, reclamation of agricultural lands, pastures and grasslands, restoration of windbreaks for agricultural lands, construction/renovation of urban and rural storm water drainage systems, cleaning of river-beds, reforestation of severely damaged forests, implementation of energy efficient measures, ecotourism development supportive activities, etc.

The structural measures also include selected demo-projects, planned to be implemented under the INRMW program, for those issues that require immediate intervention and can be implemented in a shorter time period, with relatively low cost requirements, and will have a

tangible effect on the lives of the locals. These include, for example, renovation/construction of rural water supply systems, fencing of sanitary zones at the water intakes, Installation of water treatment/ chlorination facilities/devices at the water intakes, construction of small scale (rural) sewerage systems, arrangement of drainage system and wastewater treatment facilities on the existing landfills, arrangement of dry toilets for public buildings that do not have relevant water treatment plants, establishment of traditional organic farms, Implementation of energy efficient measures, Construction/renovation of micro or small hydropower plants, and others (see Table 1 for details).

The structural measures also include public awareness activities, which include the selected demo-projects planned to be implemented under the small grants component of the INRMW program or through grass root initiatives other than the INRMW program, to solve the issues that require immediate intervention and can be implemented in shorter time period, with relatively low cost requirements, and tangible and easily replicable impacts on the lives of the locals, e.g.: construction of small-scale gabions, cleaning of drainage systems, construction of small-scale (rural) on-site sewerage systems for individual buildings, arrangement of dry toilets for public buildings that do not have relevant water treatment plants, reclamation of pastures and grasslands, establishment of traditional organic farms, implementation of energy efficient measures and introduction of small scale clean energy technologicies such as solar systems, biodigesters, and others (see Table 1 for details).

b) Non-structural measures: These are the higher scale measures that do not involvephysical intervention but aim to reduce the identified risks and impacts through improving policies and laws in corresponding spheres, as well as through raising public awareness , trainings and education. The examples of the most vital non-structural measures suggested for the lower Rioni pilot watershed area include: development of a strategy , including an organizational model for the introduction of integrated wateshed management; development of regional waste management strategy for the Samegrelo region; establishing effective tariffs and their implementation systems in water use and waste management; strengthening law enforcement systems; strengthening the national monitoring network for surface and ground water resources; and development of overall forest policies, corresponding legal basis, including regulations on forest use, GIS compatible comprehensive forest database, etc.

Furthermore, the suggested measures were categorized as: i) Long-term; ii) Medium-term; and iii) Short-term, considering the existing capacity for their implementation. Short-term activities are those that require immediate intervention and can be implemented in a time period up to one year (including the demo-projects planned under the INRMW project); medium-term activities are those that require about one to five years for realization; and long-term activities are those that will need more than five years to be carried out.

The cost ranges for the suggested measures/activities were categorized as: i) L - low-cost (up to $20,000); ii) M - medium-cost ($20,000-$100,000); and iii) H - high-cost (more than $100,000).

For the list of the measures suggested see Table 1 below.

Table 1. Matrix of Watershed Management Plan of the Lower Rioni Pilot Watershed Area

Goal	Objectives	Measures	Scale of the measure	Ecosystem Functions/values influenced	Cost Range $	Timeline	Responsible Agent	Potential Source of Funding
Sustainable development of the pilot watershed area through protection and integrated management of its ecosystems and resources	***Objective 1:*** *Reduction of the environmental pollution/improvement of environmental quality*	**Structural Measures**						
		1. Setting up of waste collection system;procurement of waste containers 250-300 pieces for each municipality and closed trucks for transportation of waste (4 or 5 for each)	Municipal centers – Senaki and Khobi and Communities	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H >100,000- (~200,000 – 400,000)	M	Regional and municipal governments	Central and local budgets; development agencies (Sida, USAID, EU etc.); development banks (ADB, EBRD, WB, KfW).
		2. Improving management of existing controlled landfills by Implementation of low-cost protection measures: fencing and locking; arranging diversion channels, placing warning signs; constructing drainage and water retention and purification ponds, preparing access roads to landfills, etc.	Existing landfills of Khobi and Senaki	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: > 100,000 (~2 projects - ~400 000)	M	Central governments: MRDI and MoENRP; Municipal government; LTD "Company of Solid Wastes" .	Central and local budgets
		3. Construction of a new EU-standard municipal solid waste landfill	Municipal- Senaki	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: >1,000,000	L	Central governments: MRDI and MoENRP; Municipal government; LTD "Company of Solid Wastes".	Development Banks (ADB, EBRD, KfW, WB, etc.); Multi-lateral development agencies (EU, USAID, etc); development banks (ADB, EBRD, WB, KfW).
		4. Arranging waste segregation and processing facility	Regional or municipal - (1 project –	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality	H: >100,000	L	Central governments: MRDI and MoENRP;	Central and local budgets; development agencies (Sida,

	Senaki)	5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism			Municipal government; LTD "Company of Solid Wastes".	USAID, EU etc.); development banks (ADB, EBRD, WB, KfW).
5. Conservation of the existing solid waste landfills (after construction of new landfill)	Khobi and Senaki landfills	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: > 100,000 (~500 000)	L	Central governments: MRDI and MoENRP; Municipal government; LTD "Company of Solid Wastes" .	Central and/or local government; Development agencies (USAID, Sida, EU, etc.); development banks (ADB, EBRD, WB, KfW).
6. Construction of municipal/ medical waste incinerator	Municipal, Khobi or Senaki	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: >100, 000	L	Central governments: MRDI and MoENRP; Municipal government; LTD "Company of Solid Wastes" ; Private sector.	Private sector; Development agencies (USAID, Sida, EU, etc.).
7. Construction of a waste transfer station in Khobi municipality. This is relevant for the option when Senaki and Khobi municipalities have a common landfill in Senaki	Khobi	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: >100,000	M	Central governments: MRDI and MoENRP; Municipal government; LTD "Company of Solid Wastes".	Central government; Development agencies (USAID, Sida, EU, etc.); development banks (ADB, EBRD, WB, KfW).
8. Renovation/construction of the urban sewerage systems	Urban scale: Senaki	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value	H: >1,000,000	M-L	Central governments: MRDI and MoENRP; LTD "UWSCG"; Regional and municipal	Central budgets; development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); development

				8. Tourism			government.	banks (ADB, EBRD, WB, KfW).
		9. Construction of urban wastewater treatment plants	Urban scale:	1. Health protection value 2. Ecological value	H:	-L	Central governments:	Central and local budgets;
		10. Construction of small scale (rural) sewerage systems with treatment plants	Village level (at least 3 villages[5])	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: >100,000 (~20 000-100 000 per each project)	M-L	Central governments: MRDI and MoENRP; LTD "UWSCG"; Water companies of villages; Municipal governments; CBOs.	Central and local budgets; development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); NGOs.
		Non-structural measures						
		1. Development of regional waste management strategy for Samegrelo region, and municipal waste management plans for Khobi and Senaki municipalities	Regional and Municipal	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	M: 20,000-100,000	S	Central government: MoENRP and MRDI; Regional authorities; Samegrelo-Zemo svaneti governor's office; local municipal governments.	Central and local budgets; Bilateral and/or multilateral development agencies (USAID, Sida, EU, bilateral donors, etc.).
		2. Improvement of fee system for waste management and enforcement of tariff payments	National; Regional.	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality	M: 20,000-100,000	M	Central government: MoENRP, MRDI and	Central and local budgets; Bilateral and/or multilateral

[5]These are the pilot villages of INRMW-Georgia program which identified the issue as priority

			5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism			MoF; regional government.	development agencies (USAID, Sida, EU, bilateral donors, etc.).
	3. Strengthening of law enforcement system	National	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	M: 20,000-100,000	M	Central government: MoENRP and MoF.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	4. Strengthening of national network for surface and ground water quality monitoring	National	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	H: >1,000,000	M-L	Central government: MoENRP, MoF, and NEA.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	5. Improvement of existing regulations on wastewater discharge in harmonization with EU directives	National	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	M: 20,000-100,000	S-L	Central government: MoENRP.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	Awareness raising and DEMO projects						
	1. Awareness raising and capacity building of municipal authorities and local population in waste management	Municipal	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	M: 20,000-100,000	S-M	Central government: MoA, MRDI and MoENRPSD; NGOs; Eco-clubs; Development Agencies;	Bi-lateral and/or multilateral development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); NGOs.

						NGOs.	
	2. Construction of on-site wastewater treatment facilities for small industries, hotels and public buildings	Community-level	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	M: 20,000-100,000 (~20 000 for each demo-projects)	M	CBOs/NGOs; Private sector.	Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private Sector; NGOs; private sector.
	3. Arrangement of dry toilets for public buildings, households and hotels with no relevant wastewater treatment plants	Communities	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Drinking water quality 5. Agricultural production 6. Aesthetic/recreational value 7. Cultural value 8. Tourism	M: 20,000-100,000 (~20 000 for each demo-projects)	S	NGOs/CBOs; Private sector.	Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private Sector, NGOs; private sector.
Objective 2: *Protection of human health through provision of safe drinking water*	**Structural Measures**						
	1. Renovation of urban water supply systems for the city of Senaki[6]	Urban scale: Senaki	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	H: >1,000,000	M-L	Central government: MRDI; UWSCG.	Central budgets; Development banks (ADB, KfW, WB, etc.); development banks (ADB, EBRD, WB, KfW).
	2. Renovation of rural water supply systems	Village-level (at least 9 villages[7])	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	H: >100,000 (20,000 for each project)	M	Central government: MRDI; UWSCG; regional government; local small scale water companies; CBOs.	Local budgets; development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

[6] See more detailed list of measures under the Water Safety Plan for Pilot Cities of GLOWS/INRMW program. at http://www.globalwaters.net/projects/current-projects/inrmw/

[7] Pilot villages (supplied from urban centralized system) of INRMW program http://www.globalwaters.net/projects/current-projects/inrmw/,

		3. Construction of rural water supply systems	Village-level (at least 10[8] villages)	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	H: > 1, 000,000	M-L	Central government: MRDI; Regional governments;I ocal small scale water companies; CBOs/NGOs.	Central and local budgets; development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); development banks (ADB, EBRD, WB, KfW).
		4. Fencing of sanitary zones at the water intakes	Community-level [9]	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	L: 20,000 (~5,000 for each intake)	S	Central government: MRDI; LTD UWSCG; Small scale local water companies; CBOs/NGOS.	Central and local budgets; development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); development banks (ADB, EBRD, WB, KfW).
		5. Installation of water treatment/chlorination facilities/devices in the pilot villages	Community-level[10]	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	M: 20,000 – 40.000	M	Central government:MRDI; Regional and Municipal governments; local rural water companies; CBOs/NGOs.	Central and local budgets; development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); NGOs.

