

## **SEA Pilot Project in Georgia**

# **SEA for the National Waste Management Strategy (2016-2030) and Action Plan (2016 – 2020)**

## **Scoping Report**

Tbilisi

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### **About SEA**

Strategic Environmental Assessment (SEA) effectively promotes sustainable development by mainstreaming environment and health considerations into economic development at a national, regional and local level.

SEA is a well-established, practical planning and governance tool. Efficient application of SEA brings a number of benefits. SEA, for instance, can:

- ensure that strategic and planning documents in key sectors such as energy, transport, agriculture, urban development water and waste management are in line with existing objectives and commitments regarding environment and health protection;
- help identifying the most sustainable and cost-effective strategic development alternatives, which would both attract new investments as well as protect environment or human health;
- strengthen the country's environmental governance through fostering transparency and consultation with relevant stakeholders and the public prior to the approval of plans and programmes.
- facilitate regional cooperation on environmental and health matters.

### **About Protocol on SEA**

The UNECE Protocol on SEA to the Convention on Environmental Impact Assessment (EIA) in a Transboundary Context (Espoo Convention) provides an international legal framework for SEA. It was adopted by an extraordinary Meeting of the Parties to the Espoo Convention during the Ministerial 'Environment for Europe' Conference (Kyiv, Ukraine) in May 2003. The Protocol on SEA is open for all countries of United Nations to become a Party to the Protocol.

### **About UNECE technical assistance on EIA and SEA**

Since 2004 the Secretariat to the Espoo Convention (hereinafter also 'UNECE Secretariat') has been providing technical assistance and capacity building support to foster ratification of, and accession to, the Espoo Convention and its Protocol on SEA in the countries of Eastern Europe, Caucasus, and Central Asia. Therefore the UNECE Secretariat has a broad experience in assisting the countries in improving their legislative and institutional frameworks for the implementation of both treaties.

For more information about the Protocol on SEA and the UNECE Secretariat please visit:

[http://www.unece.org/env/eia/sea\\_protocol.htm](http://www.unece.org/env/eia/sea_protocol.htm) and <https://www.facebook.com/UNECEpage>

### **About the EaP GREEN programme**

The "Greening Economies in the European Union's Eastern Neighbourhood" (EaP GREEN) programme aims to support the six Eastern Partnership countries: Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine to move towards green economy by decoupling economic growth from environmental degradation and resource depletion.

The programme is structured around three components:

- Governance and financing tools for sustainable consumption and production (SCP) and green economy;
- EIA and SEA accompanying SCP policy implementation;
- and demonstration projects.

Governments and the private sector are the key target groups of EaP GREEN programme.

The programme is financially supported by the European Union and other donors, and is jointly implemented by four international organizations: OECD, UNECE, UNEP, and UNIDO.

The total EaP GREEN budget for a period of implementation of 48 months is 12.5 million Euros. Although the programme is regional, many of its activities are implemented nationally and the results are shared in various regional forums.

### **EaP GREEN programme activities in Georgia**

The EaP GREEN programme aims to help the Government of Georgia to establish an integrated policy framework for the transition to a green economy. With the funds from the **EU EaP GREEN Programme**, the UNECE Secretariat currently supports the Ministry of Environment and Natural Resources Protection of Georgia in developing its national environmental assessment system in line with the Espoo Convention, the Protocol on SEA and relevant EU Directives.

The activities among others include:

- ✓ ***Improving its legislative and institutional framework to fully comply with the Convention and the Protocol;***
  - Reviews of legislative and institutional frameworks for the application of EIA and SEA procedures (September 2013 – August 2014);
  - Drafting a new law on EIA and SEA based on the results of the review and extensive expert support, numerous meetings of the national working group on drafting the law, consultations with the national stakeholders and broad involvement of civil society (August 2013 – December, 2015);
  - Preparation of the secondary legislation and integration of EIA and SEA schemes in horizontal legislation (planned for 2016).
- ✓ ***Building national and local capacities, developing practical experience and national guidelines in application of the EIA and SEA procedures in line with the both treaties and relevant EU legislation.***
- ✓ ***Pilot application of the SEA procedure to the national Waste Management Strategy and Action Plan (July-December, 2015). Besides analysing likely affects related to the Strategy and Action Plan and suggesting its optimization from environment and health point of view, the SEA pilot also aims at testing the SEA procedure as stipulated by a new draft law on “Environmental Assessment Code”.***
  - Two specific trainings and regular coaching of the national teams by international experts including initial scoping and baseline analysis workshop (via Skype) on 5 August and a training workshop on impact assessment and mitigation measures on 21-22 September.
  - Public consultation meeting on the scope of SEA on 22 September aimed at presenting the preliminary findings of the SEA scoping stage and obtaining feedback from the stakeholders.
  - Final public consultation meeting on 30 October aimed at obtaining feedback from the key stakeholders on the draft Strategy and Action Plan and the preliminary conclusions of the SEA.

#### **Regional sharing events:**

- **The study tour in the Czech Republic on the application of SEA** at national level in the urban planning, waste management, and energy sectors took place on 1-5 December 2014. Five national experts learned about the Czech SEA system and discussed challenges and success factors. (UNECE)
- **A regional conference on developing SEA legislative frameworks** (November 2, 2015, Khatheti, Georgia). Five national experts exchanged experience in drafting SEA / EIA legislation and discussed barriers on adoption of the legislation with their colleagues from Armenia, Azerbaijan, Belarus, Kazakhstan, the Republic of Moldova, the Russian Federation and Ukraine.
- **Regional “Training of Trainers” workshop on the design and delivery of training events on SEA** (November 3 – 6, 2015). Five national experts are able to further support the development of the SEA system in Georgia and provide national and local level trainings on SEA for various stakeholders.
- **Regional Training on quality control of SEA** documentation (planned for 2016, in Ukraine)

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## Acronyms

UNECE - United Nations Economic Commission for Europe

EU - European Union

EIA - Environmental Impact Assessment

SEA - Strategic Environmental Assessment

NEAP - National Environmental Action Plan

NEA - National Environmental Agency

UWSC - United Water Supply Company

GWP - Georgia Water and Power Company

WWTF - Waste Water Treatment Facilities

WRB - World Reference Book

LEPL - Legal Entity of Public Law

UNDP - United Nations Development Programme

POPs - Persistent Organic Pollutants

WWF - World Wild Fund

GDP - Gross Domestic Product

WHO - World Health Organization

DALYs - Disability Adjusted Life Years

NDCC - National Disease Control Centre

## **1. INTRODUCTION**

### **1.1. Background information**

In 2013, Georgia informed the UNECE (United National Economic Commission for Europe) about its commitment to fundamentally reform the existing EIA and SEA systems. Georgia is currently not a Party to the UNECE's Espoo Convention on the Environmental Impact Assessment (EIA) in a Transboundary Context (Espoo Convention) and its Protocol on SEA. To better prepare for accession to the treaty the country needs to undertake a number of steps and develop a national system to apply SEA procedures according to the provisions of the Protocol on SEA. With this purpose the "[Greening Economies in the Eastern Neighborhood](#)" (EaP GREEN) programme implemented by the UNECE with the financial support of the European Commission assists Georgia to develop its national SEA systems and raising awareness and understanding of the benefits of SEA among various stakeholders. Particularly, the pilot SEA project on the Georgia's Waste Management Strategy (Strategy) and Waste Management Action Plan (Action Plan) was designed to assist the Ministry of Environment and Natural Resources Protection of Georgia in: (a) building national institutional capacities and expertise to conduct SEA; (b) providing recommendations for environmental optimization and modifications of the selected strategic documents, and (c) developing recommendations for improvement of national legislative and institutional frameworks on SEA in the country.

### **1.2. Purpose of the Scoping Report**

SEA is defined as *a systematic & anticipatory process, undertaken to analyze environmental effects of proposed plans, programmes & other strategic actions and to integrate findings into decision-making.*

The scoping is an important early step in SEA. It is a simple structured method for identifying key sustainability risks or issues related to a plan or a programme (PP) under preparation. The scoping should identify relevant environmental (and health) issues, to be further considered within the SEA, and (as far as possible):

- define territorial dimension of the assessment;
- identify stakeholders to be involved; and
- suggest what methods or specific questions shall guide further analyses within the SEA process.

The scoping is important for efficiency of the SEA process, since it ensures that the SEA focuses only on the likely significant effects which are relevant for the proposed PP.

This SEA Scoping Report aims at identifying the key environmental (and public health) issues relevant to the Waste Management Action Plan implementation, and helps focus further analytical steps of SEA on important issues.

Since the SEA was initiated at an early stage of the Action Plan preparation, when the draft Action Plan was not available yet, the information about its content is limited. In order to proceed with the SEA, the Scoping phase was based on the information presented in the Strategy (i.e. the document elaborating general objectives of the waste management, and forming a framework for the Action Plan where more specific measures will be elaborated).

The SEA Scoping for the Action Plan entails several activities, namely:

- Preliminary analysis of the environmental situation (baseline) in Georgia;
- Identification of environmental (and health) policy objectives relevant to the Strategy (and thus potentially to the Action Plan) implementation;
- Identification of the key environmental (and public health) issues relevant to the Strategy (and thus potentially to the Action Plan) implementation; and
- Consultations with stakeholders.

The scoping report were revised and finalized based on the comments collected during the public consultation meeting and followed disclosure period (Please, refer to the Chapter 11). After the completing the Scoping phase, the SEA will proceed with the evaluation of potential environmental impacts/effects of the national Waste Management Action Plan and preparation of the SEA Report.

## **2. INTRODUCTION TO THE WASTE MANAGEMENT STRATEGY AND ACTION PLAN**

This section provides information about the nature of the concerned strategic document as anticipated by the draft law on Environmental Assessment Code<sup>1</sup>:

*Article 25, paragraph 2*

*a) information about the planning authority;*

*b) a brief description of strategic document,  
and paragraph 4*

*a) the aims and nature of proposed strategic document, and possible alternatives;*

*b) the degree to which the strategic document sets a framework for projects and other activities, either with regard to location, nature, size and operating conditions or by allocating natural resources.*

The Waste Management Code, which established the frame for the development of the Waste Management Strategy and the Waste Management Action Plan was adopted in December, 2014 and came into force in January, 2015. The Code is based on the principles and approaches envisaged by the EU-Georgia Association Agreement (AA) and best

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<sup>1</sup> Environmental Assessment Code draft corresponds to the version presented in September, 2015.

international practices. According to the Code “the Ministry of Environment and Natural Resources Protection of Georgia shall develop a National Waste Management Strategy (the Strategy) in compliance with the requirements of the Waste Management Code”. The Strategy shall set out the policy and the objectives in the field of waste management in Georgia”. Further, “in order to achieve the objectives and to comply with the principles established by the law on “Waste Management Code” and the National Waste Management Strategy, a National Waste Management Action Plan every 5 years for a period of 5 years shall be elaborated by the Ministry of Environment and Natural Resources Protection of Georgia together with the competent authorities and submitted to the Government of Georgia”.

The draft Strategy was prepared with the financial assistance of the European Commission and covers a period of 15 years (2016-2030). The Strategy lays down the foundation for Georgia to be able to gradually design and develop a comprehensive waste management system in accordance with the best international practice, as the socio-economic situation will allow for. The Strategy has a strong emphasis on capacity building (competent staff, fiscal means, administrative systems, etc.) in all spheres of government and awareness-raising, in general.

The Strategy covers the waste generated by industry, service sector (offices, etc.), hospitals, agricultural sector, households, medical, hazardous, etc. Given the complexity of the waste management, the Strategy strives to set more general objectives for all types of waste with emphasis on specific waste streams. The Strategy is a general and short policy document, does not contain specific technical or legal proposals for the waste management. It provides a frame for the activities to be furthered in the action plans.

The Draft Strategy consists of 4 chapters. Chapter 1 is an introductory chapter covering general information on the strategy. Chapter 2 describes the existing situation in the waste management sector and provides overview of the challenges to be addressed. The existing situation and challenges are described in brief for each of eight waste sector (as of 2015) including legislation, waste planning, waste management, prevention, reuse, recycle and recovery, cost recovery, extended producers responsibility, waste data management and waste management capacities.

Chapter 3 provides information on the main principles and hierarchy in waste management, which are the base for setting a Vision, Objectives and Targets of the waste management in Georgia.

Chapter 4 provides very short information on the effects of the strategy on the environment with particular attention to its positive effect on occupational health and safety as well as some financial and technical feasibility of implementing the strategy; however, costs of the implementation of the Strategy are estimated as part of the Action Plan.

For the development of the Strategy a planning tool entitled ‘Logical Framework Approach’ (LFA) has been applied (it is described in Annex 1 of the Strategy). It has guided the top-down planning process as follows:

- Vision
- Objectives (for meeting the Visions)

- Targets (for meeting the Objectives)
- Actions (for meeting the Targets)

The Strategy and the Action Plan are two integral parts of the waste management planning system in Georgia. All actions in the Action Plan shall be related to the Strategy's objectives and targets. The Action Plan shall set out the measures to be taken to ensure prevention, re-use, recycling, recovery and disposal of waste. The Ministry of Environment and Natural Resources Protection of Georgia shall submit reports on the implementation of the Action Plan to the Government every three years.

According to the law on "Waste Management Code" the Action Plan shall contain the following information:

- a) the type, quantity and source of waste generated within the territory of Georgia, and an evaluation of the development of waste streams expected in the future;
- b) available data related to the import and export of waste including forecasts on the waste likely to be shipped from or to the territory of Georgia;
- c) existing waste collection systems and major disposal and recovery facilities, including for specific waste streams or hazardous waste;
- d) an assessment of the need for the closure of existing waste treatment facilities, additional waste treatment infrastructure and new collection systems;
- e) information on the location criteria for site identification and on the capacity of future disposal or recovery facilities;
- f) the locations for the regional landfills and the timeframe in which the operation shall start;
- g) planned waste management technologies and methods, including for waste posing specific management problems;
- h) measures for the prevention of waste and progress indicators for the planning period;
- i) organizational aspects related to waste management including a description of the allocation of responsibilities between public and private actors carrying out the waste management;
- j) any existing and planned arrangements for inter-municipality waste collection and waste treatment facilities;
- k) information provision and the use of awareness campaigns relating to waste management;
- l) historically contaminated waste disposal facilities and measures for their rehabilitation;
- m) the way and timeframe in which the proposed measures shall be implemented, the responsible person(s) and estimated costs and sources for financing;
- n) other information considered relevant.

The Action Plan sets frame for each municipality to adopt a plan for the management of the municipal waste produced within its territory for a period of five years.