[8] Pilot villages of INRMW program http://www.globalwaters.net/projects/current-projects/inrmw/

[9] Independent centralized water supply systems exist only in Menji community, which is partially supplied from Senaki Drinking Water Supply System and partially from its own sources

[10] Independent centralized water supply systems exist only in Menji community, which is partially supplied from Senaki Drinking Water Supply System and partially from its own sources

Non-structural measures							
1. Strengthening of state inspection system of drinking water	National	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	M: 20,000-100,000		S-M	Central government: MoENRP, MoA and MoH.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
2. Establishing effective tariffs and their implementation mechanisms for drinking water supply system	National	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	L: 20,000	M		Central Government: MoF, MRDI and GNERC; municipal government.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
Public Awareness raising and DEMO projects							
1. Awareness raising and capacity building of local population, local water companies and municipal authorities on rational use of drinking water resources	Municipal	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	M: 20,000-100,000		S-M	Central government: MoENRP, MRDI and MoH; Municipal government;CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
2. Renovation of small scale water supply system	Villages	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Cultural value 6. Tourism	L: 20,000		S-M	Municipal government;CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

	Objective 3:	**Structural Measures**						
	Maintaining existing reserves of water resources through sustainable and efficient utilization	1. Construction of rural water supply systems	Community	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	H> 1,000,000	L	Central government: MRDI and MoF; CBOs/NGOs; municipal governments; CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		2. Renovation of water supply system[11]	Cities and Villages	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	H> 1,000,000	L	Central government: MRDI and MoF; CBOs/NGOs; municipal governments; CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		Non-structural Measures						
		1. Elaboration of new law and relevant sub-laws on water in harmonization with EU directives – Setting up of a River Basin Management approach	National	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	M: 20,000- 100,000	S-M	Central government: MoENRP; International and/local NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		2. Development of national regulation on ecological flow	National	1. Human health 2. Ecosystem integrity/conservation value	L: 20,000	S	Central government:	Central budget; Development

[11] Please see for more details, under objective 2. of this table

	of surface waters		3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation			MoENRP.	agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	3.Establishing effective tariffs and their implementation mechanisms for water abstraction	National	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	L: 20,000	S	Central government: MRDI/MDF, MoF and MoA. International and/local NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	4. Strengthening of law enforcement and inspection system	National	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	H: >100,000	M	Central government: MoENRP.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	5. Strengthening of national hydrological monitoring network	National & Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	H: >100,000	M-L	Central government: MoENRP and NEA.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

		Public awareness raising and DEMO projects						
		1. Awareness raising and capacity building of local population and municipal authorities on sustainable and rational use of surface water resources	Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	L: 20,000-	S-M	Central government: MoA, MRDI and MoENRPSD; Municipal government; CBOs/ NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		2. Renovation of small scale rural water supply systems	Villages	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Drinking water supply 5. Energy source 6. Livelihood value 7. Agricultural production 8. Cultural value 9. Tourism 10. Recreation	M: 20,000-100,000 (~20000 for each project)	S	Municipal governments; local LTDs of rural water companies; CBOs/NGOs.	Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Development banks (ADB, EBRD, WB, KfW).
	Objective 4:	**Structural measures**						
	Disaster risk reduction[12]	1. Cleaning of river beds	Municipal level: River beds of Rivers: Rioni, Tekhuri, Tsivi, Tsiva, Abasha and other small streams	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	H: >1,000,000 ~ 700,000 for each project	M-L	Central government: MoENRP and MRDI; Regional and municipal governments.	Central and regional budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Development banks (ADB, EBRD, WB, KfW).

[12] For detailed information regarding this objective, see in "Assessment of the Vulnerability to Natural Disaster and Climate Change and Plan of Mitigation and Adaptation Measures of the lower Rioni pilot watershed area" developed under the INRMW-Georgia project

2. Construction of gabions along the river beds	River banks: Rioni (left bank, across village Siriachkoni) Tekhuri, Abasha, and other small rivers	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	H: >1,000,000	M-L	Central government: MoENRP and MRDI; Regional and municipal governments.	Central and regional budgets; Development agencies (USAID, UNDP, EU, bilateral donors, Development banks (ADB, EBRD, WB, KfW).
3.Construction of new storm water and drainage systems	Minicipalities	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	H: >1,000,000	M-L	Central government: MoENRP and MRDI; Regional and municipal governments.	Regional budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
4. Renovation of existing storm water and drainage systems	Minicipalities	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	H: >1,000,000	M-L	Central government: MoENRP and MRDI; Regional and municipal governments.	Central and regional budgets; Development agencies (USAID, UNDP, EU, Dutch government, GIZ, Sida, etc.).
Non-structural measures						
1. Strengthening of natural disaster early warning-information systems	National	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	H: > 100,000	M-L	Central government: MoENRP and MIA.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Development banks (ADB, EBRD, WB, KfW).
Public awareness and DEMO projects						

		1. Awareness raising and capacity building of municipal authorities and local population on DRR	Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	M: 20,000–100, 000	S-M	Central government: MoENRP, MIA and MRDI; Municipal government; CBOs/ NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		2. Renovation of eroded lands/river banks by bioengineering methods	Villages	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	M: 20,000-100,000; ~20,000 at list one project	S-M	Regional and municipal governments;CBOs/ NGOs.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
		3. Construction /renovation of small size gabions along the river beds	Villages	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	M: 20,000-100,000; 20,000-50,000 for one project	S-M	Regional and municipal governments	Central and regional budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.) .
		4. Renovation of existing small scale storm water and drainage systems	Villages	1. Human health 2. Ecosystem integrity/conservation value 3. Disaster Risk Reduction 4. Cultural value 5. Tourism 6. Recreation	M: 20,000– 100,000 20,000-50,000 for one project	S-M	Municipal governments; CBOs.	Central and regional budgets; Development agencies (USAID, UNDP, EU, Dutch government, GIZ, Sida, etc.).
	Objective 5:	**Structural measures**						
	Conservation, recovery and sustainable use of natural ecosystems,	1. Afforestation/reforestation activities in the pilot areas with severely damaged forests	Municipalities	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value	H: >100,000	M-L	Central government: MoENRP and National Agency of	Central and local budgets; Development agencies (USAID, UNDP, EU,

	including maintaining biodiversity within and outside the PAs			5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation			Forest; Regional and municipal governments.	bilateral donors, GIZ, Sida, etc.).
		2. Establishment of open/closed tree nurseries	Communities	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	M: 20,000–100,000	M	Central government: MoENRP and National Agency of Forest; Municipal governments;CBOs/NGOs; Private sector.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		3. Building of roads to the lots allocated for communities to extract fuel wood	Municipalities	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	M: 20,000– 100,000	S-M	Central government:MoENRP and National Agency of Forest; Municipal governments; CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		4. Restoration of degraded forest ecosystems (pest control for forests, sanitary logging etc.)	Municipalities	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	M: 20,000–100,000	S-M	Central government: MoENRP and National Agency of Forest; Municipal governments; CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

	5. Improvement of the infrastructure of PAs (Waste management, water supply, wastewater treatment, etc.)	Kolkheti Protected Areas	1. Ecological value 2. Economic/commercial value 3. Livelihood support value 4. Aesthetic/recreational value 5. Cultural value 6. Tourism 7. Recreation	H: > 100,000	M-L	Municipal government: MoENRP-APA, MESD andTourism Agency; CBOs/NGOs; Private Sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	Non-Structural Measures						
	1. Development of overall forest policies, corresponding legal bases, laws and sub-laws including enhancing law enforcement mechanisms on regulations of forest use	National	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	M: 20,000-100,000	M	Central government: MoENRP and National Agency of Forest.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	2. Development of forests management plans for a watershed/ municipality that should include measures for using, maintaining, protection and restoration of forests	Watershed pilot area/municipali-ties	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	M: 20,000–100,000	M	Central government: MoENRP and National Agency of Forest.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	3. Implementation of functional zoning of the forests, based on the standards of sustainable management and use of forest resources	National	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism	M: 20,000– 100,000	M	Central government: MoENRP and National Agency of Forest.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

			10. Recreation				
	4. Inventory of forests, elaboration of forest cadastre	National; Municipalities.	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	H: >100,000	M-L	Central government: MoENRP and National Agency of Forest; International and/local NGOs; Private Sector.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	5. Setting up of forest monitoring systems	National; Municipalities.	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	M: 20,000-100, 000	M	Central government: MoENRP and National Agency of Forest.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	6. Determining the annual demand for fuel wood at the municipality level	Municipalities; villages.	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value 8. Cultural value 9. Tourism 10. Recreation	L: 20,000	S	Central government: MoENRP and National Agency of Forest; Municipal governments.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