### **3. PRELIMINARY BASELINE ANALYSIS**

This chapter presents the results of the preliminary analysis of the environmental and public health situation related to the Strategy. It establishes the environmental baseline allowing for the identification of key environmental and public health issues relevant to the Strategy, thus preparing the background for the assessment of potential environmental and health effects of the Action Plan.

#### **3.1. Water and Soil**

Georgia is rich in water resources. The total actual renewable water resources from rivers and renewable groundwater resources are estimated at 61.5 billion m<sup>3</sup> per year, there is sufficient water in Georgia to meet the actual demands. However, water is distributed unevenly, predominantly located in the west, while the eastern regions frequently suffer from water shortages. In general, available resources of fresh water in Georgia are being formed out of the surface and ground waters representing the rivers, ground water aquifers, as well as the water of the glaciers, lakes, water reservoirs and swamps.

Rivers in Georgia mainly have features typical for Mountain Rivers: highly ranging gradients and slopes, temporary flood/mud water in small rivers and river beds, snow and rainfall and ground water feeding of the rivers, and spring high waters. Rivers are being mostly fed by the glaciers, atmospheric precipitation and ground waters. Water in the majority of the Mountain Rivers is fresh and can classify as potable water.

##### **3.1.1. Surface water**

Due to insufficient monitoring of surface water bodies, data for surface water quality are limited ([See Annex 1: Surface River Monitoring Stations for 2011-2015 years](#)). However, even the limited existing monitoring data indicate that pollution from urban wastewater discharges is a general problem. High levels of ammonia are reported for most of the observed rivers. Concentrations of heavy metals exceed permissible levels at certain locations on particular rivers ([See Annex 2: Trends of Pollution of the Rivers of the Caspian Sea and the Black Sea](#)).

Major issues related to water pollution are due to wastewater discharges from the municipalities, industries and agriculture, causing pollution of both surface water and groundwater and irrigational water. In Georgia, large industrial facilities producing manganese, copper and gold mining and processing plants, oil refineries and power plants pollute the river bodies of the Black Sea and the Caspian Sea basins with heavy metals, oil products and other toxic substances.

Industrial sectors significantly affecting the surface water quality are mining, oil production and food industry. Other sources are sanitary landfills, illegal dumpsites and agricultural

activities. Untreated municipal wastewater is responsible for 67% of all surface water pollution (NEAP, 2012 –2016).

Most of the official municipal landfills operational today do not have a groundwater protection barrier and a leachate collection/treatment system. Some of the landfills are located on riverbanks or water-tracing gorges, creating a risk for surface and ground water pollution.

The largest source of pollution is municipal wastewater, which pollutes the rivers downstream of large cities with organic matter, suspended solids, ammonia, detergents, etc. polluting surface water with heavy metals, oil products, and other hazardous substances.

Water pollution is connected to human activity. It comes from point and non-point sources.

**Point sources:**

1. Municipal sewage from cities and settlements.
2. Industrial wastewater.
3. Wastewater from hospitals, recreation and other health centers.

**Non-point sources:**

1. Surface run-off from agricultural fields.
2. Storm runoff from cities and landfills.

**Point sources:**

Municipal sewage from cities and settlements pollute water with organic matters, nitrogen and phosphorus compounds. Most polluted rivers are the Kura, Vere, Alazani, Algeti, Suramula (the Caspian Sea basin) and Rioni (the Black Sea basin). There are centralized sanitation systems in 45 cities including 33 with treatment facilities. They were built in 1972-1986 and mostly are out of operation, the rest work unsatisfactorily. Biological treatment is practically absent.

Industrial wastewater brings heavy metals; in particular cases also oil products, phenols, etc. Most polluted rivers in the Kura basin are:

- the Kura River section within Tbilisi and Rustavi (ammonia and bacteriological pollution);
- the Kazretula River and Mashavera as well as the Foladauri River at some places (heavy metals). Based on the information of the National Environmental Agency most polluted rivers in the Black sea basin are:
- The Kvirila (manganese ions);
- The Rioni and its tributary Ogaskura (ammonia ion);
- The Tkibuli (mechanical pollution from coal mining industry);
- The Kubiszkali (ammonia ion, oil products); and
- The Luhumi (arsenic ion).

Since 1992 due to economic crisis industrial production has fallen down to approximately 15-20% of the designed one, and the consumed water reduced. Presently, some large plants start to operate and have some perspectives for development.

Food industries are connected to centralized sanitation network and pollution depends on efficiency of municipal services.

Presently, serious problem is lack of water treatment of sewage coming from hospitals, recreation and other health centers. Tuberculosis hospitals in Abastumani are particularly dangerous because have no treatment plants and sewage is discharged directly to the rivers. In Tbilisi, the infectious center also has no treatment facilities.

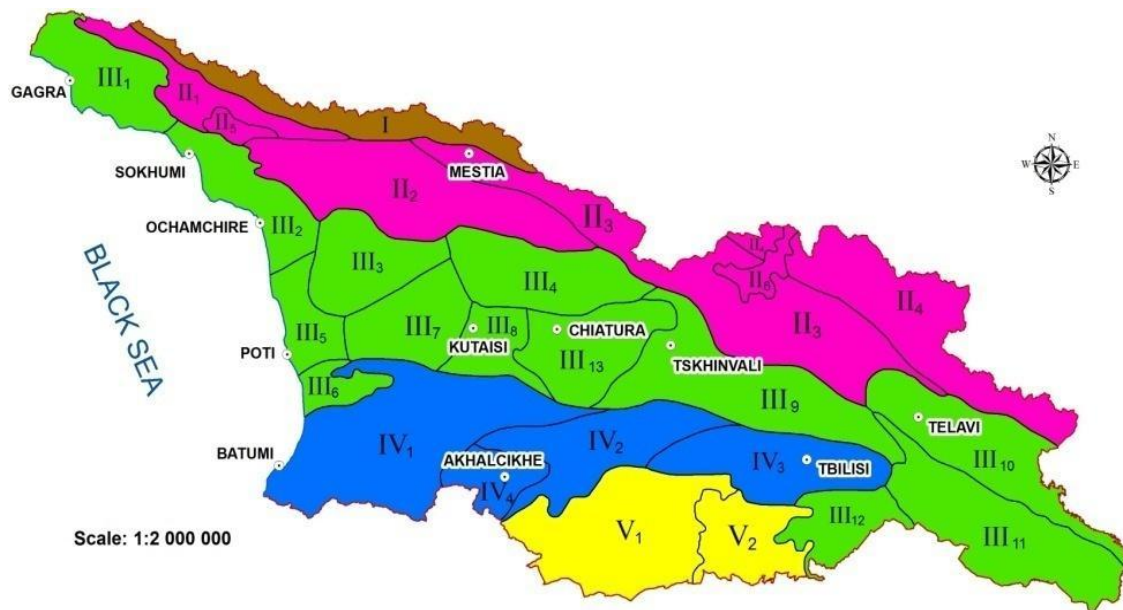
#### **Non-point sources:**

Agricultural waste water brings about mineral fertilizers and pesticides to the surface waters. Storm runoff from cities and landfills also pollute surface waters. Most of Landfills have no treatment facilities and observation wells. They are mostly located on river banks and do not meet water protection requirements.

#### **3.1.2. Underground water**

Georgia is one of the richest countries in the world in terms of groundwater resources. According to the hydrogeological zones, in Georgia there are artesian basins and pressured (confined) groundwater systems, which contain porous, fractured, and fractured/karstic aquifers. They are abundant, renewable and of high quality (Figure 1: Hydrogeological zoning map of Georgia).

**Figure 1: Hydrogeological Zoning map of Georgia (Buachidze, 1970)**





### Legend

Hydrogeological region		Hydrogeological district	
I	Great Caucasus Cristal Substrate groundwater zone		
II	Pressured Water System Zone of Great Caucasus Southern Slope	II <sub>1</sub>	Abkhazian fractured pressured water system
		II <sub>2</sub>	Svanetian crack pressured water system
		II <sub>3</sub>	Mestia-Tianeti fractured and fractured/karstic pressured systems
		II <sub>4</sub>	Kazbegi-Mtatskheta fractured pressured system
		II <sub>5</sub>	Crack groundwater district of Kelasuri crystal massive
		II <sub>6</sub>	Fractured groundwater district of Keli-Kazbegi lava formations
III	Georgian belt Artesian basin zone	III <sub>1</sub>	Fractured and fractured/karstic artesian basin of Bzpi
		III <sub>2</sub>	Porus, fractured and fractured/karstic artesian basin of Kodori
		III <sub>3</sub>	Fractured and fractured/karstic artesian basin of Samegrelo
		III <sub>4</sub>	Fractured and fractured/karstic artesian basin of Racha-Lechkhumi
		III <sub>5</sub>	Porus, fractured and fractured/karstic artesian basin of Kolchheti
		III <sub>6</sub>	Porus and fractured water artesian basin of Guria
		III <sub>7</sub>	Porus, fractured and fractured/karstic artesian basin of Tskaltubo
		III <sub>8</sub>	Porus, fractured and fractured/karstic artesian basin of Argveti
		III <sub>9</sub>	Porus, fractured and fractured/karstic artesian basin of Kartli
		III <sub>10</sub>	Porus, fractured and fractured/karstic artesian basin of Alazani
		III <sub>11</sub>	Porus and fractured water artesian basin of Iori-Shiraki
		III <sub>12</sub>	Porus and fractured water artesian basin of Mamuli-Gardabani
		III <sub>13</sub>	Fractured and fractured/karstic artesian water basin of Dzirula crystal massive
IV	Pressured water systems of Adjara-Trialeti fold mountain zone	IV <sub>1</sub>	Fractured pressured water system of Achara-Imereti
		IV <sub>2</sub>	Fractured and fractured/karstic pressured water system of Trialeti
		IV <sub>3</sub>	Fractured and fractured/karstic pressured water system of Tbilisi
		IV <sub>4</sub>	Fractured water artesian system basin of Akhalikhe
V	Artvin-Bolnisi belt Groundwater zone	V <sub>1</sub>	Fractured water system district of Akhalkalaki lava sheet
		V <sub>2</sub>	Javakheti East slope fractured groundwater district

Natural recourses of fresh groundwater in Georgia compile 573 m<sup>3</sup>/sec (49.5 million m<sup>3</sup> per day) and with its side it is redistributed in the 4 big hydrogeological systems: Great Caucasus water stand system; South Caucasus artesian basin; Lesser Caucasus water stand basin; Artvin-Bolnisi Hydrogeological massive.

Territorially fresh groundwater recourses are distributed unequally. Particularly: 62% comes on West Georgia, East Georgia - 25% and 13% comes on South Georgia. It must be mentioned the high quality of drinking water in this part of Georgia (South Georgia), which is the one of the main alternative supply for Tbilisi.

Fresh groundwater resources are distributed distinctly (unequally) and groundwater level fluctuates from several ten meters to 500 meters deep and in general it changes between 100 - 300 meters.

The country is also rich with thermal waters, which are widely used for balneological purposes (e.g. health resorts such as Borjomi, Tskhaltubo). According to the all above

mentioned the rational assimilation and protection of fresh groundwater in Georgia have the most importance.

Assessment of ground waters carried out in 2000 year revealed significant contamination with organic and non-organic substances. Intensive uses of agrochemicals during the last decades of XX century lead to contamination of surface and ground waters with nitrates, nitrites, and pesticides. These facts indicate the recent pollutions, which are coming not only from the agricultural lands, but also from the industrial wastewaters discharged into the rivers. The first (from the surface) water containing horizon within the limits of these territories is also significantly polluted by ammonia and nitrates. Pollution of ground waters takes place mostly in the regions, where the water supply sources are formed by the filtrates of rivers, or by the insufficiently protected ground water horizons located close to the surface. These horizons are very sensitive to the surface water quality, because they have direct hydraulic connections. Though these water horizons can be easily polluted and often need sanitarian treatment, they are widely used in practice. The ground waters are polluted most of all in locations of discharging of industrial wastewaters, as well as in those areas, where agricultural chemicals leak together with atmospheric precipitations or irrigation waters. The pressured ground water horizons are usually much less polluted. They can be even protected from the pollution by pressure. In many densely populated regions, such as Samegrelo, Ajara-Guria, Kartli, Kakheti, QvemoImereti, where the centralized water systems are operational, some rare cases of pollution of deep artesian horizons were still observed in the last decade of XX century.

Monitoring of groundwater in Georgia has not been conducted during the last several years (data is available for 2014-2015 from the legal entity of public law (LEPL) “National Environmental Agency”). As a result, complete groundwater quality and quantity data are not available. For now groundwater water quality is monitored in 16 points ([See Annex 3: Groundwater Monitoring Stations for 2014-2015](#)). The measures necessary for maintaining and improving the qualitative and quantitative state of the resources have not been determined. Presently, only 29% of the estimated groundwater reserves have been explored and approved. Artesian wells in Alazani, Tskaltubo, Kartli, Marneuli-Gardabani, and Kodori are well-explored, while the big and less Caucasus slopes represent the least studied areas. Groundwater monitoring programme is especially urgent in regions where the groundwater is used intensively. The most important of these are Kolkheti, Alazani-Agrichai, Tiripona-Mukhrani and Marneuli-Gardabani artesian basins

The general state of the environment has a direct influence of the status of groundwater. The environmental quality of soils, surface waters, ambient air and rainfall all have an impact on groundwater quality. Environmental pollutants enter groundwater during the water cycle. Pollutants from soils are carried down to groundwater by percolating rainwater. Pollutants from surface waters also percolate down to the water table. Airborne pollutants such as dust are dissolved by the rain, and deposited onto the soil which then percolates into the groundwater.

The groundwater is mainly affected when pollutants from wastes, agricultural lands and polluted surface waters get into the aquifers. As a result groundwater is polluted by

microelements, non-metals, oil products and pesticides. Pesticides are of most concern as they are persistent in water and the environment, they are toxic and can travel long distances.

Groundwater pollution occurs mostly in areas where groundwater is derived from infiltration of rivers or where little protection is provided by the overburden (thin soils and sub soils) and rock layers over the groundwater aquifer. These aquifers are very sensitive to the surface water quality, because they are in direct hydraulic continuity with surface water. The pressured groundwater horizons are usually much less polluted especially in the high pressure area.

Rational use and protection of ground water resources is very important not only for supplying clean water to local communities but also for its economic value to the country. In the future, more efforts should be focused on exploring fresh, high-pressure groundwater resources to assure that they are well protected against pollution.

### **3.1.3. Water supply and use**

United Water Supply Company (UWSC) is providing water supply and sanitation service in administrative centers through Georgia except Tbilisi, Mtskheta, Rustavi and Ajara region. The cities of Tbilisi, Mtskheta and Rustavi are operated by Georgian Water and Power (GWP) Company.