7. Improvement of biodiversity related legislation, policy and planning	National	1. Ecosystem integrity/conservation value 2. Economic/commercial value 3. Recreation 4. Tourism	M: 20,000 100,000	M	Central government: MOENRP.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
8. Establishment of comprehensive and efficient system of biodiversity monitoring	National	1. Ecosystem integrity/conservation value 2. Economic/commercial value 3. Recreation 4. Tourism	H: > 100,000	M-L	Central government: MoENRP.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
9. Strengthening law enforcement system on biodiversity and forest management laws and regulations	National	1. Ecosystem integrity/conservation value 2. Economic/commercial value 3. Recreation 4. Tourism	H: >100,000	M	Central government: MoENRP and National Agency of Forest.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
10. Capacity building of the Protected area management staff	Kolkheti Protected Area	1. Ecological value 2. Economic/commercial value 3. Livelihood support value 4. Aesthetic/recreational value 5. Cultural value 6. Tourism	M: 20,000-100,000	M	Central and local government: MoENRP and APA; Academic Institutions e.g. Iliauni TSU, etc.	Central and local budgets; Development UNDP, EU, bilateral donors, GIZ, Sida, etc.).
Public awareness raising – DEMO projects						
1. Awareness raising and capacity building of municipal authorities on ecosystem functions and protection	Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Energy source 6. Livelihood support 7. value Cultural value 8. Tourism	M: 20,000– 100,000	S-M	Central government: MoENRP and MES; Municipal governments;CBOs/NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

			9. Recreation				
	2. Promotion of using alternative energy sources through implementation of demo project and awareness raising campaigns *(Please see more details under objective 6)*	Municipalities; Villages; households.	1. Human health 2. Drinking water supply 3. Ecosystem integrity/conservation value 4. Economic/commercial value 5. Disaster Risk Reduction 6. Energy source 7. Livelihood support value Cultural value 8. Tourism 9. Recreation	M: 20,000-100,000	S-M	Central government: MoENRP-National Agency of Forest and Ministry of Energy of Georgia; Municipal governments; NGOs/CBOs	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.)
	3. Inclusion of local communities, especially youth and children, in the activities related to PAs	Watershed pilot area	1. Ecological value 2. Economic/commercial value 3. Livelihood support value 4. Aesthetic/recreational value 5. Cultural value 6. Tourism	M: 20,000-100,000	S-M	Central and local government: MoENRP and APA; academic institutions; CBOs/NGOs; Eco-clubs.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	4. Installation of information and prohibition/ demarcation signs to reduce illegal grazing	Samegrelo-Lechkhumi-Lower Svaneti PAs	1. Ecological value 2. Economic/commercial value 3. Livelihood support value 4. Aesthetic/recreational value 5. Cultural value 6. Tourism	L: <20,000	S	Central and Municipal government: MoENRP and APA; Eco-clubs; CBOs/NGOs.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	5. Establishment of fish farms or cooperative farms, including hatcheries, nurseries and grow-out facilities	Communities and farmers	1. Ecological value 2. Economic/commercial value 3. Livelihood support value 4. Aesthetic/recreational value 5. Cultural value 6. Tourism	H: >100,000 (~4 demo-projects, ~20,000 for each project)	S-M	Municipal government; CBOs/NGOs;Private Sector.	Local budgets; Private sector; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	6. Establishment of hunting farms	Communities	1. Ecological value 2. Economic/commercial value 3. Livelihood support value	H:	S-M	Municipal government; CBOs/NGOs;	Local budgets; Private sector; Development

				4. Aesthetic/recreational value 5. Cultural value Tourism	>100,000 (~2 demo-projects, ~ 200,000)		Private sector.	agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc); Private sector.
	Objective 6: *Sustainable utilization of renewable energy resources*	**Structural measures**						
		1. Implementation of energy efficient measures	Public buildings; Individual households.	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Energy source 6. Livelihood support value 7. Tourism	M: >20,000; (~10 projects, ~20,000–100,000)	S-M	Municipal governments; CBOs/NGOs; Private sector.	Central and local budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
		2. Construction of micro to small size hydropower plants	Municipal; Communities; households.	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Energy source 6. Livelihood support value 7. Tourism	M-H: - Micro: >20,000; (~6 projects, ~100,000) -Small: >100,000 (~2 projects, ~200,000)	S-M	Regional and municipal governments; CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
		3. Construction of biogas digesters	Households; Communities.	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Energy source 6. Livelihood support value 7. Tourism	M: 20,000-100,000; (~6 projects, ~100,000)	M	Municipal governments; CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
		Public awareness raising – DEMO projects						

		1.Promotion of using alternative energy sources through implementation of demo project and awareness raising campaigns	Municipalities; Villages; Households	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Energy source 6. Livelihood support value 7. Tourism	M: 20,000-100,000	S-M	Central government: MoENRP-Nation Agency of Forest and Ministry of Energy of Georgia; Municipal governments; NGOs/CBOs; Private sector.	Central and local budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
		2. Installation of solar systems	Individual farmer houses	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Livelihood support value 5. Energy source 6. Cultural value 7. Tourism	M: 20,000-100,000; (~10 projects, ~40,000 – 100,000	S	Municipal governments; CBOs/NGOs; Private sector.	Central and local budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
		3. Construction of biogas digesters	Households; Communities.	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Energy source 6. Livelihood support value 7. Tourism	M: 20,000-100,000; (~6 projects, ~100,000)	M	Municipal governments;CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private sector.
	Objective 7: *Reduction of land degradation through application of sustainable land management practices*	**Structural Measures**						
		1. Reclamation of pastures and grasslands	Watershed pilot area – Municipalities/Communities	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	H: > 1,000,000	M-L	Central government: MoENRP and MoA; municipal governments; CBOs/NGOs;	Central and local budgets; Development agencies (USAID, UNDP, EU, bi-lateral donors, GIZ, Sida, etc.);

						Private sector.	Private sector.
	2. Implementation of land reclamation measures of eroded agricultural lands (through the use of bio fertilizers, drainage systems, etc.)	Communities	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	H: > 1,000,000	M-L	Central government: MoENRP and MoaA; municipal governments; CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bi-lateral donors, GIZ, Sida, etc.); Private sector.
	3. Carry out activities against land erosion - terracing, using no-tillage technologies, planting trees, grasses, etc.	Communities	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	H: > 100,000	L	Central government: MoENRP and MoA; municipal governments; CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bi-lateral donors, GIZ, Sida, etc.); Private sector.
	4. Restoration of windbreaks	Communities	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Livelihood support value 5. Aesthetic/recreational value 6. Agricultural production	M: 20,000– 100,000 (~ 10 projects)	M	Regional and municipal governments;CBOs.	Central and local budgets; Development agencies (USAID, UNDP, EU, Dutch government, GIZ, Sida, etc.).
	Non-structural measures						
	1. Introduction of effective land/ agricultural land management policy and its implementation mechanisms (land use zoning, land inventory and monitoring, land use fees, land allocation, etc.)	National	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	M: 20,000– 100,000	M	Central government: MoENRP and MoA; NGOs/CBOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
	2. Conducting an inventory of eroded and degraded agriculture lands	National & Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction	M: 20,000– 100,000	M	Central government: MoENRP and MoA;	Central and local budgets; Development agencies (USAID, UNDP, EU,

		5. Livelihood support value 6. Agricultural Production			NGOs/CBOs.	bilateral donors, GIZ, Sida, etc.).
3.Setting up of regular state monitoring network for soil quality	National Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	H: >100,000	M-L	Central government: MoENRP and MoA; Local authorities NGOs/CBOs.	Central and/or budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
Public Awareness raising – DEMO projects						
1. Awareness raising and capacity building of municipal authorities on ecosystem functions and protection, sustainable land management and traditional agricultural practice	Municipal	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	M: 20,000– 100,000	S-M	Central government: MoENRP and MoA; NGOs/CBOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
2. Reclamation of pastures and grasslands	Watershed pilot area – Municipalities & Communities	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	M: 20,000-100,000 ≈20,000-50,000 for each project	S-M	Municipal governments; CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bi-lateral donors, GIZ, Sida, etc.); Private sector.
3. Implementation of land reclamation measures of eroded agricultural lands (through the use of bio fertilizers, drainage systems, etc.)	Communities	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	M: 20,000-100,000 ≈20,000-50,000 for each project	S-M	Municipal governments; CBOs/NGOs; Private sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bi-lateral donors, GIZ, Sida, etc.); Private sector.
4. Carry out activities against land erosion - terracing, using no-tillage technologies,	Communities	1. Human health 2. Ecosystem integrity/conservation value	M:	S-M	Municipal governments; CBOs/NGOs;	Central and local budgets; Development

		planting trees, grasses, etc.		3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production	20,000-100,000 ≈20,000-50,000 for each project		Private sector.	agencies (USAID, UNDP, EU, bi-lateral donors, GIZ, Sida, etc.); Private sector.
	Objective 8: *Promotion of organic/ traditional agriculture*	**Non - structural measures**						
		1. Development of a central policy and its implementation mechanisms on Georgian agro-biodiversity and regulating GMO materials and products	Watershed pilot area	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production 7. Tourism	H: >100,000	M-L	Central government: MoA; local government; International and/local NGOs.	Central budget; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		Demo projects						
		1. Establishment of traditional organic farms	Communities – farmer's level	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production 7. Tourism	M: 20,000– 100,000 (~10 demo-projects)	M	Municipal governments; CBOs/NGOs; Private Sector.	Local budgets; Private sector; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		2. Introduction of seed materials to re-establish production of traditional endemic species	Watershed pilot area	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production 7. Tourism	M: 20,000– 100,000 (~10 demo-projects)	M	Municipal governments; CBOs/NGOs; Private Sector.	Local budgets; Private sector; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).
		3. Establishment of herbal farms	Communities – farmer's level	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production 7. Tourism	M: 20,000– 00,000 (~6 demo-projects,)	M	Municipal governments; CBOs/NGOs; Private Sector.	Local budgets; Private sector; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.).