Majority of the water supply systems in Georgia were built in 1950-1980. During the Soviet era due to the low prices for electric power and the relatively low cost of process equipment, construction of the water supply systems that did not require significant capital investment, but which required a considerably high operational cost, was prevailing. According to the experts' opinion, development of the water supply systems was mainly aimed at the use of new water sources, extension of the pump stations' capacity and the water treatment facilities, as well as the maximum flow capacity of the main water pipelines, etc.

Major part of urban and rural population of Georgia uses the wells and springs for drinking purposes. These sources are not well protected from impact of either anthropogenic or even natural factors. Lowlands and the intermountain regions (Kolkheti Lowland, left bank of the river Alazani, etc), where the whole economic potential is concentrated and where over 80% of major settlements are located, are within the pollution risk zone.

According to the 2014 statistic data, water supply provided at homes, in Tbilisi is 97.5%; in Kvemo Kartli - 45.4%; in Kakheti - 28.3%; 26.3% in Samegrelo; Imereti - 34.3%; for the rest of the regions of Shida Kartli, Samtskhe-Javakheti, Ajara, Guria and Mtskheta aggregated - 42.8%. Overall, the city of Tbilisi and urbanized regions have better access to drinking water. Zemo Svaneti is exception, where most of the water is drawn from individual wells. Obviously, the centralized water supply is a major and important challenge for Georgia.

### **3.1.4. Waste water production and treatment**

Lack of effective water management, absence of effective pollution prevention and water extraction control mechanisms, and poor conditions of municipal wastewater systems are major problems Georgia faces with respect to the surface water sector.

In the settlements without treatment facilities, wastewater is discharged directly to the receiving water, usually through several outlets. In the settlements where Waste Water Treatment Facility WWTF exists and operates, only mechanical treatment is applied. In the settlements where WWTF do not operate, wastewater is discharged directly into the receiving water either through emergency outlets passing the treatment facilities or after all or a part of the technological chain without treatment.

The condition of water and wastewater infrastructure in other settlements is rather lamentable: many facilities are being destroyed, and the equipment is completely worn out and partly lost.

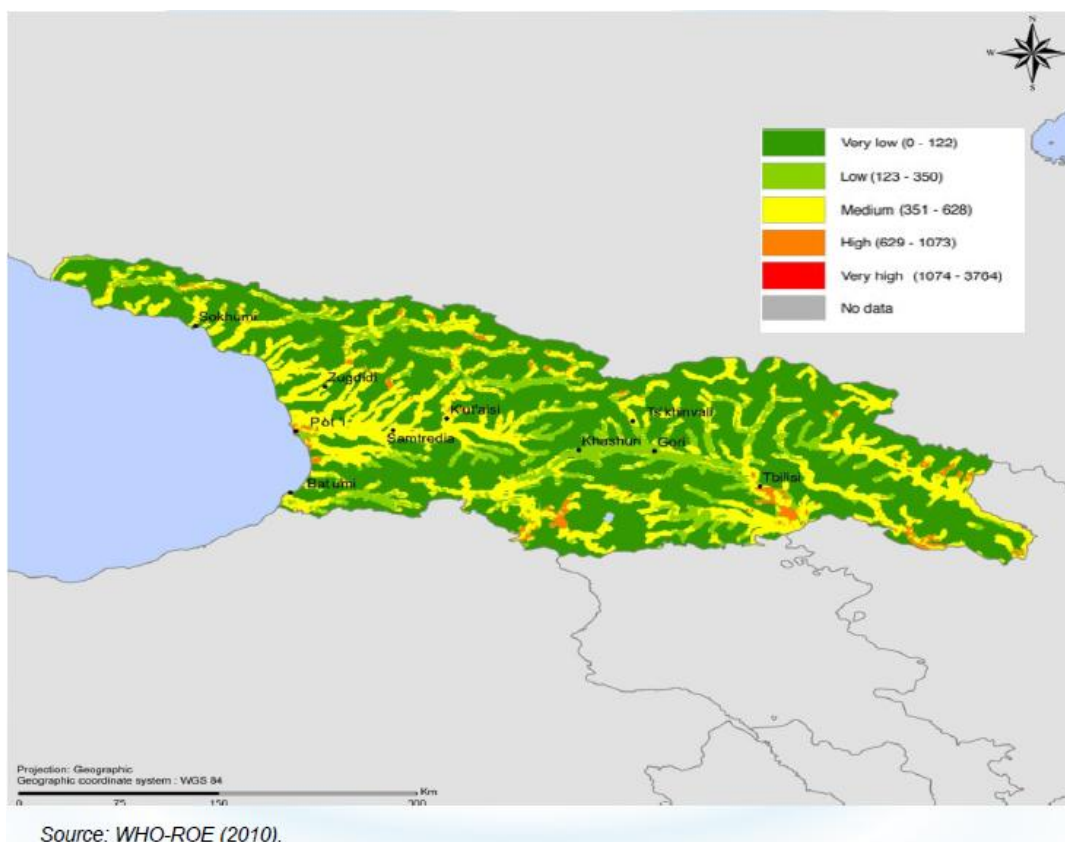
Untreated municipal wastewater is a major cause of surface water pollution in Georgia. Presently, almost all wastewater treatment plants are inoperable. Nationally, there is only one fully operational waste water treatment plant (WWTP) in Sachkhere. Another, in Gardabani, provides only primary, mechanical treatment. The Gardabani WWTP receives municipal wastewaters from the capital, Tbilisi, and the city of Rustavi. One of the most complex and large-scale construction - Wastewater Treatment Plant is also in Adlia, Batumi began in 2010, which consists of the 3 phases including mechanical treatment, biological treatment and discharge into the sea. Today mechanically operated water treatment unit is working.

In accordance with the EU Water Framework Directive each country should take full responsibility for treatment of its effluents.

### **3.1.5. Flood-prone areas**

Flood events are frequent in Georgia. Georgia's flood hazard is mainly medium, although some high hazard areas occur - in upstream areas as well as related to concentrated human activities in rural districts, and the presence of widening floodplains within a (semi) mountainous environment (Figure 2: Georgia Flood Distribution Map 2010). The map shows flood prone areas with low to very high floods and damages.

**Figure 2: Georgia Flood Distribution Map 2010**



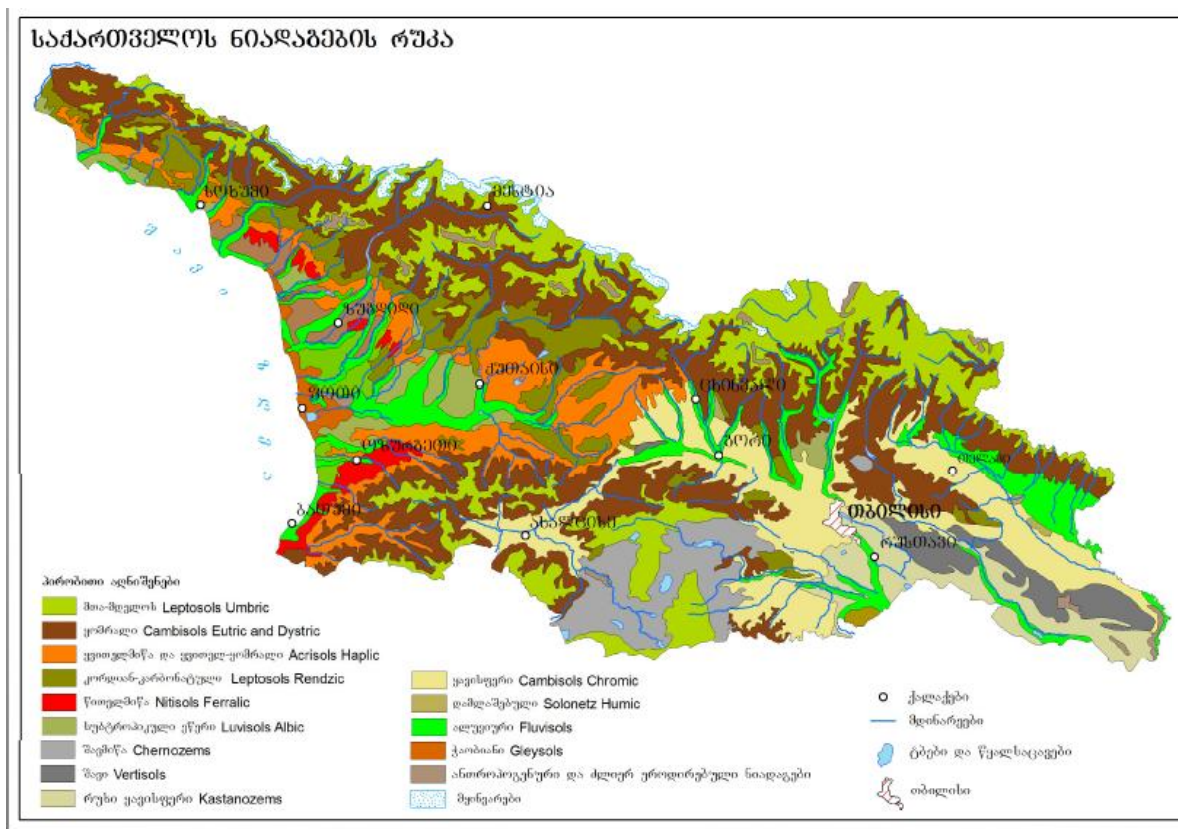
### 3.1.6. Soil

Georgia is a country with very diverse soil types<sup>2</sup>. Distribution of the major soil types are shown on the map (Figure 3: Soil Types of Georgia).

The Soil Map of Georgia at the scale 1:500 000 was published in 1998. The map was composed by more than 50 scientists and practitioners. It was the first map with the legend where soils nominations according to the World Reference of Soil Resources (WRB) were indicated along with national classification.

<sup>2</sup> The major soil types spread in Georgia are the followings: Mountain-Meadow (Leptosols), Brown Forest (CambisolsEutric), Cinnamonic (CambisolsCromic), Alluvial (Fluvisols), Raw Humus Calcareous (LeptosolsRendzic), Yellow Brown Forest (AcrisolsHaplic), Meadow Cinnamonic (Cambisols Chromic), Subtropical Podzols (LuvisolsAlbic), Yellow Soils (AcrisolsHaplic), Red Soils (NitisolsFerralic), Black (Vertisols), Grey Cinnamonic, Meadow Grey-Cinnamonic (Cambisols Chromic, Cambisols Chromic), Chernozems (Chernozems), Bog (Gleysols), Raw Humus Sulphate and Salt (Gypsisols, Solonetz, Solonchaks)

**Figure 3: Soil Types of Georgia**



The National Environmental Agency LELP (operating under the **Ministry of Environment and Natural Resources Protection**) is responsible for the monitoring of the soil quality but unfortunately there is no regular monitoring system on quality of soil. Soil monitoring were updated in 2013 year ([See Annex 4: Number of Soil Monitoring Sites for 2013-2015](#)), analyzes are performed only on heavy metals, pesticides and Total petroleum Hydrocarbons, which is not enough for the describing the picture regarding the soil pollution and particularly in connection with the pollution from dumpsites.

Nevertheless, the National Environmental Agency has carried out a number of projects and studies of outdated pesticides in close proximity to the former storage (storage in the Kakheti region). The samples were taken from the close proximity to the former storage in 2013, and were analyzed for pesticide concentrations. In addition to the National Environmental Agency, the United Nations Development Programme (UNDP) initiated an international tender-based research on "Disposal of POPs Pesticides and Initial Steps for Containment of Dumped POPs Pesticides in Georgia". The project objective directly contributed to the broader goal "support to sustainable development through elimination of POPs from the environment. Within the frames of this project 230 tonnes of soil mixed with pesticides was removed from the Iagluja Mountain for destruction in France and Belgium.



Considering the generally poor condition of dumps it is necessary to organize an impenetrable bottom, the channels, for prevention of ground water and soil pollution.

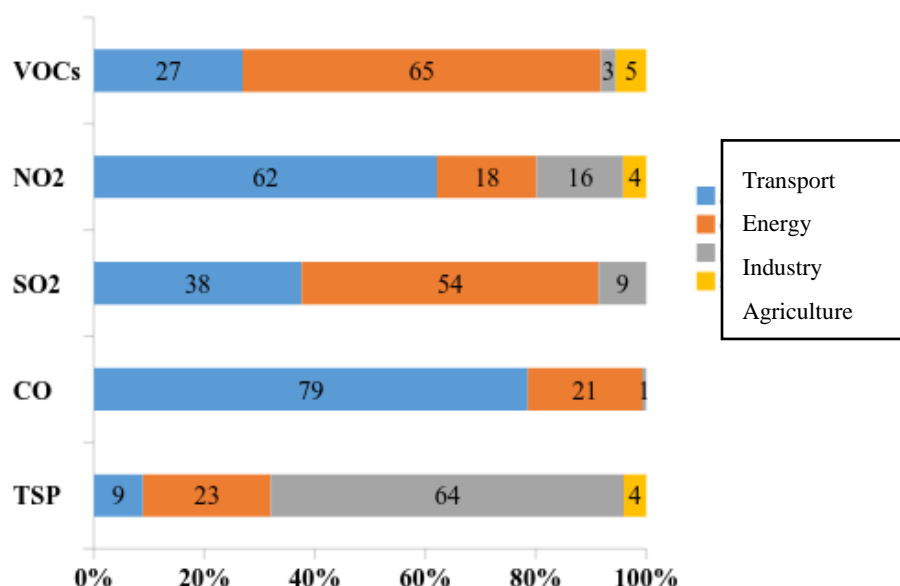
## 3.2. Atmospheric Air and Climate

### 3.2.1. Overview

Air pollution in Georgia is mainly due to the transport sector. It accounts for 62-78% of NO<sub>x</sub> and CO emissions in the country. Emissions from the sector has increased, as number of registered vehicles doubled in the country in the past 10 years, besides most cars are more than 10 years old (National Report on the State of Environment of Georgia 2007-2009).

Other major pollutants are energy and industrial sectors. In the energy sector, the major pollutants are Gardabani thermal power plants working on natural gas, main emissions are CO, NO<sub>x</sub> and dust. In the industrial sector, the main pollutants are cement, concrete and asphalt factories located in Kartli Region and Rustavi City, also the Batumi Oil Terminal and the Manganese factory in Zestaponi (Figure 4: Emission Percent per Sector by 2013).