		4. Taking measures against invasive pests ("American butterfly")	Watershed pilot area	1. Human health 2. Ecosystem integrity/conservation value 3. Economic/commercial value 4. Disaster Risk Reduction 5. Livelihood support value 6. Agricultural Production 7. Tourism	L-M: 20,000 or 20 000–100 000 (~5 projects)	Short term	Central government - MoA; Municipal governments;CBOs; private sector.	Local budgets; Private sector; Development agencies (USAID, UNDP, EU, Dutch government, GIZ, Sida, etc.).
	Objective 9: *Development of eco, agro and cultural tourism potential*	**Public awareness – Demo projects**						
		1. Ecotourism development supportive activities - arranging tourist trails, shelters, picnic and camping areas, panoramic views, wildlife tracking spots, placing sign boards and banners, etc.	Kolkheti National Park and Protected Areas	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Livelihood support value 5. Cultural value 6. Tourism 7. Recreation	L: <20,000 (3 projects, ~60,000)	S	Central and regional governments; Private Sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private Sector.
		2. Establishment of environmentally friendly technologies for hotels and guest houses near the protected areas and buffer zones	Kolkheti National Park and Protected Areas	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Livelihood support value 5. Cultural value 6. Tourism 7. Recreation	M: 20,000-100,000 (~5 projects, ~100,000)	S	Central and regional governments; Private Sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.); Private Sector.
		3. Setting up of waste collection system at the protected areas	Kolkheti National Park and other Protected Areas of Kolkheti	1. Health protection value 2. Ecological value 3. Economic/commercial value 4. Livelihood support value 5. Cultural value 6. Tourism 7. Recreation	M: 20,000-100,000 (~3 projects, ~150,000)	S	Central and regional governments; Private Sector.	Central and local budgets; Development agencies (USAID, UNDP, EU, bilateral donors, GIZ, Sida, etc.

3.2.2 Management and Funding Mechanisms

The plan (Table 1) includes responsible agents for each suggested measure. They are categorized as: a) those practiced by governmental structures such as central, regional and municipal governments (e.g. MoENRP, MRDI, Samegrelo Governor's office, United Water Supply Company of Georgia (UWSCG), etc.); and b) those practiced by the private sector such as businesses, CBOs, international and local NGOs, eco-clubs and others. For each measure, a number of stakeholders will be involved in the implementation process, with a responsible party identified according to the specifics of its implementation needs and the accepted management practices of the structures listed above.

Potential funding sources are also recommended in the plan. Again, accepted funding practices were considered and the selection of the funding sources for specific measures was made based on the particulars of the type of activity, e.g., for nonstructural measures the potential funding sources are mostly central budget, bilateral and/or multilateral development agencies such as USAID, Sida, EU, the Dutch Government, etc. In some cases, the funds can be supplemented from the local budgets too for these measures. As for the structural measures, the possible funding sources may include but are not limited to: central and local budgets; development agencies (Sida, USAID, EU, etc.); development banks (ADB, EBRD, WB and KfW); multi-lateral development agencies (EU, USAID, etc); private sector – businesses, NGOs, etc.

It should be noted that the current legal and institutional setting does not allow for the management of natural resources within the boundaries of watersheds. Management repsonsibilities over local natural resource bases are dividied between the state government and local municipalities. Therefore, at this stage the most feasible measure is to create a watershed council with two units in each municipal government covered by this IWMP. It will be an advisory and consultative body for the effective monitoring and update of the IWMP. The council will be composed of local government, community and NGO representatives but will be open to other stakeholders including private buisnesses and donors. The council will be hosted by each local government on a rotational basis.

ANNEXES

Annex 1. INRMW project list of target communities of the Lower Rioni Pilot Watershed Area

Table 1. List of Selected Communities in the Khobi Municipality (Downstream Watershed Area of the Rioni River Basin)

	Community	Village	Population (Persons)	Share of Vulnerable Groups[1] (%)
1	**Patara Poti**		**1241**	**15%**
		I Hamlet	549	188
		II Hamlet	242	197
		III Hamlet	239	52
		IV Hamlet	211	88
2	**Chaladidi**		**2316**	**31%**
		Sachochuo	422	128
		Sabazho	1894	499
3	**Sagvichio**		**650**	**22%**
		Sagvichio	650	142
4	**Shavgele**		**1043**	**7%**
		Shavgele	1043	68

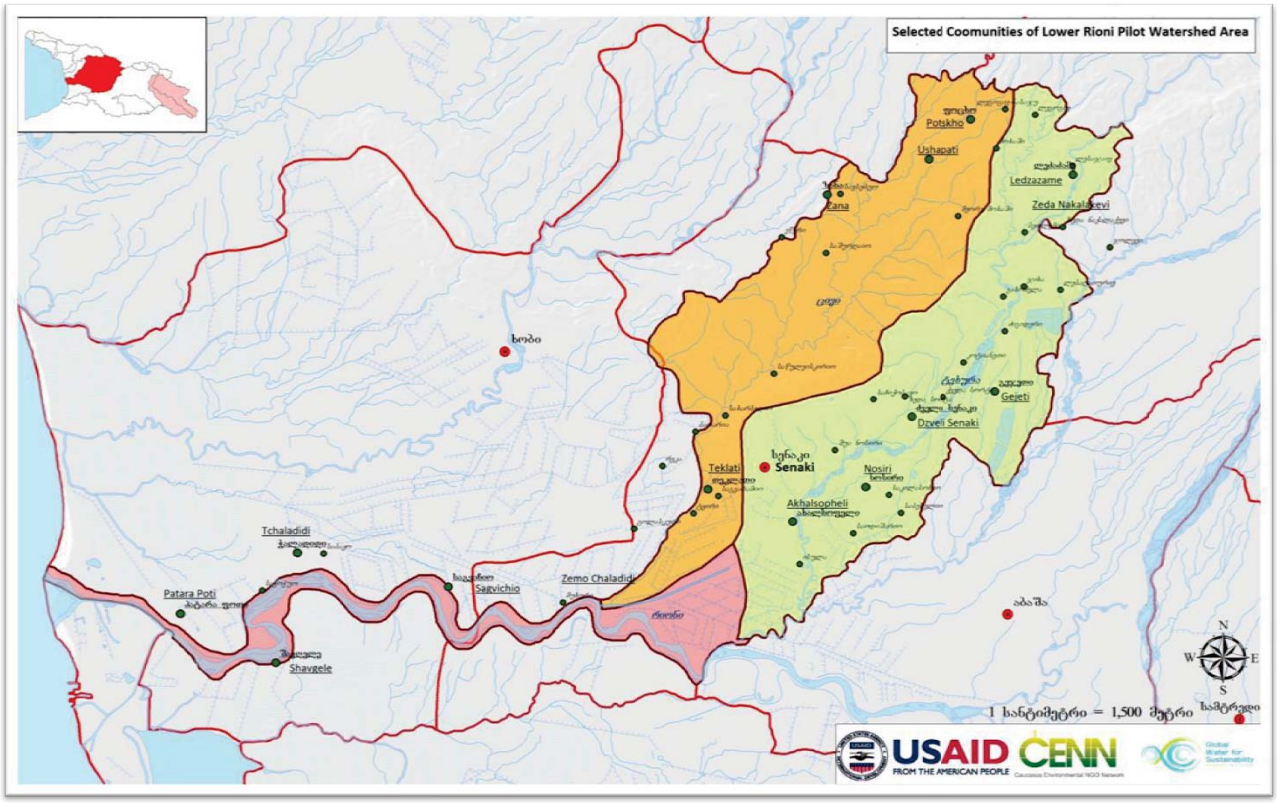
Table 2. List of Identified Communities in the Senaki Municipality (Downstream Watershed Area of the Rioni River Basin)

	Community	Village	Population (Persons)	Share of Vulnerable Groups (%)
1	**Teklati**		**3000**	**26%**
		Sagvaramio	840	208
		Teklati	650	228
		Golaskuri	590	91
		Tkiri	460	100
		Reka	460	156
2	**Akhalsopeli**		**2023**	**24%**
		Akhalsopeli	1327	299
		Isula	696	185
3	**Zemo Chaladidi**		**786**	**26%**
		Mukhuri	726	188
		Siriachkoni	60	18
4	**Dzveli Senaki**		**4453**	**31%**
		Kveda Sorta	386	92
		II Nosiri	942	259
		Zeda Sorta	208	76
		Sachiqobavo	80	28
		Kotianetio	705	279
		Dzveli Senaki	2132	627
5	**Nosiri**		**3313**	**20%**
		Saodishario	900	195
		Sakilasonio	513	35
		Sabeselio	650	174
		Shua Nosiri	580	91

[1] Vulnerable groups include community residents with income below the poverty line and Internally Displaced Persons (IDPs).

		Nosiri	670	172
6	**Gejeti**		**1250**	**37%**
		Gejeti	1250	459
7	**Nokalakevi**		**1398**	**34%**
		Zemo Nokalakevi	24	12
		Jikha	351	134
		Lebagaturie	283	100
		Gakhomila	573	178
		Dziguderi	167	53
8	**Menji**		**1293**	
		Bataria	635	136
		Sakharbedio	350	81
		Satsuleiskirio	155	35
9	**Ledzadzame**		**1095**	**14%**
		Ledzadzame	193	40
		Betlemi	288	29
		Lesajaie	242	45
		Legogie	104	21
		Jolevi	189	13
10	**Zana**		**1502**	**30%**
		Zana	440	166
		Etseri	245	68
		Saesebuo	191	49
		Sashurgaio	287	81
11	**Potskho**		**2003**	**36%**
		I mokhashi	229	97
		II mokhashi	217	95
		Legogie-Nasaju	487	153
		Potskho	1070	379

Map of the Identified/Selected Communities of Lower Rioni Pilot Watershed Area



Annex 2. Priority Environmental Problems Identified by Selected Communities

Table 1. Priority Problems Identified by Selected Communities of Khobi Municipality

Community	Village	Priority Issue
1. Patara Poti		
	Patara Poti	• Availability of safe drinking water (drinking water shortage and poor quality); • High risk of natural disasters–floods and flash floods; • Secondary bogging of agricultural lands due to poor drainage; • Wind induced soil erosion of agricultural lands.
2. Chaladidi		
	Sagvamichao	• Availability of safe drinking water (drinking water shortage and poor quality); • High risk of natural disasters – floods and flash floods; • Reduction of crops and green cover due to introduction of invasive species (American butterfly).
	Sachochuo	• Reduction of crops and green cover due to introduction of invasive species (American butterfly); • High risk of natural disasters – floods and flash floods; • Bogging of agricultural lands due to poor drainage; • Availability of safe drinking water (drinking water shortage and poor quality).
	Sabajo	• Reduction of crops and green cover due to introduction of invasive species (American butterfly); • Bogging of agricultural lands due to poor drainage.
3. Sagvichio		
	Sagvichio	• Availability of safe drinking water (drinking water shortage and poor quality); • High risk of natural disasters – floods and flash floods; • Reduction of crops and green cover due to introduction of invasive species (American butterfly).
4. Shavgele		
	Shavgele	• Shortage of drinking water; • High risk of natural disasters – floods and flash floods; • Bogging of agricultural lands due to poor drainage.