**Figure 4: Emission (percent per sector, 2013)**



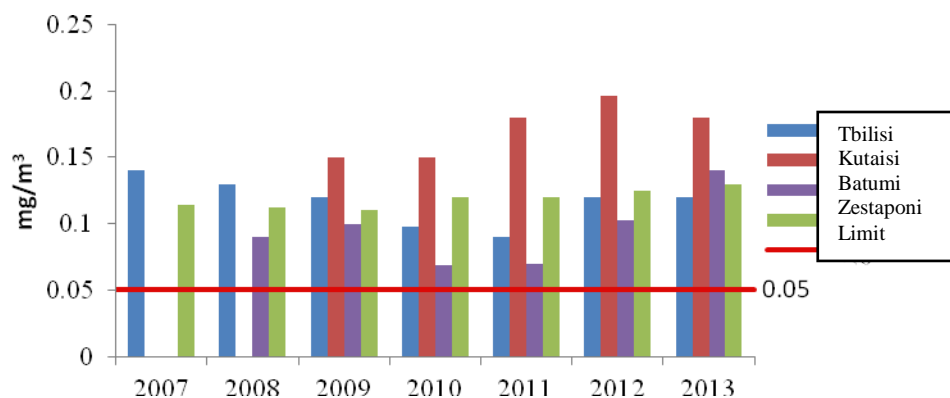
In urban areas, vehicle emissions are the primary source of air pollution. As per the available data, the concentrations of the priority pollutants (SO<sub>2</sub>, NO<sub>2</sub>, CO) exceed the allowable limits in all Georgian cities where monitoring occurs (NEAP, 2012-2016).

Air monitoring in Georgia is carried out by the National Environmental Agency. Currently air is monitored by 8 stations located in five cities (Tbilisi, Kutaisi, Batumi, Zestaponi and

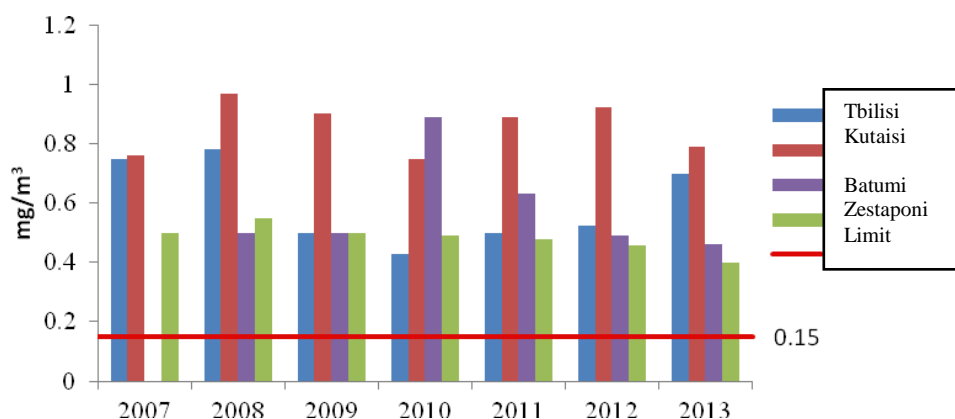
Rustavi). The automatic monitoring system monitors constantly the following pollutants: sulfur dioxide (SO<sub>2</sub>), Nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), ozone (O<sub>3</sub>) and dust (PM<sub>10</sub>, PM<sub>2.5</sub>). The charts below show that in urban areas in Georgia the air is quite polluted, concentration of pollutants in air is well above the limit (Figure 5: Average Annual Concentration of SO<sub>2</sub> and Dust).

**Figure 5: Average Annual Concentration of SO<sub>2</sub> and Dust in Georgian Cities**

Average annual concentration of SO<sub>2</sub> in Georgian cities



Average annual concentration of dust in Georgian cities





It must be noted that air monitoring in Georgia does not meet international standards related to number of stations, their location, data gathering, storing and processing. In 7 stations out of 8, air monitoring is done on working days, 3 times a day and only one station monitors air permanently. The present monitoring system does not allow us to have actual information on air quality in the country.

### **3.2.2. Emission from waste**

Waste is one of sources of air pollution in Georgia. Most of the existing landfills (except Rustavi and Tbilisi) do not have system of collection and removal of combustible landfill gasses. Air monitoring of landfill areas was not conducted in Georgia, correspondingly no accurate historic data is available, but after adoption of the “Technical Regulation on the Construction, Operation, Closure and After-care of Landfills” in August 2015, it became obligatory to monitor emissions during operation of landfill on monthly basis and following to closure of the landfill - in every six months. Smell from landfills is a problem in many areas, particularly for residents living within the vicinity of such landfills; it also comprises risks to human health.

For instance, the Norio landfill, located near Tbilisi, initially was planned according to the modern sanitary landfill standards, which envisaged installation of emission collection system, but certain complications occurred during construction and currently emissions are not collected.

Currently, alternative ways are being sought, such as energy recovery for waste that could be used for generation of heating or electricity (National Report on the State of the Environment of Georgia 2010-2013, Draft).

According to the “Technical Regulation on the Construction, Operation, Closure and After-care of Landfills” (August 2015), landfill gas collection systems shall be installed at all landfills receiving biodegradable waste and the collected gas shall be used as an energy source or flared.

### **3.2.3. Climate Change**

Climate Change (CC) and its adverse impacts on ecosystems and the economy are a threat to sustainable development. For the last 10 years, the average air temperature has increased by 0.7 °C in some regions of Western Georgia, and by 0.6 °C in Eastern Georgia. Precipitation has slightly decreased in most regions of Western Georgia since the 1960`s; however some areas have seen increased precipitation. Precipitation in Eastern Georgia has increased by no more than 6%.

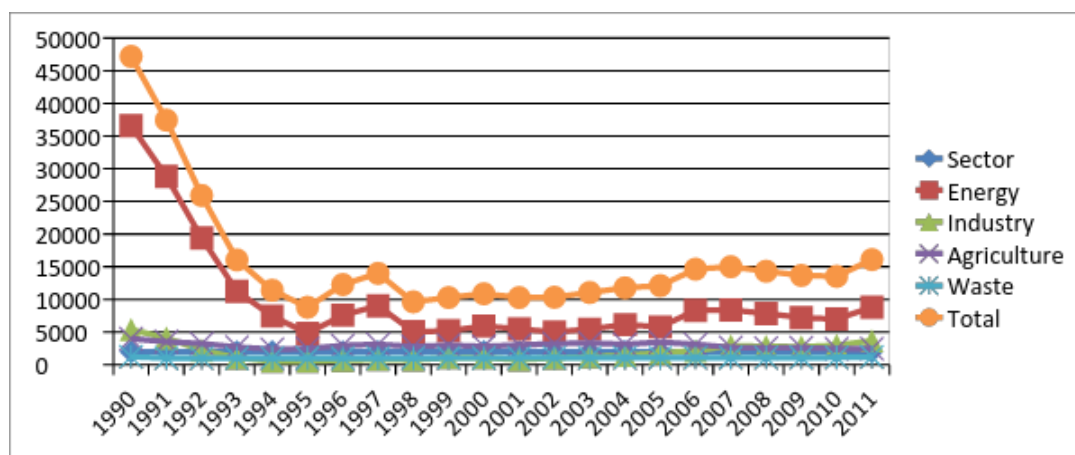
As a result of these changes, the intensity and frequency of extreme events caused by global warming have risen. In semi-arid regions, the frequency of droughts and strong winds in the spring has increased. In the Black Sea coastal zone, coastal erosion and abrasion processes have intensified. In addition, satellite observations of the Greater Caucasus mountain range has shown that the average speed of glacial withdrawal is 8 m/year, and their surface area has decreased by 6-9%. When withdrawing, glaciers of the Caucasus leave behind immense

quantities of stones, pieces of rock, mud, and resulting mud-flows after intense rains. (NEAP, 2012-2016)

### 3.2.4. Greenhouse Gas Emissions

Share of Georgia in the world greenhouse gas emissions is very low; it makes less than 0.02 %. Greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC, SF<sub>6</sub>) emission trends by sectors are provided in Figure 6: Greenhouse gas emission trends by sectors (CO<sub>2</sub> Equivalent) in 1990-2011. After break-up of the Soviet Union Georgian economy collapsed causing significant decrease in emissions reaching its minimum in 1995. Then emissions started to rise till 2007, but then it decreased again till 2010, largely due to world economic crisis and the war with Russia causing decline of economic activities and foreign investments and increase of hydropower share in power generation sector. Emissions started to rise again in 2011, possibly being caused by economic growth and increased demand for electric power generated.

**Figure 6: Greenhouse gas emission trends by sectors (CO<sub>2</sub> Equivalent) in 1990-2011**



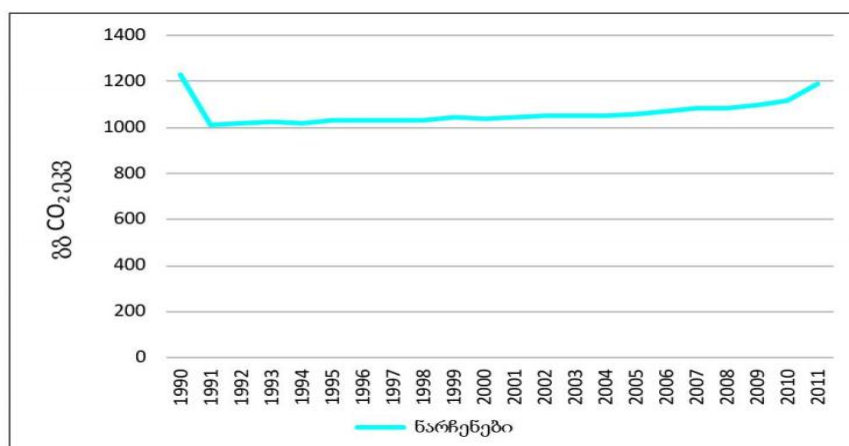
Source: Third National Communication of Georgia on Climate Change.

### 3.2.5. Landfill Gases

The air emissions arising from the waste management sector in Georgia are due to either the direct emissions (landfill, composting, anaerobic digestion) or indirect emissions (transports associated with waste collection or disposal). Landfill gas (LFG) is produced during the breakdown of organic components of waste by anaerobic bacteria with methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) (in the ratio of 3:2). Both are greenhouse gases, and methane in particular is a major contributor to global warming and has 21 times the global warming capacity of carbon dioxide.

Figure 7: Greenhouse Gas Emission (CO<sub>2</sub> Equivalent) from waste management sector (solid waste and waste water)) shows that in 1990-94 there was a sharp decline from waste management sector as mostly due to decline of waste water from industrial sector since economic activities reduced significantly after collapse of the USSR. The trend was stable over 1995-99, but it started to increase again from 2000 since economic situation of the country started to improved.

**Figure 7: Greenhouse Gas Emission (CO<sub>2</sub> Equivalent) from waste management sector**



Source: Third National Communication of Georgia on Climate Change.

The landfills in the region are located in rural areas but are close to main towns (from 3km-10km). Waste traffic is done by heavy vehicles; however the contribution to air quality from waste transport is unknown as there is no data available. There is lack of information on existing non-hazardous landfills. About 80% of emissions come from landfills and 20% from waste water. Methane makes 95.6% of total emissions, and NO<sub>x</sub> – 4.4%, CO<sub>2</sub> emissions are not calculated.

The waste management sector has a potential for Greenhouse has reduction. Table 1 shows baseline methane emissions from all landfills in four cities (Tbilisi, Batumi, Kutaisi, Zugdidi) over 2012-2030 in case if no additional actions are taken. According to the table total emissions in 2012 are 484 M ton CO<sub>2</sub> equivalent and in 2030 is expected – 418 M ton CO<sub>2</sub> equivalent (Third National Communication of Georgia on Climate Change). The emissions are about 70 M ton less in 2030 due to two reasons: 1. methane emissions from closed landfills reduce overtime; and 2. methane emissions take 3-5 years from new landfills to generate.

**Table 1: Baseline CH<sub>4</sub> Emissions from Landfills**

City	Landfill	Emissions in 2012 (M T CO <sub>2</sub> equiv.)	Emissions in 2030 (M T CO <sub>2</sub> equiv)
Tbilisi	Gldani	227.95	30.64
Tbilisi	Iagluja	113.02	13.43
Tbilisi	Lilo	23.26	3.78
Tbilisi	Norio	27.33	243.79
Batumi	Old	14.91	2.31
Batumi	New	0.00	36.96
Kutaisi	Nikea	36.96	77.7012
Zugdidi	Old	2.52	0.42
Zugdidi	New	1.05	9.24
<b>Total</b>		<b>483.96</b>	<b>418.26</b>

Sources: Third National Communication of Georgia on Climate Change 2010-2014

Table 2 shows methane emission reduction potential by 2030 if certain measures are taken. Greenhouse gas emissions can be reduced by 292 M T CO<sub>2</sub>. The table also shows mitigation measures required for each landfill.

**Table 2: Methane emission reduction potential by 2030**

City	Landfill	Mitigation Measures	Emissions reduced by 2030 (M T CO <sub>2</sub> equiv)
Tbilisi	Gldani	Gas collection and burning	21.30
Tbilisi	Iagluja	Gas collection and burning	9.33
Tbilisi	Lilo	Gas collection and burning	2.63
Tbilisi	Norio	Gas collection and burning	169.49
Batumi	Old	Gas collection and burning	1.61
Batumi	New	Gas collection and burning	25.70
Kutaisi	Nikea	Gas collection and burning	54.02
Zugdidi	Old	Gas collection and burning	0.29
Zugdidi	New	Gas collection and burning	7.39
<b>Total</b>			<b>291.76</b>

Source: Third National Communication on Georgia on Climate Change 2010-2014.

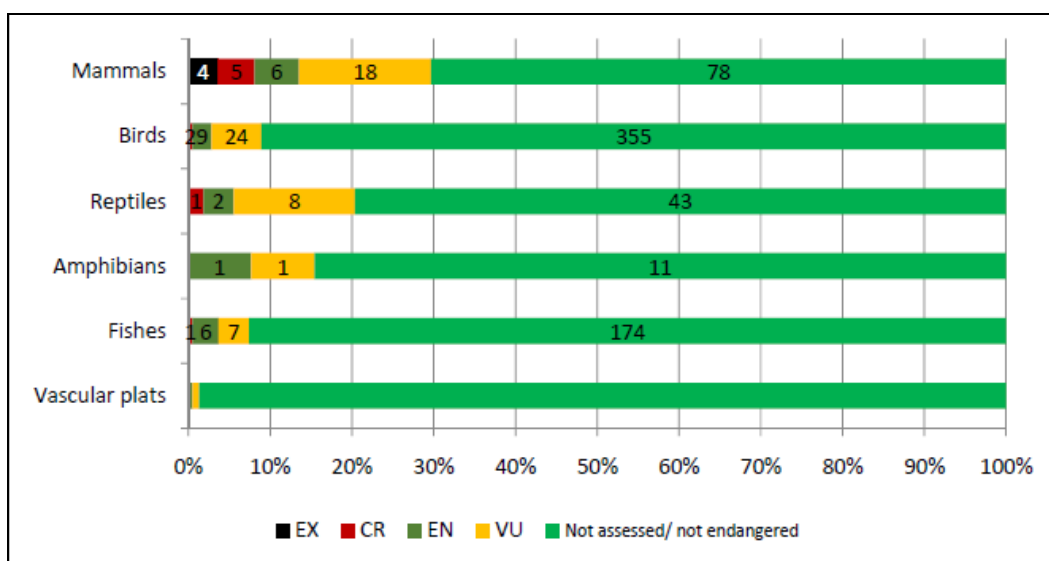
### **3.3. Biodiversity and protected areas**

In terms of biodiversity, Georgia is a unique country located in a similarly unique Caucasus eco-region. The Caucasus, including Georgia, is characterized by abundance of various types of ecosystems and habitats. It is rare in the world to find such small area with such diverse landscapes including Black Sea coastal wetlands, semi-deserts, lakes, forests, alpine and sub-alpine meadows, snowy mountains and glaciers. Furthermore, the Caucasus is considered by international organizations as one of the distinguished regions of the world in respect of biodiversity. It is within one of WWF's (World Wildlife Fund) 35 "priority places" (the greater Black Seabasin) and is also part of two of 34 "biodiversity hotspots" (the Caucasus and Iran-Anatolian hotspots) identified by Conservation International as being simultaneously the richest and most threatened reservoirs of plant and animal life.

At present, the Red List of Georgia contains 139 animal species and 56 wooded plant species. 43 of the animal species and 20 of the plant species are categorized as endangered or critically endangered. Many of the animal species in the list are also considered globally

threatened. 275 species of vascular plants are endemic to Georgia. 152 species of Georgian endemic flora (approximately 60% of endemic species) are categorized as endangered (Figure 8: The Status of Animal and Plant Species in Georgia). In the freshwater ecosystems of Georgia, there are 91 fish species, over 100 crustacean species, 58 ostracean species and more than 2,600 algae species.

**Figure 8: Status of Animal and Plant Species in Georgia (Source: Georgia's Fifth National Report to the Convention on Biological Diversity, 2015)**



In terms of biodiversity conservation, forests are the most important habitats of Georgia and Caucasus region. Existence of about 65% of Caucasus species depends on forests. The forest area currently covers about 41% of the total area of Georgia (28,382 km<sup>2</sup>).

Protected Areas (PAs) are of a great importance for biodiversity and habitats conservation. Today there are 14 State Reserves, 11 National Parks, 19 Managed Reserves, 41 Natural Monuments and 2 Protected Landscapes. The protected areas occupy a total of 598,363.87 hectares, which is about 8.58% of the country's overall territory.

Biodiversity of Georgia provides life-sustaining ecosystem services and natural resources for the population. The forest ecosystems provide timber and non-timber products, meadows (pastures and hay meadows) provide food for livestock. Wetlands and lakes are natural fresh water reservoirs. Fisheries in the Black Sea and inland waters are of great importance for food security. Natural ecosystems support tourism development. Various economic sectors rely on ecosystem services and natural resources. Agriculture, hydropower, fisheries and fresh and mineral water supplies depend on freshwater resources formed in Greater and Lesser Caucasus Mountain Ranges. Rural population of Georgia (46.3% of the total population) is considerably dependent on biological resources and ecosystem services.

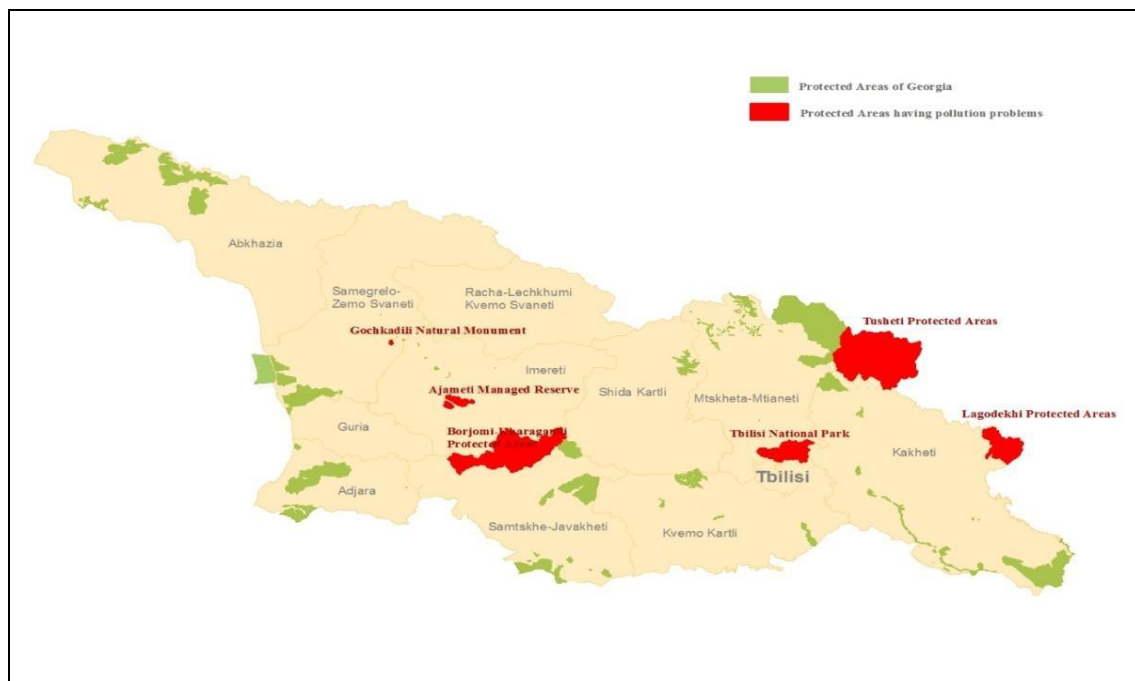
Accordingly, consumption and dependence at natural resources together with many other issues cause numerous problems in the sector of biodiversity and protected areas.

The main threats, underlying causes and problems for biodiversity conservation and protected areas are as follows:

- Poverty which drives people to use natural resources unsustainably in order to obtain energy, food and financial benefits
- Unawareness regarding values of biodiversity and the importance of biodiversity preservation
- Insufficient incorporation of the values of biodiversity in policy documents, strategies and programs
- A lack of resources for exercising biodiversity preservation laws and procedures
- Fragmentation and degradation of natural habitats causing loss of biodiversity
- Illegal hunting and fishing
- Unsustainable utilization of forest resources
- Overgrazing by the livestock and soil erosion
- Excess utilization of natural resources which is mainly caused by lack of access to alternative energy sources
- Introduction of alien invasive species
- Climate change
- Pollution of protected area with waste
- Main threats to biodiversity of freshwater ecosystems include water pollution with organic matters and heavy metals
- Construction and operation of infrastructural sites
- Increasing pressure on natural environment from various sector development (including energy, agriculture and infrastructure)
- Human-wildlife conflict
- Georgia's forests are suffering from pest species and diseases
- Absence of protected areas network in Georgia, separate protected areas are not connected through ecological corridors
- Lack of PA management planning capacity
- Lack of qualified personal and staff
- Absence of established monitoring system
- Lack of involvement of wide public in decision-making
- Low awareness of general public and knowledge in biodiversity conservation and functions of PAs
- Lack of interest in and understanding of protected areas issues among decision-makers
- Pollution of water threatens many of the species associated with Georgia's wetlands
- Threats such as contamination, degradation of neighboring ecosystems, disturbance, etc. posed to the territories adjacent to protected areas by use of natural resources, unsustainable agriculture, development, remain a serious issue
- Eutrophication of the Black Sea creates a significant risk for its biodiversity.

Considering above mentioned, pollution is one of the most evident problems that impairs on biodiversity and human health. It has a direct effect on the protected areas and needs to be addressed rapidly as PAs due to their protection regime are the source of fresh air, clean water, etc. For instance, Borjom-Kharagauli National Park supplies potable water to town Borjomi with a population of 10 thousand people. Contribution of the Mtirala National Park ecosystems to provision of water supply for Ajara population should also be taken into account. Ways of pollution differs, at some of the PAs main source of littering is construction materials together with other type of waste, for instance at Tbilisi National Park, where there is a road inside the territory and people through their garbage straight from the cars or leave their construction materials at night. Due to such circumstances it is very difficult for PA rangers to find such facts and issue an administrative act. Other critical Protected Areas in terms of pollution are: Ajameti, Tusheti, Borjomi-Kharagauli, Lagodekhi, Gochkadili PAs (Figure 9: Protected Areas of Georgia and PAs having most critical situation with regard to waste).

**Figure 9: Protected Areas of Georgia and PAs having most critical situation with regard to waste**



In general, problems of the waste existing at PAs are mainly caused by three factors: no collection, distribution and low awareness. Furthermore, in the whole network of PAs there is a need for garbage bins and system, where municipalities (currently some of them even do not have relevant techniques) will fulfill their responsibility to collect and take the garbage



out to the nearest landfills. There is list of negative aspects that are caused from the problems identified above: decreasing number of visitors at PAs (on the other hand, increased number of visitors will increase the negative impact in case of inefficient SWM), increased risks of fire, loss of animals (by eating the litter or drinking polluted water), pollution of drinking water, damaging flora and fauna species existing in the rivers, decreasing reputation of the PA, decreasing the ecosystem conditions, littering drinking and ground water, segregation of toxic substances.

The Tusheti Protected Areas is an obvious example showing the sources and causes of pollution. Whole Tusheti is a protected area (Three categories: National Park, Strict Nature Reserve and Protected Landscape). Due to the absence of household waste collection system, way of waste liquidation differs from village to village; people have to solve the problem on their own. This situation results in developing piles of domestic waste in the surroundings of villages, mainly in ravines and terrain depressions. During strong rains and winter seasons the waste is often spontaneously removed from the place by snow or water down to valleys and later transported by rivers out of Tusheti. Certain amount of garbage is also burned in households or deposited in special holes dug out in the ground. After burning toxic substances are segregating, this has a very negative effect on population. In larger villages there is some service provided by the PA administration regarding establishment of waste storage places (large holes in the ground dug by heavy machinery). These places are often not well chosen; they are not marked and not secured against pollution caused by deposited material. Obviously, this approach is not sufficient and sustainable in the long-term perspective. There is no landfill, no system for municipality to collect the garbage and take them out, no garbage bins. Accordingly, situation is critical.

Noted problems are not only the case at PAs but to other areas as well which are important for their biodiversity, as key biodiversity areas, biological corridors, animal migration corridors, and important plant and bird areas. It is critically important that all above noted aspects should be taken into account and integrated in the policy documents as municipality waste management plans, various environmental strategies and action plans, relevant legislation.

### **3.4. Geology**

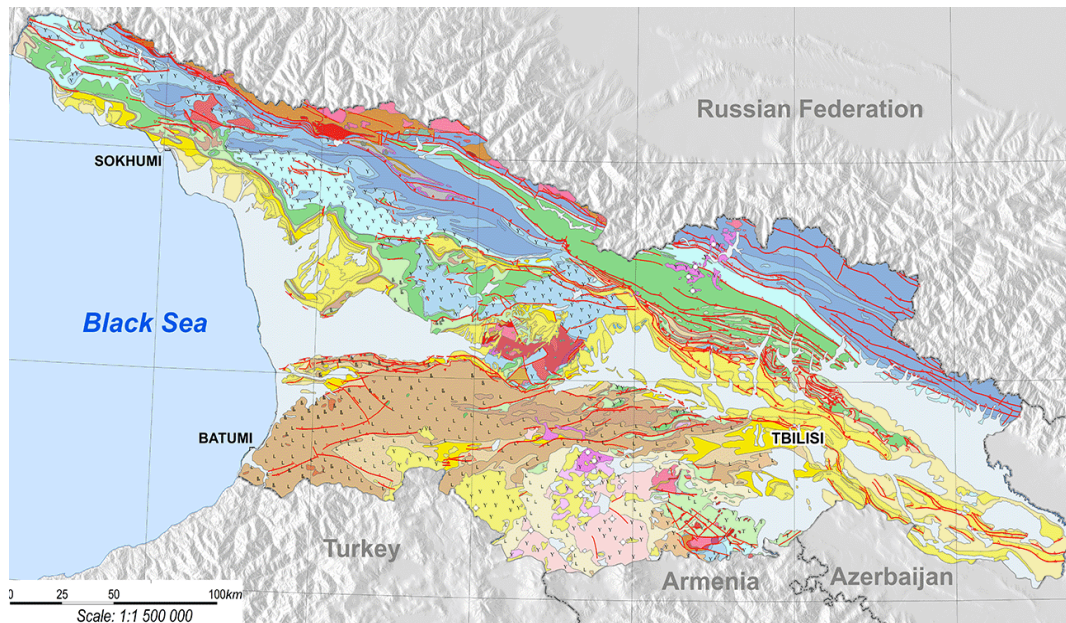
The relief of Georgia consists of different morphographic and morphological features: mountain slopes, intermountain depressions, erosive gorges, valleys, plateaus etc. Despite its relatively small area, Georgia has complicated topography; it varies from sea level at the Black Sea to over 5000 meters in the Caucasus Mountains (Figure 10: Topography Map of Georgia).

**Figure 10: Topography Map of Georgia**



Main geomorphologic units can be distinguished in the territory of Georgia: the high mountainous zone of the Caucasus, the middle mountainous zone of the Lesser Caucasus, the volcanic mountainous zone of South Georgia and the zone of intermountain depression. The Greater Caucasus Mountain Range is much higher in elevation than the Lesser Caucasus Mountains, which are located in the south of the country (Figure 11: Geology Map of Georgia).