Table 2. Priority Problems Identified by Selected Communities of Senaki Municipality

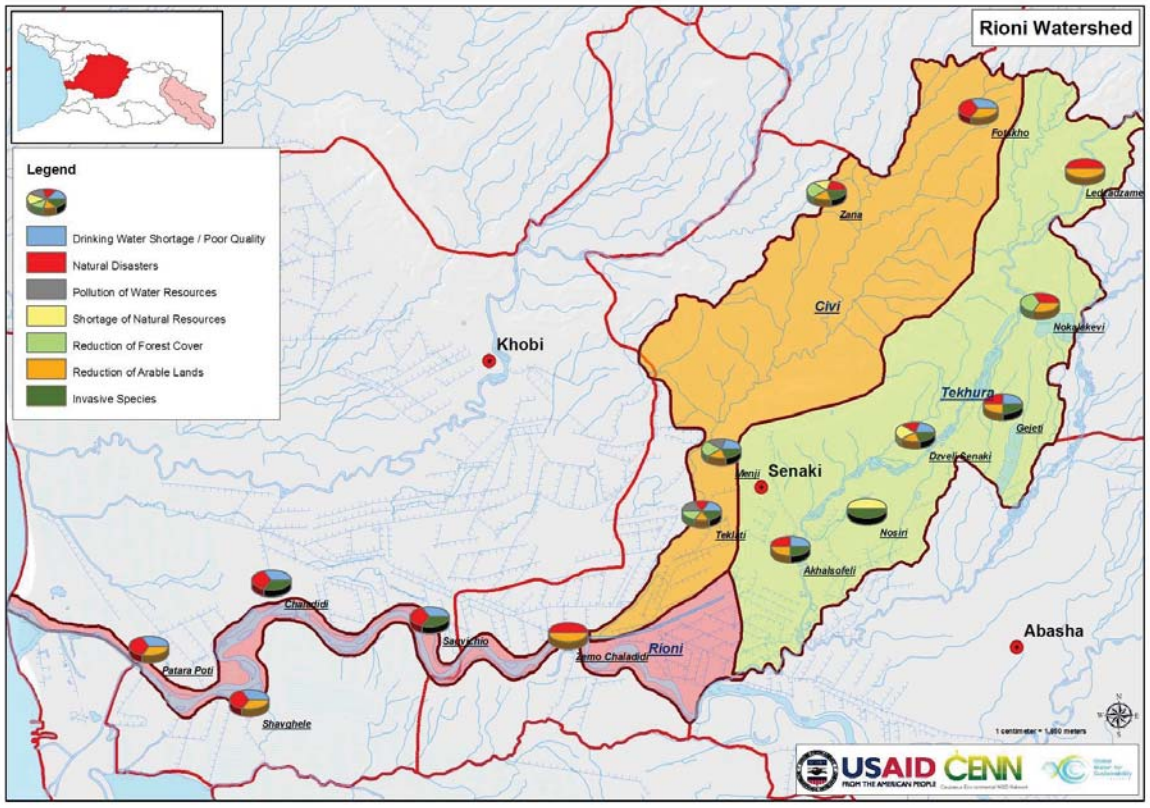
Community	Village	Priority Issue/Problem
1. Teklati		
	Sagvaramio	• High risk of natural disasters – floods and flash floods; • Bogging of agricultural lands due to poor drainage; • Pollution of the Tsivi River from untreated wastewater discharges.
	Teklati	• Reduction of crops and green cover due to introduction of invasive species (American butterfly).
	Golaskuri	• Deforestation.
	Tkhiri	• High risk of natural disasters – floods and flash floods; • Bogging of agricultural lands due to poor drainage.
	Reka	• Pollution of surface waters (solid waste and untreated wastewaters).
2. Akhalsopheli		
	Akhalsopheli	• High risk of natural disasters – floods and flash floods; • Reduction of green cover due to invasive species (American butterfly); • Bogging of agricultural lands due to poor drainage.
	Isula	• High risk of natural disasters – floods and flash floods (significant threats posed to the kindergarten) • Reduction of green cover due to introduction of invasive species (American butterfly); • Bogging of agricultural lands due to poor drainage.
3. Old Senaki		
	Kveda Sorda	• Wind-induced erosion of agricultural lands; • High risk of natural disasters – floods and flash floods; • Bogging of agricultural lands due to poor drainage; • Reduction of green cover due to introduction of invasive species (American butterfly).
	Meore Nosiri	• Poor drinking water quality in the centralized water supply system; • Wind-induced erosion of agricultural lands; • Bogging of agricultural lands due to poor drainage; • Reduction of green cover due to introduction of invasive species (American butterfly).
	Zeda Sorda	• Wind-induced erosion of agricultural lands; • High risk of natural disasters – floods and flash floods; • Bogging of agricultural lands due to poor drainage; • Reduction of green cover due to introduction of invasive species (American butterfly).

	Sachikobavo	• Natural disasters – landslides and floods; • Reduction of green cover due to introduction of invasive species (American butterfly).
	Kotianeti	• Reduction of drinking water resource in individual wells; • Bogging of agricultural lands due to poor drainage; • Reduction of agricultural lands due to weeding and transformation into shrublands and forests; • Reduction of green cover due to introduction of invasive species (American butterfly).
	Old Senaki	• Poor drinking water quality in centralized water supply system; • Wind-induced erosion of agricultural lands; • Bogging of agricultural lands due to poor drainage; • Reduction of green cover due to introduction of invasive species (American butterfly).
4.Nosiri		
	Saodishario	• Reduction of drinking water resource in individual wells; • Reduction of green cover due to introduction of invasive species (American butterfly).
	Sakilasonio	• Reduction of drinking water resource in individual wells.
	Sabeselio	• Reduction of drinking water resource in individual wells; • Reduction of green cover due to introduction of invasive species (American butterfly).
	Shua Nosiri	• Reduction of drinking water resource in individual wells.
	Nosiri	• Reduction of drinking water resource in individual wells.
5. Gejeti		
	Gejeti	• Availability of safe drinking water (absence of centralized water supply system); • Reduction of crops and green cover due to introduction of invasive species (American butterfly); • Wind-induced soil erosion due to destruction of windbreaks; • High risk of natural disasters – floods and flash floods.
6.Nokalakevi		
	Zemo Nokalakevi	• Deforestation; • Disaster risk – landslides, floods and flashfloods.
	Jikha	• Disaster risk – floods and flashfloods; • Flooding and bogging of agricultural lands; • River bank erosion.

	Lebaghaturie	• Disaster risk – floods and flashfloods; • Bogging of agricultural lands due to poor drainage; • River bank erosion; • Deforestation.
	Gakhomila	• Disaster risk – floods and flashfloods; • Bogging of agricultural lands due to poor drainage; • River bank erosion; • Deforestation.
	Dzigideri	• Wind-induced soil erosion of agricultural lands due to destruction of windbreaks; • Bogging of agricultural lands due to poor drainage; • Disaster risk – floods and flashfloods.
7. Menji		
	Bataria	• Poor availability of safe drinking water (water shortage and poor quality); • Pollution of soil and ground waters from untreated wastewater discharges and dumping/disposal of solid household wastes; • Deforestation; • Reduction of crops and green cover due to introduction of invasive species (American butterfly).
	Sakharbedio	• Reduction of crops and green cover due to introduction of invasive species (American butterfly); • Wind-induced soil erosion of agricultural lands due to destruction of windbreaks; • Shortage of drinking water supplied through centralized water supply system due to poor condition of the network.
	Satsuleiskiro	• Poor availability of safe drinking water (water shortage and poor quality); • Reduction of crops and green cover due to introduction of invasive species (American butterfly); • Wind-induced soil erosion of agricultural lands due to destruction of windbreaks.
9. Ledzadzame		
	Ledzadzame	• Reduction of crops and green cover due to introduction of invasive species (American butterfly); • Pollution of soil and groundwaters from untreated wastewater discharges and dumping/disposal of solid household wastes; • Bogging of village territory and agricultural lands due to poor drainage.
	Betlemi	• Wind-induced soil erosion of agricultural lands due to destruction of windbreaks; • Pollution of soil and groundwaters from untreated wastewater discharges and dumping/disposal of solid household wastes; • Bogging of village territory and agricultural lands due to poor drainage.
	Lesajaie	• Reduction of crops and green cover due to introduction of invasive species (American butterfly);

		• Wind-induced soil erosion of agricultural lands due to destruction of windbreaks; • Bogging of agricultural lands due to poor drainage.
	Legogie	• Reduction of crops and green cover due to introduction of invasive species (American butterfly); • Wind-induced soil erosion of agricultural lands due to destruction of windbreaks; • Bogging of agricultural lands due to poor drainage.
	Jolevi	• Bogging of village territory and agricultural lands due to poor drainage; • Reduction of crops and green cover due to introduction of invasive species (American butterfly).
10. Zana		
	Zana	• Reduction of source water in individual wells; • Reduction of crops and green cover due to introduction of invasive species (American butterfly).
	Satkebuchao	• High risk of natural disasters – floods, flashfloods and landslides.
	Saesebuo	• High risk of natural disasters – floods and flash floods.
	Etseri	• Wind-induced soil erosion due to destruction of windbreaks; • Deforestation.
	Sashurgaio	• Deforestation; • Bogging of lands; • High risk of natural disasters – floods, flashfloods and landslides.
11. Potskho		
	Pirveli Mokhashi	• Shortage of safe drinking water (quantity and quality); • Wind-induced soil erosion due to destruction of windbreaks; • High risk of natural disasters – floods and flashfloods.
	Meore Mokhashi	• Shortage of safe drinking water (quantity and quality); • Wind-induced soil erosion due to destruction of windbreaks; • High risk of natural disasters – floods and flashfloods.
	Legogie-Nasaju	• Wind-induced soil erosion due to destruction of windbreaks.
	Potskho	• Shortage of safe drinking water (quantity and quality); • Wind-induced soil erosion due to destruction of windbreaks; • High risk of natural disasters – floods and flashfloods.

Map 1. Priority Environmental and Natural Resources Management Issues of Pilot Communities



Annex 3. Matrix of Priority Watershed Issues of the Lower Rioni Pilot Watershed Area Identified by INRMW Experts

Topic: Forest Resources

#	Priority Issue	Criteria: Negative Impact	Maximum Attainable Score	Scoring Result	Causal-Chain Analysis		
					Causes	**Negative Impacts/Impacts on Other Resources**	**Scale of the Impact**
1.	Deterioration in general condition of high conservation value forest areas (Total score:17)	On the health of population	10	6	Absence of proper legal-regulatory, policy and institutional framework for sustainable forest management; absence of data on the current state of the forests and volumes of timber harvesting; underutilization of alternative (renewable) energy resources such as solar energy, wind energy, geothermal energy and biogas; lack of technical, financial and human resources for sustainable forest management.	Deterioration of water balance and shortening of water resources Degradation of ecosystems; Degradation of soil cover; Decreased biodiversity and extinction of rare species; Degradation on natural habitats within the protected areas and its buffer zones.	Whole watershed area
		Watershed ecology.	8	7			
		Social-economic conditions: housing, infrastructure, and agriculture.	5	4			
2	Deterioration in general condition of forests; decrease of forest stand frequency below the allowable level (Total score:18)	On the health of population	10	6	Failure to implement inventory and functional zoning of forests; Absence of optimal norms (rules) for resources use; Lack of data on demand for resources; Uncontrolled cutting of trees for firewood; Absence of reliable information on forest resources and conditions. Lack of measures on restoration of degraded forest.	Deterioration of water balance and shortening of water resources; Degradation of ecosystems and soil cover; Decreasing of biodiversity and extinction of rare species; Degradation on natural habitats.	Whole watershed area
		Watershed ecology.	8	8			
		Social-economic conditions: housing, infrastructure and agriculture.	5	4			

3.	Reduction of timber resources **(Total score: 18)**	On the health of population.	10	6	Unsustainable use of timber resources; Uncontrolled cutting of trees for firewood; Failure to implementation of a monitoring system; underutilization of alternative (renewable) energy resources such as solar energy, wind energy and biogas; There is no set up optimal quota for timber use, that does not exceed the annual increment of timber; Absence of forest maintenance and restoration measures;	Degradation of forests and soil of adjacent territories; sharp decrease of climate and water regulatory functions; Deterioration of water balance and shortening of water resources; Decreasing of biodiversity and extinction of rare species; Ecosystem degradation.	**Whole watershed**
		On the ecological condition of the whole water catchment area.	8	8			
		On socio-economic conditions: dwellings, infrastructure, agriculture.	5	4			

Topic:: Land Resources

#	Priority Issue	Criteria: Negative Impact	Maximum Attainable Score	Scoring Result	Causal-Chain Analysis		
					Causes	**Negative Impacts/Impacts on Other Resources**	**Scale of the Impact**
1.	Soil degradation (Total score: 16)	On the health of population	10	7	secondary bogging of soils; Overgrazing and uncontrolled grazing; unsustainable pasture management (absence of pasture vertical zoning and rotation, absence of optimum grazing loads, etc).	Reduction of soil stability (thickness of the soil); stream/lake sedimentation. degradation of ecosystems within the KNP and its buffer zones. Pasture erosion and loss of its productivity;	**Entire watershed.**
		Watershed ecology.	8	6			
		Social-economic conditions: housing, infrastructure and agriculture.	5	3			
2.	Loss of high productivity agricultural lands and changes in land use Total score: (Total score: 17)	On the health of population	10	8	Improper land cultivation; destruction of windbreaks. Absence of land reclamation measures. Use of valuable agricultural land for non-agricultural purposes. Unsustainable agricultural practices;	Loss of agricultural land productivity and total area of productive lands; generation of eroded sections;	Entire watershed.
		Watershed ecology.	8	6			

		Social-economic conditions: housing, infrastructure and agriculture.	5	3	Damaged drainage systems.		
3.	Land pollution (Total score: 17)	On the health of population	10	8	Pollutants leaching from waste dumps, open-pit mines, and pit latrines; Urban storm water and agriculture runoff; Untreated wastewater discharge; Absence of regulatory and law enforcement mechanisms for soil quality; Absence of effective waste and wastewater control regulatory and/or economic mechanisms; Absence of financial, technical, and human resources for implementing effective waste management and water sanitation policies; Absence of soil quality monitoring system.	Loss of land productivity; Pollution of underground and surface waters; Decreased biodiversity.	Entire watershed.
		Watershed ecology.	8	5			
		Social-economic conditions: housing, infrastructure and agriculture.	5	4			

Topic:: Waste Management

#	Priority Issue	Criteria: Negative Impact	Maximum Attainable Score	Scoring Result	Causal-Chain Analysis		
					Causes	Negative Impacts/Impacts on Other Resources	Scale of the Impact
1	Unsanitary (which are not in compliance with environmental norms) legal and illegal landfills in the pilot municipalities	On the health of population	10	8	Landfills constructed during the Soviet period without any projection of environmental protection measures; Absence of waste collecting and transportation services in the villages; Low level of awareness in the local population;	Polluted water, soil, and air in recreational and other territories; Impedes development of tourism.	Watershed level.
		Watershed ecology.	8	7			

	(Total score: 19)	Social-economic conditions: housing, infrastructure and agriculture	5	4	Limited financial and personnel capabilities in the municipalities. Lack of technical equipment (e.g., containers, garbage trucks, etc.); Weak legislation on waste management.		
2.	Absence of waste re-use and recycling capacities and practices. (Total score: 11)	On the health of population	10	4	Absence of relevant infrastructure to process waste, including collection stations for recyclable materials; Low level of awareness in the local population; Weak legislation on waste management.	Large quantity of waste, including nondegradable waste in landfills; Loss of land resources for landfills.	Watershed level.
		Watershed ecology.	8	4			
		Social-economic conditions: housing, infrastructure and agriculture.	5	3			

Topic: Water Resources

#	Priority Issue	Criteria: Negative Impact	Maximum Attainable Score	Scoring Result	Causal-Chain Analysis		
					Causes	**Negative Impacts/impacts on Other resources**	**Scale of the Impact**
1.	Increased floods and flash floods. (Total score: 22)	On the health of population	10	10	Unequal river runoff distribution among various seasons; Increased precipitation due to climate change; Poor infrastructure: drainage systems and flood control structures.	Secondary bogging of large territories; Distribution of insects and algae; negative impacts on aquatic biota; increase in evapotranspiration, change in ground water table and negative impacts on soil cover and local climate; reduction of productive agricultural lands and agricultural output; damage to houses and local	Entire watershed.
		Watershed ecology.	8	7			
		Social-economic conditions: housing, infrastructure and agriculture.	5	5			

						infrastructure.	
2.	Water pollution (surface and underground). (Total score: 13)	On the health of population	10	7	Poor infrastructure of legal and illegal landfills; Amortized centralized sewage systems in the cities and absence of waste water treatment plants; Absence of sewage networks in villages; Agriculture and urban runoff; Wastewaters drained from Chiatura manganese mine and enrichment plant; Poor monitoring systems for ambient water quality (underground and surface); Absence of effective regulations, including standards for wastewater discharges; Absence of a common effective policy on waste management; Poor law enforcement.	Deterioration of the water ecosystem. Decreased biodiversity in surface waters;	Watershed level.
		Watershed ecology.	8	5			
		Social-economic conditions: housing, infrastructure and agriculture.	5	1			

Topic: Water supply systems

#	Priority Issue	Criteria: Negative Impact	Criteria: Negative Impact	Maximum Attainable Score	Causal-Chain Analysis		
					Causes	Negative Impacts/Impacts on Other Resources	Scale of the Impact
1.	Poor drinking water quality. (Total score: 10)	On the health of population	10	7	Water supply system headworks are not protected; Intakes of the headworks and pipes are depreciated;	-	Selected communities.
		Watershed ecology.	8	1			

		Social-economic conditions: housing, infrastructure and agriculture.	5	2	headworks are faulty: they do not have the capacity for even crude technological processing (purifying, filtering) and they are missing components such as filters, clean water reservoirs, and sediment traps; Absence/insufficient water disinfection; No state monitoring of water quality.		
2.	Shortage/Poor availability of drinking water. (Total score: 9)	Community health.	10	7	Absence of centralized water supply systems in many villages and uncontrolled use of water through individual wells; Insufficient technical condition of intakes; Significant water loss due to depreciated/damaged main pipes and internal networks; Irrational water distribution due to absence of storage reservoirs and, in some cases, due to incorrect construction of the system; Inadequate funding to rehabilitate existing systems/build new efficient systems; Absence of effective water use tariffs and implementation systems (e.g., proper institutions, billing and bill collection systems, penalties).	Shortage of drinking water; high losses in the system; reduction of source water due uncontrolled abstraction of water from individual wells.	Selected communities.
		Watershed ecology.	8	1			
		Social-economic conditions: housing, infrastructure and agriculture.	5	1			

Topic: Biodiversity

#	Priority Issue	Criteria: Negative Impact	Maximum Attainable Score	Scoring Result	Causal-Chain Analysis		
					Causes	**Negative Impacts/Impacts on Other Resources**	**Scale of the Impact**
1.	Degradation of natural ecosystems and biomes through destruction,	On the health of population	10	7	Overgrazing, intensive forest cutting; Unsustainable harvesting of species; poaching; Introduction of invasive species and	Degradation of wetland habitats; reduction of wetlands' water retention	Watershed level
		Watershed ecology.	8	8			

	modification and/or transformation; Destruction of habitats. (Total score: 20)	Social-economic conditions: housing, infrastructure and agriculture.	5	5	unsustainable tourism; peat extraction; Draining of wetlands; Burning of wetlands; Poor biodiversity-related legislation, policy, and planning; Weak enforcement of biodiversity and forest management laws and regulations; Poor economic conditions of rural communities heavily dependent on local resources for their subsistence Low public awareness of environmental protection.	and purification capacities; intensification of coastal erosion; loss of species, particularly wetland species, including birds, reptiles, fish, relict, rare and endemic plant species; reduction of ecotourism potential of the region.	