**Figure 11: Geology Map of Georgia (Author: E. Gamkrelidze)**

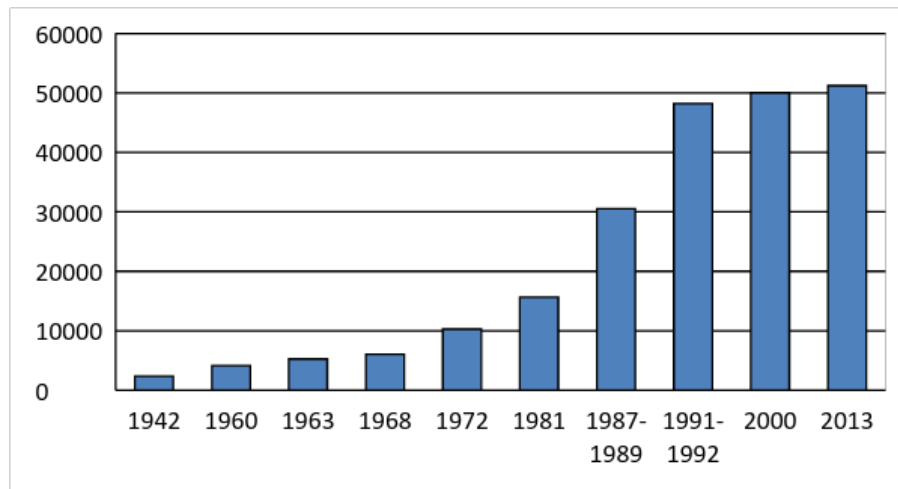


### 3.4.1. Geological Hazards

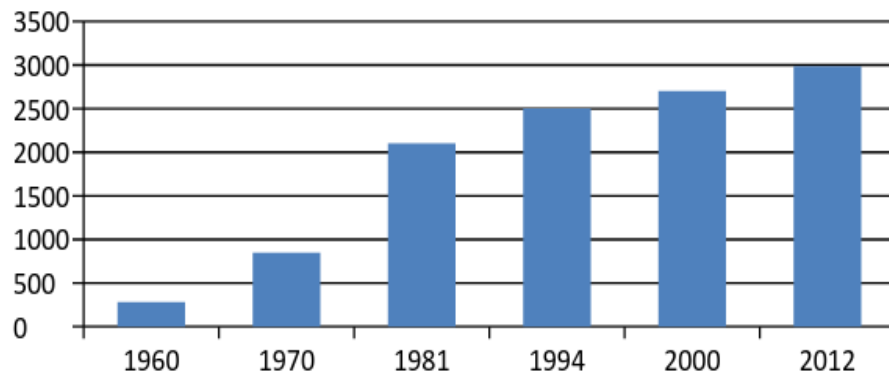
Due to the complicated landscape and specific geographical conditions, natural disasters in Georgia is characterized by high extensiveness, frequency and risk level. Georgia belongs to one of world's most complex mountainous regions according to the scale and frequency of natural hazardous processes and damage caused to population, farmlands and infrastructure facilities. Natural hazards (Landslides, Debrisflow/Mudflows, river floods, flashfloods, rockfalls, snow avalanches etc) are affecting many populated areas, agricultural fields, roads, oil and gas pipes, high-voltage electric power transmission towers, hydraulic structures and reclamation constructions, and tourist complexes. In Georgia natural hazards occur almost in all landscape - geomorphological zones, resulting in wide differentiation in the failure types and mechanisms and in the size-frequency distribution. During recent decades, a significant increase in the frequency and intensity of geological, hydro-meteorological natural disasters has been recorded in Georgia. This increase is considered to be the consequence of a negative impact of human activities on the state of environment, coupled with phenomena attributed to global climate change (Figure 12: Recorded Landslides and Debrisflows by year).

**Figure 12: Recorded Landslides and Debrisflows by years**

Recorded Landslides by years

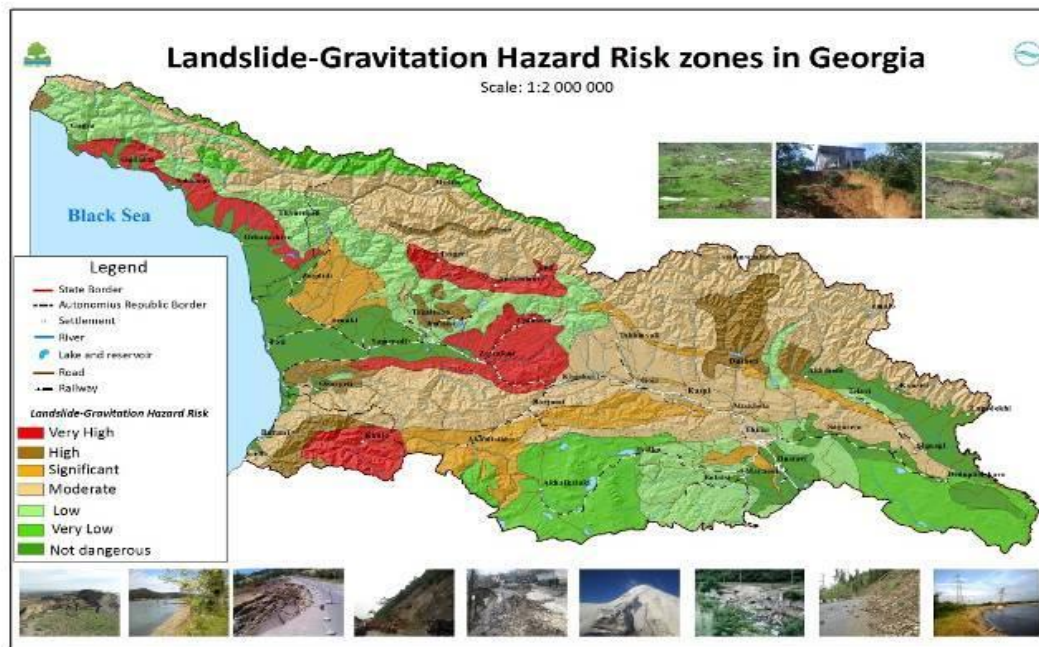


Recorded Debrisflows by years



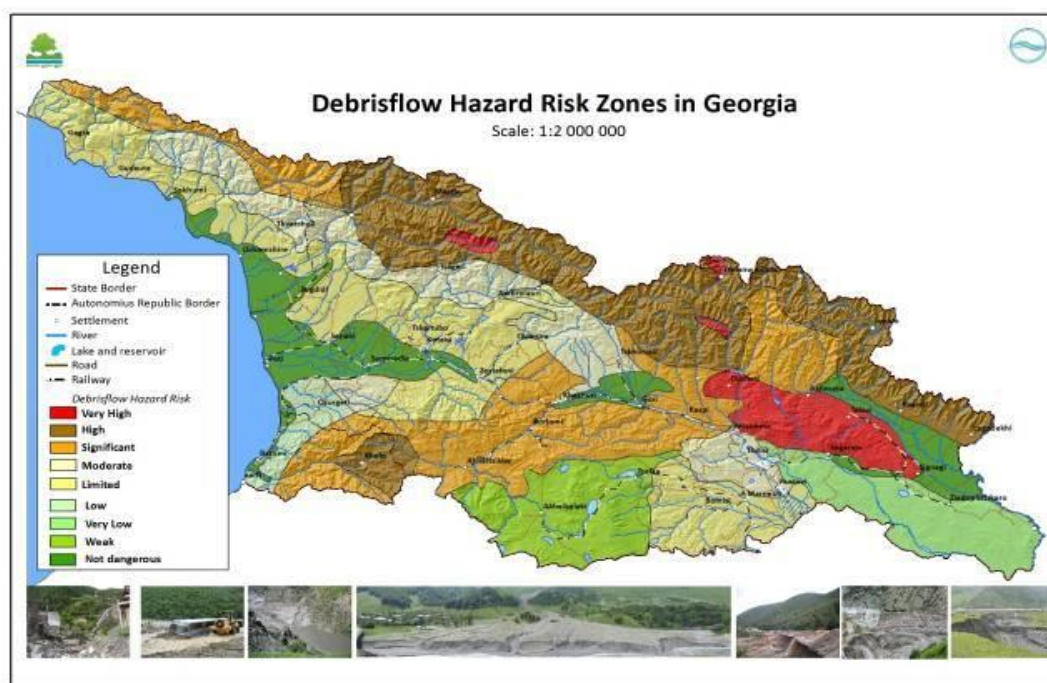
With the potential magnitude of negative impacts associated with natural disasters on the population, agricultural lands and infrastructure, Georgia is one of the most sensitive countries to natural disasters among mountainous regions of the world. Landslide-gravitational, debrisflow and water based erosion processes are the most frequent natural disasters of geological character that occur in Georgia (Figure 13: Landslide-Gravitation Hazard Risk Zones in Georgia). At the same time, the geographic location of Georgia and its complex topography result in atmospheric conditions that give rise to extreme meteorological and hydrological events. There are frequent floods, flash floods, heavy rains, hail, snow avalanches etc. Specialized surveys confirm that landslide-gravitational processes, debrisflows and riverbank erosion increase year by year (Figure 14: Debrisflow Hazard Risk Zones in Georgia and Figure 15: Number of Settlements under Geological Hazard Risk).

**Figure 13: Landslide-Gravitation Hazard Risk Zones in Georgia (Author: Tsereteli, Gaprindashvili)**

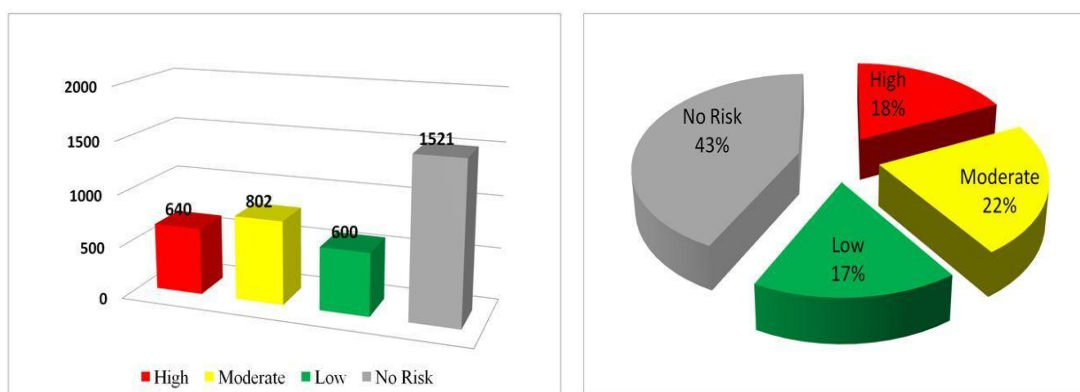




**Figure 14: Debrisflow Hazard Risk Zones in Georgia (Author: Tsereteli, Gaprindashvili)**



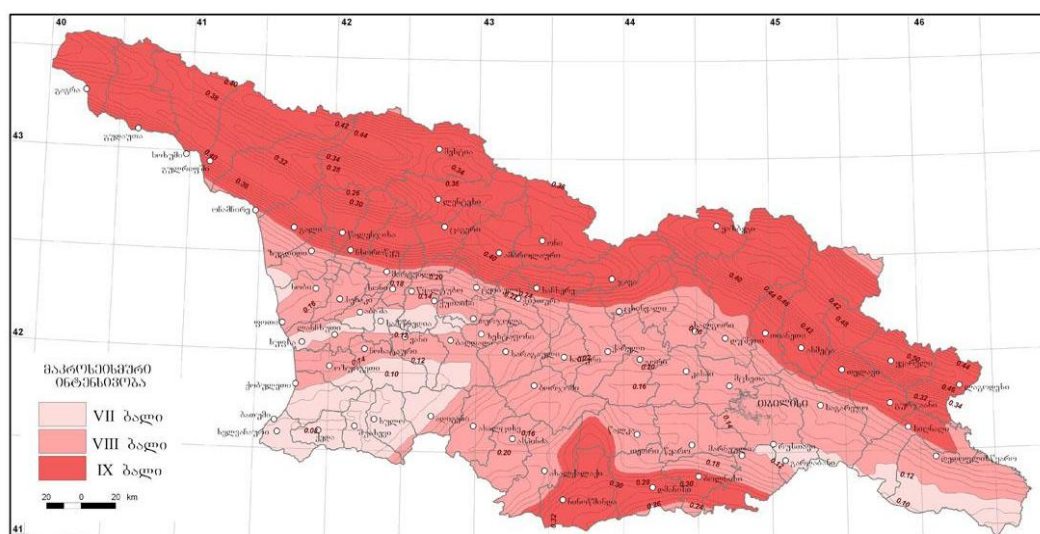
**Figure 15: Number of Settlements under Geological Hazard Risk (Author: Tsereteli, Gaprindashvili)**



Catastrophic events may be triggered by (1) intense earthquakes (Figure 16: Seismic Map of Georgia), (2) extreme hydro-meteorological events, probably on the background of global climatic changes and (3) large-scale human impacts on the environment. Georgian

communities with a low level of preparedness concerning these hazards are especially hit hard.

**Figure 16: Seismic Map of Georgia**



For disaster management the long-term goal is to avoid the human losses and minimize the negative impacts to human health and ecosystems as well as minimize economic losses.

The main organization conducts monitoring of Geological hazards is Department of Geology of National Environmental Agency of Ministry of Environment and Natural Resources Protection of Georgia<sup>3</sup>.

A number of activities have been conducted in the field of disaster management caused by natural and anthropogenic factors. Specifically, all types of geological risks have been studied and mapped; detailed engineering and geological research and appropriate protective activities have been completed for more than 100 high risk areas; and long-term forecasts for landslides, debrisflow and erosion have been processed.

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<sup>3</sup>The primary responsibilities of the Department are: elaboration of hazardous geological risk zoning maps (with the scale of 1:50000); permanent monitoring over hazardous geological processes and forecasting; provision of recommendations for population living in hazard-prone areas and preparation of relevant conclusions for immediate measures in case of geological processes' extreme activation in the settlements; implementation of all scales of engineer-geological, engineer-geodynamic and geo-ecological studies; zoning of the territory of Georgia in accordance with frequency and intensity of hazardous geological processes; engineer-geological and geo-ecological examination of projects of big industrial objects to define the scale of possible impact over changes in environment on the whole territory of Georgia; participation in preparation of hydrogeological conclusions on the land intended for civil-industrial purposes, in the frames of its competence; Hydrogeological monitoring of Groundwater, Management of Mineral Resources; Geological Survey.

### **3.4.2. Mineral resources**

Georgia is rich in mineral resources, many of which are competitive on the world market (Figure 17: Deposits Registered in the Mineral Resources Fund and Distribution of Metal and Non-metal Resources in Georgia). In particular gold, copper, manganese and zeolites are interesting for international trade. The extraction of these minerals will contribute to the economic growth of the country.

Uncontrolled and unregulated extraction of mineral resources can affect the environment. Excavation of mineral resources in Chiatura, Kazreti, Uravi and Tsana affects on the Environment. As such, it is important that a proper regulatory system be in place to ensure that these activities are carried out in an environmentally sound manner.