Topic: Agriculture

#	Priority Issue	Criteria: Negative Impact	Maximum Attainable Score	Scoring Result	Causal-Chain Analysis		
					Causes	**Negative Impacts/Impacts on Other Resources**	**Scale of the Impact**
1	Loss of traditional, endemic species (e.g., lentil, chickpea, flax, wheat) and wide use of GMOs. Total score: 16	On the health of population	10	8	Lack of control of gene-manipulated materials and products; Wide use of mass-production crops; Loss of local knowledge of traditional agriculture.	Agricultural genetic erosion.	**National**
		On the ecological condition of the whole water catchment area	8	5			
		On socioeconomic conditions: dwellings, infrastructure, and agricultural fields.	**5**	**3**			

Annex 4. Summary of priority problems of the Lower Rioni pilot Watershed Area

#	Area	Priority Issue	Watershed/Ecosystem Value/Function/Service Impacted	Max. Score	Scoring
1.	Forest Resources	**1. Deterioration of overall quality of high conservation value forests;** **2. Reduction of timber resources.** Immediate/underlying causes – problem 1 and 2: unsustainable use of timber resources, including uncontrolled cutting of trees for firewood; overgrazing in forest ecosystems; cutting of forests for implementation of land development projects; absence of forest maintenance and/or restoration measures. Root causes – problem 1 and 2: application of unsustainable silviculture methods, e.g. clearcutting; lack of financial, technical and financial resources to carry out afforestation/reforestation measures; underutilization of alternative energy sources; poor economic sense of local population that limits access to secure energy sources (gas, electricity, etc.); local population's lack of awareness on energy saving and efficiency measures; absence of a common forest management policy, effective legislation and regulations; absence of forest inventory and monitoring systems; absence of effective law-enforcement system.	Human health	40	**40**
			Drinking water supply	40	**20**
			Ecosystem integrity/conservation value	40	**40**
			Disaster risk reduction	40	**30**
			Energy resources	30	**10**
			Forest resources used as fuel	30	**30**
			Agricultural production	30	**10**
			Provision of reserves of mineral resources.	30	**20**
			Cultural value	20	**10**
			Ecotourism	20	**20**
			Recreation	20	**20**
Total score					***250***

#	Area	Priority Issue	Watershed/Ecosystem Value/Function/Service Impacted	Max. Score	Scoring
2.	**Water Quantity**	**1. Poor access to drinking water and reduction of water sources; 2. Increase in the frequency and intensity of floods and flash floods.** Immediate/underlying causes - problem 1: existence of inefficient and outdated centralized water supply systems in urban areas and few villages; absence of centralized rural water systems in the absolute majority of villages; extraction of drinking water from individual/common wells; Root causes – problem 1: lack of financial, technical and human resources for rehabilitating existing systems and/or building new efficient systems; absence of effective water use tariffs and implementation systems (appropriate institutions, billing and bill collection systems and penalties). Immediate/underlying causes – problem 2: deterioration of existing drainage systems and flood control structures and/or absence of such systems; river bank and bed erosion, riverbed sedimentation/silting, coastline erosion and loss, naturally occurring tectonic and geodynamic process including, eustasy, intensification of sea surges and storms, etc. Root causes – problem 2: lack of technical, human and financial resources to properly design, construct, operate and maintain drainage systems and flood control structures; climate change and change in seasonal river runoff due to: a) forest degradation/decline as a result of unsustainable timber harvesting and absence of proper legal-regulatory, policy and institutional frameworks; b) extensive extraction of sand and gravel from riverbanks and beds without any environmental consideration, river bed diversion, construction and operations HPPs in the upstream areas of the river basin, etc.	Human health	40	**40**
			Drinking water supply	40	**40**
			Ecosystem integrity/conservation value	40	**40**
			Disaster risk reduction.	40	**40**
			Energy resources	30	**10**
			Forest resources used as fuel	30	**0**
			Agricultural production.	30	**15**
			Provision of reserves of mineral resources.	30	**20**
			Cultural value	20	**20**
			Ecotourism	20	**20**
			Recreation	20	**20**
Total score					***265***

#	Area	Priority Issue	Watershed/Ecosystem Value/Function/Service Impacted	Max. Score	Scoring
3.	**Water Quality**	**1. Pollution of surface and ground waters;** **2. Contamination of tap water** Immediate/underlying causes – problem 1: discharge of untreated wastewaters from point sources of pollution (sewerage systems, upstream and local industries, etc.) into surface waters; agriculture and urban runoff; drainage of storm waters and seepage of leachates from controlled and uncontrolled waste disposal sites, open pit mines, dry pit latrines; Root causes – problem 1: deteriorated or absent sewerage systems; absence of wastewater treatment facilities; absence of standard-based sanitary landfills and poor condition of existing landfills; non-proper agricultural practice; lack of state finances to rehabilitate/build centralized sewerage systems and construct WWTPs and standard-based landfills; poor ambient water quality and soil monitoring; absence of effective regulations, including standard for wastewater discharges; absence of a common effective policy on waste and water management; weak law enforcement; low environmental consciousness of local communities. Immediate/underlying causes - problem 2: deteriorated drinking water supply infrastructure or absent infrastructure in the majority of the villages; absence of sanitary zones/lack of protection of zones around existing water sources; absence of tap water treatment in virtually all communities with centralized water supply systems; Root causes – problem 2: shortage of funds to rehabilitate existing centralized systems or to build new systems; absence of effective regulations, weak law enforcement and monitoring mechanisms; low local capacity for tap water quality and environmental pollution control; low environmental consciousness of local communities	Human health	40	**40**
			Drinking water supply	40	**40**
			Ecosystem integrity/conservation value	40	**40**
			Disaster risk reduction	40	**0**
			Energy resources	30	**0**
			Forest resources used as fuel	30	**0**
			Agricultural production	30	**25**
			Provision of reserves of mineral resources.	30	**0**
			Cultural value	20	**20**
			Ecotourism	20	**20**
			Recreation	20	**20**
Total score					***205***

#	Area	Priority Issue	Watershed/Ecosystem Value/Function/Service Impacted	Max. score	Scoring
4.	**Waste Management**	**1. Poor sanitary-hygienic conditions in urban and rural settlements;** **2. Pollution of streams, rivers, groundwater and soil from waste dumped in dry ravines, drainage canals and riverbeds, as well as from seepage of pollutants from controlled and uncontrolled waste disposal sites.** Immediate/underlying causes - problem 1: substandard waste collection, transportation and disposal systems in the urban areas and nonexistence of these systems in the vast majority of villages; existence of illegal and uncontrolled dumpsites Root causes – problem 1: lack of financial, technical and human resources/capacity to organize effective waste collection, transportation and disposal systems; absence of effective waste collection and disposal tariffs; poor enforcement of tariff collections. Immediate/underlying causes - problem 2: unsanitary and poor ecological conditions of existing legal landfills, proximity of waste disposal sites to streams and settlements; improper operation and maintenance of existing waste disposal sites. Root causes problem 2: lack of financial, technical and human resources to build standard-based sanitary landfills and/or properly operate and maintain existing facilities; absence of waste recycling and processing practices and amenities; absence of common standard-based legal-regulatory, policy and institutional frameworks in the area of waste management; weak environmental monitoring and law enforcement; low environmental consciousness of local communities.	Human health	40	**40**
			Drinking water supply	40	**30**
			Ecosystem integrity/conservation value	40	**40**
			Disaster risk reduction	40	**0**
			Energy resources	30	**0**
			Forest resources used as fuel	30	**0**
			Agricultural production	30	**20**
			Provision of reserves of mineral resources.	30	**0**
			Cultural value	20	**20**
			Ecotourism	20	**20**
			Recreation	20	**20**
Total score					***190***