**Figure 17: Deposits Registered in the Mineral Resources Fund and Distribution of Metal and Non-metal Resources in Georgia**

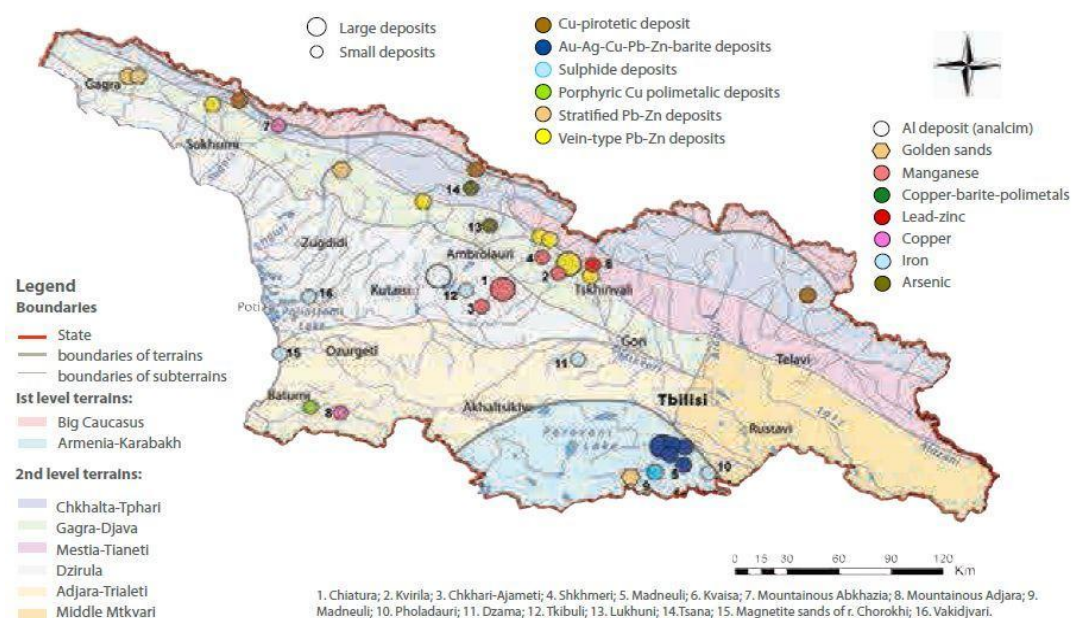
Deposits Registered in the Mineral Resources Fund



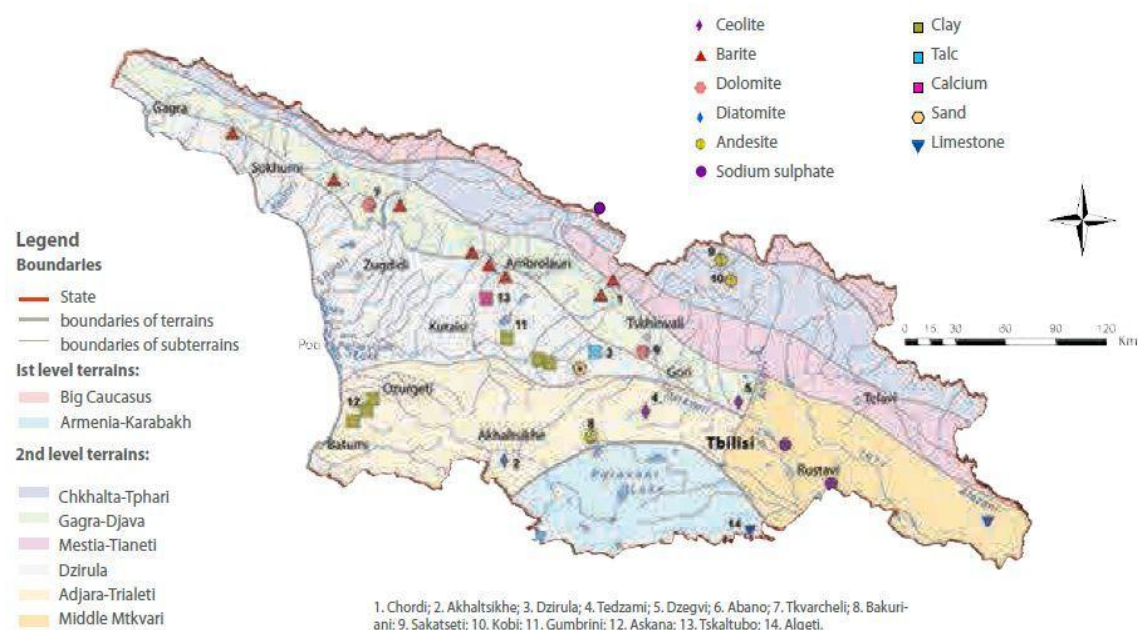
Mineral Resource	Supply Approved
<b>Metals</b> (ferrous, non-ferrous, precious, rare)	419,965,000 t
<b>Solid fuel resources</b>	
Coal	373,934,000 t
Peat	47,644,000 t
<b>Facing stones</b>	
Gabbros	7,224,000 m <sup>3</sup>
Gabbros-diorite	5,972,000 m <sup>3</sup>
Syenite	660,000 m <sup>3</sup>
Granite	5,400,000 m <sup>3</sup>
Tuff-breccias	14,938,000 m <sup>3</sup>
Dacite	2,289,000 m <sup>3</sup>
Teschenite	6,165,000 m <sup>3</sup>
Diabase	10,741,000 m <sup>3</sup>
Basalt	45,052,000 m <sup>3</sup>
Dolerite	19,579,000 m <sup>3</sup>
Marble	4,259,000 m <sup>3</sup>
Marble-like limestone	78,026,000 m <sup>3</sup>
<b>Chemical Industry raw materials</b>	
Barytes	4,731,000 t
Acid-resistant andesite	12,717,000 t
Mirabilite	1,493,000 m <sup>3</sup>
Bentonite	6,418,000 t
Mineral pigment	437,000 t
Talc	2,774,000 t
Calcite	27,211,000 t
Diatomite	7,995,000 m <sup>3</sup>
<b>Building materials</b>	
Detritus	459,221,000 m <sup>3</sup>
Sand-gravel	658,487,000 m <sup>3</sup>
Brick clays	135,207,000 m <sup>3</sup>

Mineral Resource	Supply Approved
<b>Building materials</b>	
Chalk	3,962,000 m <sup>3</sup>
Limestone for lime	292,173,000 t
Gypsum	20,342,000 t
Cement clays	64,070,000 m <sup>3</sup>
Cement limestone	392,014,000 t
Sheetrock	14,917,000 m <sup>3</sup>
Slate tiles	11,796,000 m <sup>3</sup>
Light stuffs	220,323,000 m <sup>3</sup>
Wall rocks	4,898,000 m <sup>3</sup>
Silica sand	168,804,000 m <sup>3</sup>
<b>Subsidiary raw material for metallurgy</b>	
Dolomite	44,904,000 t
Fire-clay	91,636,000 m <sup>3</sup>
Molding (forming) sand	2,300,000 m <sup>3</sup>
Spongolite	1,957,000 m <sup>3</sup>
Fluxing limestones	1,700,000 t
<b>Supply of industrial materials</b>	
Teeming basalt	9,892,000 m <sup>3</sup>
Lithographic stones	120,000 m <sup>3</sup>
Semi-precious stones	920 t
<b>Raw materials for agriculture</b>	
Peat	41,880,000 t
Zeolite	30,381,000 t
Clay gypsum	3,460,000 t
<b>Raw materials for ceramic industry</b>	
Ceramic clay	2,504,000 m <sup>3</sup>
Trachyte	945,000 m <sup>3</sup>
Loamy gypsum	2,232,000 t

Distribution of metals in Georgia



## Distribution of non-metal mineral resources in Georgia



In Georgia, all mineral resources are the property of the state. Any activity connected to the exploitation of mineral resources is subject to licensing. A license for the exploitation of mineral resources must be obtained at the public auction. The term of the license depends on the type of mineral resource and on the actual demand for it. In addition to a mining license, the licensee also obtains a temporary right on the land use necessary for the processing operations. After finalizing its activities, the company is obliged to rehabilitate the site - recultivate the land and return it to the state. Many sites are contaminated because of activities, which occurred during the Soviet period.

Geologic surveys have been conducted throughout Georgia. As a result, various scale geological maps have been created that provide a good basis for identifying and further investigating mineral resource reserves. More than 1500 deposits with high potential for industrial purposes have been identified, mapped and studied.

**Ferrous Metals** - Georgia does not belong to any important world basins of ferrous-containing ores. However, there are number of areas where iron ores may be found. Four quite significant deposits of ferrous metals have been identified in Poladauri, Dzama, Tkibuli-Shaori, and Supsa-Natanebi. In addition, there are significant reserves of titan magnetite sands located in the estuaries of the rivers Supsa and Natanebi. The ferrous deposits are not currently being exploited, although studies are underway and it is anticipated that mining operations will begin in the near future.

Georgia has been one of the biggest producers of manganese in the world since the end of the nineteenth century). Manganese extraction continues today, and according to the license conditions issued for exploitation of the Chiatura manganese deposit, approximately 1.6 million tonnes of this metal should have been extracted between 2008 and 2011.

**Precious Metals** - Precious metals are found as small deposits in the Caucasian main ridge and include arsenic, mercury, tungsten, and molybdenum. Gold-arsenic, arsenic and gold-antimony deposits in Georgia are of significant economic importance. The extraction works for arsenic deposits have temporarily ceased even though the license for extraction works at the Lukhuni deposit was issued for 25 years and allows for the extraction of 9, 534 tonnes of arsenic. Intensive extraction of metals (including gold and silver) is on-going at Bolnisi gold-cooper-barite-polymetal deposits.

The pollution of air, water and soil, as well as deforestation and landslide activation are major environmental concerns related to the extraction of mineral resources. The scale of these impacts varies depending on the minerals being extracted and the technologies used. The anticipated lifetime of a mining operation is mainly dependent on the supply of mineral reserves available at the mine site and the viability of their extraction. The rate at which such reserves may be extracted is also determined by the mining license which defines annual extraction amounts.

The extraction and processing of mineral resources is a key sector of the Georgian economy, and is essential for economic development of the country. However, these processes can have a significant impact on the environment and are considered one of the most potentially dangerous activities for the environment in Georgia. The monitoring network for mining and processing facilities dealing with hazardous materials such as heavy metals should be

improved. The monitoring programme should not be restricted only to measuring environmental parameters in the close vicinity of the facility but should also include monitoring of these parameters at remote locations from the site in order to take into account the dispersion of pollutants by air and water and to determine the overall impact of the site activities.

### **3.5. Socio-economic situation and demography**

The quality of the natural environment plays a significant role in the success of any country's economic development. Waste management becomes a growing problem and environmental challenge for Georgia. One of the main issues in waste management is to analyze those socio-economic variables that influence the amount and composition of waste generation.

Gross domestic product (GDP) is one of the significant determinant of the amount and structure of waste. Empirical evidence shows a positive correlation between GDP and waste amount<sup>4</sup>. In 2014, the real growth of GDP amounted to 4.8 percent in Georgia (Table 3: Trends in GDP-related Indicators for 2010-2014).

**Table 3: Trends in GDP-related Indicators for 2010-2014 (Source: National Statistics Office of Georgia; 2015 data)**

	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
GDP real growth, percent	6.2	7.2	6.4	3.3	4.8
GDP at current prices, mil. GEL	20743.4	24344	26167.3	26847.4	29187.1
GDP per capita (at current prices), GEL	4675.7	5447.1	5818.1	5987.6	6499.7

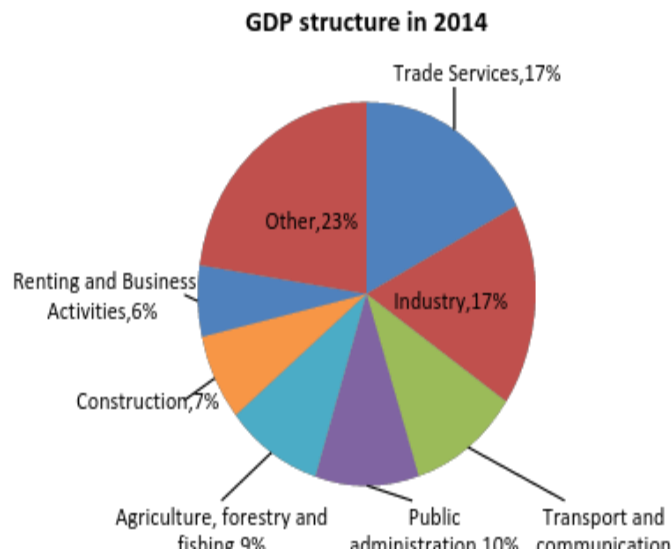
GDP annual growth rate in Georgia averaged 4.29 percent from 2006 to 2015, reaching an all time high of 12.30 percent in the fourth quarter of 2007 and a record low of 9 percent in the second quarter of 2009. GDP per capital also demonstrates a growing trend: its annual average growth rate was 7.8 from 2010 to 2014. However, the growth in this indicator is largely due to the decrease in the size of the population of Georgia. The sectoral structure of the Georgian GDP is presented in Annex (Figure 18: GDP Structure in 2014)<sup>5</sup>. According to the forecasts of the New York based analytical organization (Trading Economics), the annual Georgian GDP growth is expected to be about 4% from 2015 to 2020<sup>6</sup>.