#	Area	Priority Issue	Watershed/Ecosystem Value/Function/Service Impacted	Max. Score	Scoring
5.	Land Resources	**1.Soil bogging, wind and water induced soil erosion, river bank and coastal erosion;** **2. Loss of productive agricultural lands and high conservation value natural ecosystems, including floodplain forests, wetlands, etc.;** **3. Soil contamination.** Immediate/underlying causes - problem 1: poor land reclamation caused by improper drainage of agricultural lands or absence of such mechanisms; lack of flood control structures on river banks, river bed diversion or other changes in river hydromorphology as a result of various instream manipulations; eustasy and tectonic subduction of land; uncontrolled and excessive grazing, uncontrolled land cultivation, unrestrained forest cutting; Root causes – problem 1: lack of financial, technical and human resources to rehabilitate existing drainage and flood control systems, design and build new and more efficient systems as well as to implement erosion control/land reclamation measures; absence of policy/plan for sustainable land management; absence of effective land use tariffs and implementation mechanisms; low awareness of local farmers on sustainable water and land use and good agriculture practices; lack of the scientific knowledge on human and climate change impacts on coastal erosion, etc. Immediate/underlying causes - problem 2: application of unsustainable agricultural practices; destruction/elimination of windbreaks; overgrazing and uncontrolled timber harvesting; infrastructure development activities without considering and mitigating expected environmental impacts; uncontrolled peat extraction; Root causes – problem 2: absence of effective agricultural land management policy, including land use planning and its implementation mechanisms (e.g., land use zoning, land inventory and monitoring, land use fees, land allocation, etc.); absence of proper zoning or other regulatory or economic mechanisms for sustainable pasture management; absence of sustainable forest management laws, policies and effective mechanisms for law enforcement; lack of local knowledge on good agriculture	Human health	40	**30**
			Drinking water supply	40	**25**
			Ecosystem integrity/conservation value	40	**40**
			Disaster risk reduction	40	**40**
			Energy resources	30	**0**
			Forest resources used as fuel	30	**0**
			Agricultural production	30	**30**
			Provision of reserves of mineral resources.	30	**0**
			Cultural value	20	**10**
			Ecotourism	20	**15**
			Recreation	20	**15**

		practices; absence of common effective policy and its implementation mechanisms for forest management. Immediate/underlying causes - problem 3: leaching of pollutants from waste dumps or waste burial sites, open-pit mines and pit latrines; pollution from urban and agriculture runoff; discharge of untreated wastewaters into the earth's surface. Root causes – problem 3: improper use of agrochemicals; poor knowledge on the optimum agrochemical inputs; absence of regulatory and law enforcement mechanisms for soil quality; absence of effective environmental pollution control regulatory and/or economic mechanisms; absence of financial and technical resources for implementing effective environmental control policies, including policies for waste and wastewater management.			
Total score					***205***

#	Area	Priority Issue	Watershed/ecosystem Value/Function/Service Impacted	Max. Score	Scoring
6.	**Biodiversity**	**1. Degradation (destruction, modification/transformation) of natural ecosystems and biomes (e.g., wetlands, floodplain forests, sand dunes, etc.);** **2. Species loss and decrease in wildlife populations;** **3. Loss of traditional and endemic species (e.g. lentil, chickpea, flax, wheat etc.);** **4. Widespread use of GMOs** Immediate/underlying causes - problem 1: overgrazing; intensive forest cutting; introduction of invasive species; poaching and unsustainable tourism; uncontrolled peat extraction; instream operations, including extraction of sand and gravels from river beds and terraces; artificial fires; land clearing for infrastructure and other economic development activities in protected wetlands and its buffer zones.	Human health	40	**25**
			Drinking water supply	40	**0**
			Ecosystem integrity/conservation value	40	**40**
			Disaster risk reduction	40	**0**
			Energy resources	30	**0**
			Forest resources used as fuel	30	**0**
			Agricultural production	30	**30**

		Immediate/underlying causes - problem 2: poaching; overfishing; distribution of invasive species; implementation of infrastructural projects in areas rich in biodiversity without conducting environmental impact assessment and mitigation measures; unsustainable tourism. Root causes – problem 1 and 2: inadequate legal-regulatory, policy and institutional frameworks for biodiversity conservation and sustainable utilization; poor biodiversity monitoring and law enforcement capacities, including the lack of technical and financial resources and qualified staff; high local poverty level and low environmental awareness of the local population. Immediate/underlying causes – problem 3: widespread use of mass-production crops. Root causes – problem 3: absence of state policy and its implementation mechanisms on Georgian agrobiodiversity, and the decline of local knowledge on traditional agriculture. Underlying cause – problem 4: wide availability and low cost of GMO seeds and products compared to ecological seeds and products. Root causes – problem 4: low public awareness and absence of legal, policy and institutional frameworks for regulating the use of GMO raw materials and products.	Provision of reserves of mineral resources.	30	**0**
			Cultural value	20	**20**
			Ecotourism	20	**20**
			Recreation	20	**20**
Total score					***155***

Annex 5. Identification of Priority Measures for Lower Rioni Watershed Management Plans - Matrix

Integrated Natural Resources Management in Watersheds (INRMW) of Georgia Program

Identification of Priority Measures for Lower Rioni Watershed Management Plans

Group				
#	Measures	Criteria - Positive Impact on	Maximum possible	Given points
1	Construction/rehabilitation of small-scale sewerage systems for municipal waste waters	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
2	Construction of on-site waste water treatment facilities for municipal centers	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
3	Construction of small scale on-site waste water treatment facilities	Population health	5	

		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
4	Rehabilitation/construction of rural water supply systems	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
5	Rehabilitation/construction of urban water supply systems	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
6	Land erosion protection measures (wind breaks, bogging, etc.)	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and	3	

		their habitats)		
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
7	Cleaning of river beds/catastrophe risk reduction measures	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
8	Construction/rehabilitation of storm water drainage systems	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
9	Improvement of waste collection system	Population health	Population health	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	Environment (ecosystems like forests, plains, floodplains, animal species 1and their habitats)	

		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	
		Total		
10	Existing waste disposal site/landfill improvement measures	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
11	Conservation of the existing landfills/waste disposal sites	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
12	Construction of new modern, high-standard municipal solid waste landfill	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	

		Total		
13	Arranging waste segregation and processing facility in existing/new landfill site	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
14	Construction of municipal/medical waste incinerator	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
15	Afforestation/reforestation activities (floodplain forests)	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
16	Reclamation of pastures	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	

		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
17	Establishment of tree nurseries	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
18	Establishment of farms for utilizing forest non-timber resources	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
19	Establishment of traditional/organic farm(s)	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	

		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
20	Measures against invasive species (“American butterfly”)	Population health		
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)		
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)		
		Total		
21	Establishment of hunting farm(s)	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
22	Establishment of fish farm(s)	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
23	Implementation of low-	Population health	5	

	cost energy efficiency measures	Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
24	Rehabilitation/construction of micro to small hydropower plants	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
25	Installation of solar systems	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
26	Construction of biogas digesters	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	

		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
27	Production of woodwaste pellets/briquettes (construction of pellet/briquette mill or installation of pellet/briquette production line)	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		
28	Eco-tourism development supportive measures	Population health	5	
		Environment (ecosystems like forests, plains, floodplains, animal species and their habitats)	3	
		Social-economic conditions: (homes, infrastructure, agriculture lands, etc.)	3	
		Total		

List of participants
Names:
1.
2.
3.
4.
. . .

Annex 6: List of Participants and Agenda of the Workshop on Identification of INRMW Priority Actions, Lower Rioni Pilot Watershed Area

Integrated Natural Resources Management in Watersheds (INRMW) of Georgia Program

Workshop on Identification of INRMP Priority Actions
Pilot Territory of the Downstream Areas of the River Rioni Watershed
13 September, 2012,
Venue: Anaklia. Hotel "Golden fleece"

The workshop is organized by GLOWS consortium members - ***Representative Office of Florida International University in Georgia*** (ROFIU-GE) and ***CARE International in Caucasus*** (CARE) with content wise contribution from all INRMW partners

Purpose of INRMP Priority Actions Identification Workshop is to discuss with local stakeholders the INRMP potential interventions and prioritize them through stakeholder participation

Agenda

Participants - Local authorities, Trustees of Selected Communities and CIG representatives of Khobi and Senaki Municipalities, GLOWS/INRMW program team, USAID

12.00-12.30 Registration
12.30-13.15 Welcoming & introduction by ROFIU-GE and Care
13.15-13.45 Presentation of watershed interventions, ROFIU-GE team
13.45-14.00 Q&A, discussion
14.00-15.00 Break
15.00-15.30 Presentation of IRNMP actions prioritization methodology, including criteria, FIU-GE
15.30-16.00 Q&A
16.00-17.00 INRMP actions prioritization exercise (work in 2/3 break-up groups)
17.00-17.45 Five minute Presentations by breakup groups, Q&A
18.00 Wrap-up and closing remarks

List of Invitees

#	Name/Title
1	Mariam Shotadze, USAID/GLOWS INRMW Program Country Director, ROFIU-GE
2	Eliso Barnovi, USAID/GLOWS INRMW Program Country Deputy Director, ROFIU-GE
3	Malkhaz Adeishvili, USAID/GLOWS INRMW Program Community Engagement Component, Grants Manager, Care International
4	Nino Kikabidze, USAID/GLOWS INRMW Program Community Engagement Component, Field Coordinator, Care International
5	Giorgi Shamugia, USAID/GLOWS INRMW Program Community Engagement Component, Community Mobilizer, Care International

6	Nana Kvrivishvili, USAID/GLOWS INRMW Program Community Engagement Component, Governance Officer, Care International
7	Mariam Bakhtadze, USAID/GLOWS INRMW Program Energy Analysis Component, Team Leader, Winrock International
8	Irakli Kobulia, USAID/GLOWS INRMW Program DRR and CC component, Manager, CENN
9	Paata Shanshiashvili, USDoI-ITAP, Manager
10	Vakhtang Lekveishvili, USAID/GLOWS INRMW Program Energy Analysis Component, Winrock International
11	Gela Beridze, Specialist
12	Ramazi Bjalava, Poti community member
13	Shorena Beraia, Tchaladidi community Trustee
14	Gulnazi Jishkariani, Tchaladidi community
15	Leri Tkebuchava, Zani community specialist
16	Mikheil Khorava, Zani community representative
17	Mamuka Chokobava, Dzveli Senaki community representative
18	Aleksandre Janjgava, Dzveli Senaki community representative
19	Lasha Janashia, Upper Tchaladidi community member
20	Rusudan Abramia, Upper Tchaladidi, Librarian
21	Khatia Gvichia, Teacher, Sagvichio
22	Inga Bjalava, Technologist, Gejeti
23	Zurabi Bualava, Economist, Gejeti
24	Jimsheri Silagava, Trustee, Gejeti
25	Vitali Gvichia, Sagvichio trustee
26	Nani Gogia, Senaki , Akhalsopeli community trustee
27	Tengiz Gvinjalia, Akhalsopeli community, Accountant
28	Gulsunda Kuchava, Tevlati community member
29	Marine Gvaramia, Tevlati community member

Global Water for Sustainability Program

Florida International University

Biscayne Bay Campus

3000 NE 151St. ACI-267

North Miami, FL 33181 USA

Phone: (+1-305) 919-4112