<sup>4</sup> Jonas Petro Senzige, Daniel Oluwole Makinde, Karoli Nicolas Njau, Yaw Nkansah-Gyeke. Factors influencing solid waste generation and composition in urban areas of Tanzania: The case of Dar-es-Salaam; American Journal of Environmental Protection 2014

<sup>5</sup> National Statistics Office of Georgia, 2015 data

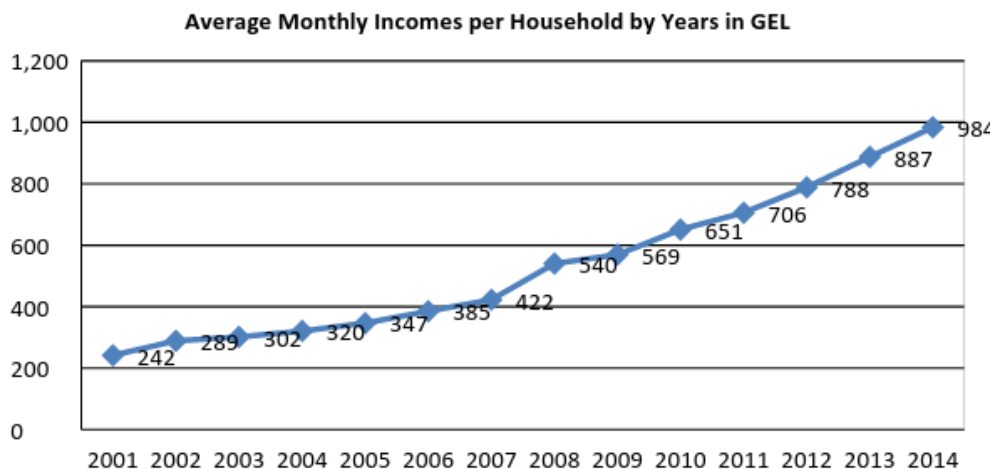
<sup>6</sup> <http://www.tradingeconomics.com/georgia/gdp/forecast>

**Figure 18: GDP Structure in 2014 (Source: National Statistics Office of Georgia; 2015 data)**

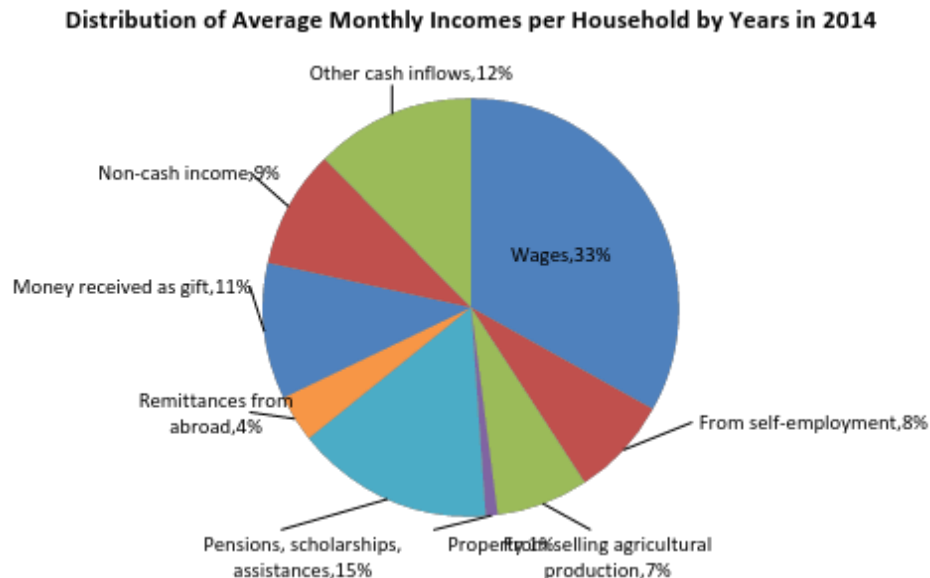


Average monthly income (per household) reached 984 GEL in 2014. This figure was 4.1 times higher than in 2001 (Figure 19: Average Monthly Income per Household by Years in GEL; Figure 20: The Structure of the Average Monthly Income per Household for 2014).

**Figure 19: Average Monthly Income per Household by Years in GEL**



**Figure 20: The Structure of the Average Monthly Income per Household, 2014**



Expenditure of households has also increased during the last 14 years. Average monthly expenditure per household reached 956.2 GEL in 2014 ([See Annex 5: Average Monthly Expenditures per Household by Years in GEL](#)).

Distribution of Population growth rate also determines the amount of waste. The population of Georgia is currently 3.73 million people<sup>7</sup>. According to the preliminary data by the Geostat, the population of Georgia has decreased by 642,000, during the period from 2002 to 2015. 57.5% of the population lives in urban areas and 42.6% - in rural areas ([See Annex 6: Population of Georgia in 2008-2015](#)).

Between 2008 and 2015 the population growth was negative with overall decrease of 14 %<sup>8</sup>. This change is reflected in the age structure of the population and the gender. Men accounted for 0.5 percentage points during this period, women's share; therefore, decreased. As for the age structure, the change here is mixed. 0-4 year's age group in the population growth is due to a sharp increase in the number of live births in 2009 for both sexes. The largest percentage increase was in the 50-59 age groups in both men and women, while the largest percentage decline in both sexes in the 10-19 age groups. In other age groups there was a slight increase or decrease.

There was a significant change in the structure of urban and rural population during the last eight years. If in 2008 the urban to rural population ratio was 53% to 47%, in 2015 it changed to 57% to 43% accordingly. According to the UN Population Division (United

<sup>7</sup> National Statistics Office of Georgia, 2015 data

<sup>8</sup> The data is based on the preliminary results of the General Population Census 2014



Nations, 2013 a) report<sup>9</sup> the population of Georgia is expected to decrease by 6% between 2013 and 2025. If the trends in waste amount would depend only on the population change, (with all other drivers being ceteris paribus or unaltered), it might be assumed that waste amount might decrease in perspective

The most municipal governments in Georgia face challenges in proper management of waste with most effort made to generate sufficient funds for waste management. Today in all regions of Georgia one type of municipal cleaning fee exists. Each municipality establishes the amount of cleaning fee by its decision. As per the existing law, the monthly cleaning fee should not exceed 3 GEL per person and 25 GEL per company. According to the analysis of the State Audit Office of Georgia, in most municipalities accumulated cleaning fees are much lower than cleaning accrued revenue (service fees that are due but have not been paid/collected)<sup>10</sup> - [See Annex 7. Accrued and Accumulated Revenues for 2013](#)).

The average annual revenue from cleaning fee has been 27 million GEL in Georgia for the last 2 years. This amount represents about 0.09% of the annual GDP in 2014. According to this data, the average annual cleaning expenditure per person in Georgia is 7.25 GEL, which accounts approximately 0.3%-0.8% of annual household expenditure.

As big share (approximately 80%)<sup>11</sup> of the total amount of the waste generated in Georgia comes on the population, we can assume that population downturn trend will decrease the amount of waste from 2015 to 2025. But we cannot exclude the fact that the structure of the waste amount between population and economy will change in the future. It requires further researches and analysis in order to determine the trends of waste amount in Georgia.

### 3.6. Public health

#### 3.6.1. Health Profile

According to the WHO estimates 17% of the overall disease burden<sup>12</sup> and 19% of all deaths in Georgia are attributable to environmental risk factors.

Basic Facts	
Life expectancy 2010 (years)*	74.4
Infant mortality, 2010 (per 1000 live births)*	11.2
2009 ****	14.1
Child under 5 mortality, 2010 (per 1000 live births)****	15.4
* National Statistics Office of Georgia	
** World Bank	
*** UNDP	
**** Georgia National Centre for Disease Control and Public Health	

<sup>9</sup>[http://esa.un.org/unpd/wpp/Publications/Files/WPP2012\\_HIGHLIGHTS.pdf](http://esa.un.org/unpd/wpp/Publications/Files/WPP2012_HIGHLIGHTS.pdf)

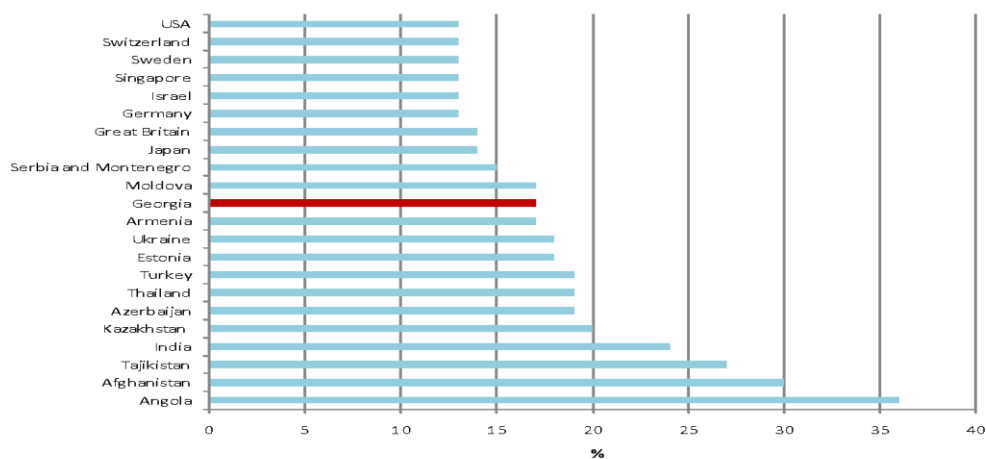
<sup>10</sup>State Audit Office of Georgia; Efficiency audit of solid municipal waste management; 2015, p. 36

<sup>11</sup>Clean up Georgia; *Report on Municipal Solid Waste Management in Georgia*; 2012, p. 3

<sup>12</sup>Disease burden is estimated in years of life lost due to poor health or disability or premature death (DALYs - Disability Adjusted Life Years). One DALY can be thought of as one lost year of healthy life.

Environmental disease burden in DALYs<sup>13</sup> and deaths in Georgia are higher as compared to developed countries, although Georgia is least impacted than other post-soviet and developing countries (Figure 21: Environmental Disease Burden by Countries, 2004). Non-communicable diseases (NCDs) are a major challenge to human health. In Georgia 91% of all deaths are caused by non-communicable diseases (Figure 22. Mortality Structure (Georgia, all ages)<sup>14</sup>). NCD comprise the largest share among the total global burden in Georgia. Leading causes are cardiovascular diseases (38%), neuropsychiatric disorders (28%), cancers (8%), and sense organ diseases (8%).

**Figure 21: Environmental Disease Burden by Countries, 2004**

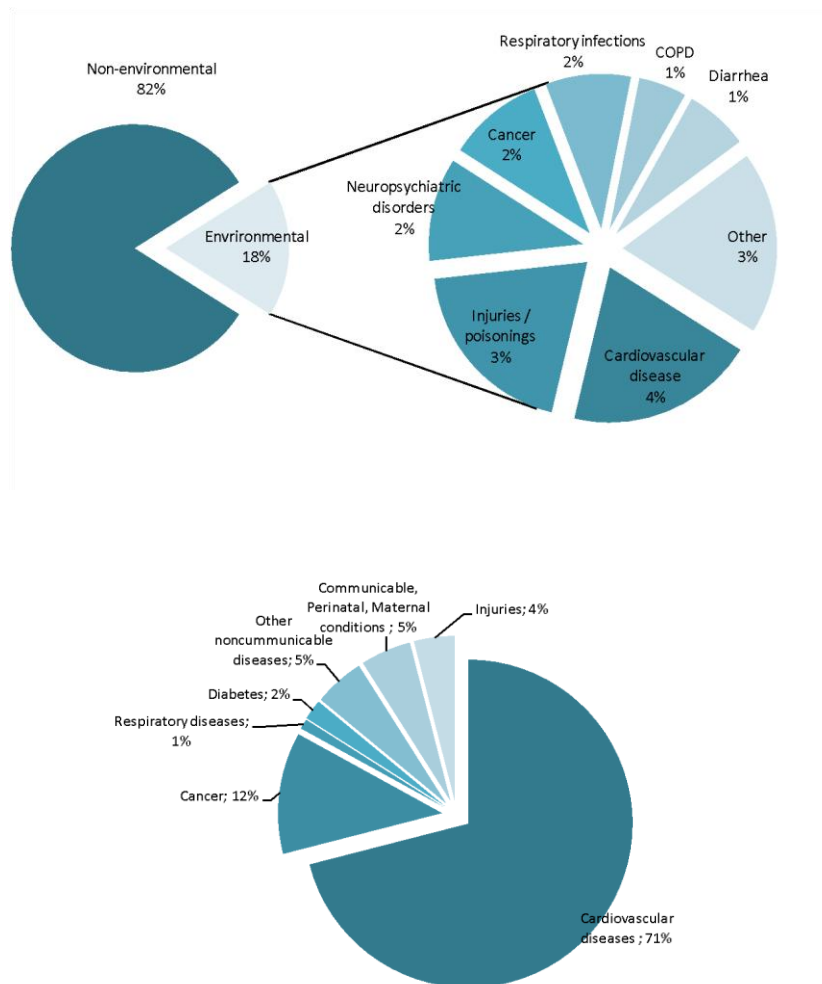


**Figure 22: Mortality Structure (Georgia, all ages) (Source: Global status report on non-communicable diseases. WHO (2010))**

<sup>13</sup> DALYs - Disability Adjusted Life Years

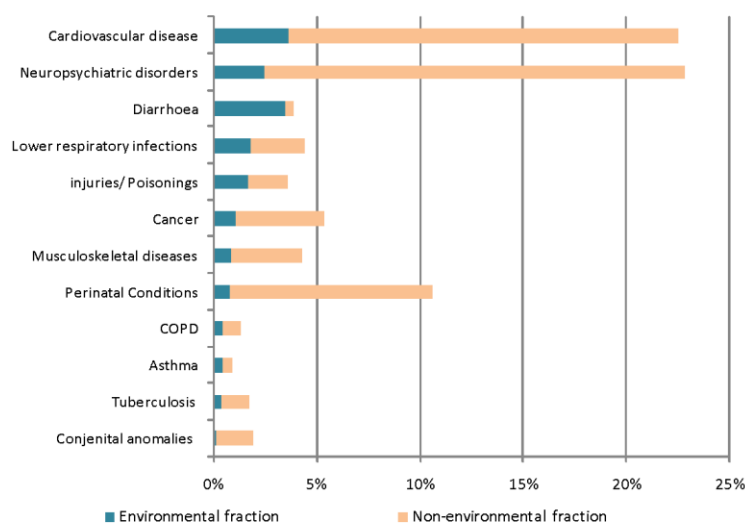
<sup>14</sup> Global status report on non-communicable diseases. WHO (2010)





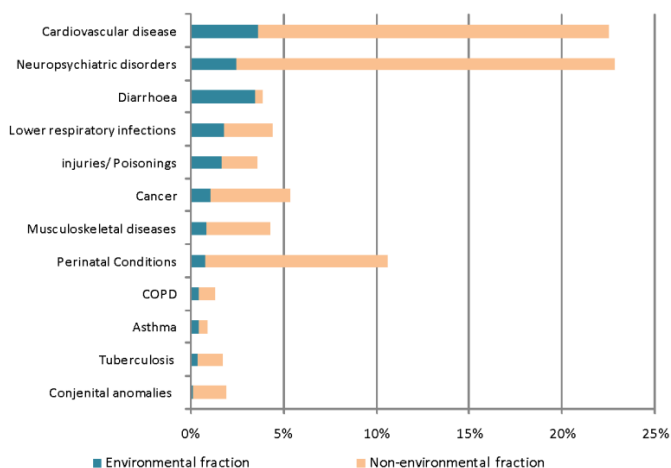
Among disease burden attributable to the environmental factors about 1/5 is caused by cardiovascular diseases, followed by injuries/trauma and cancers (Figure 23: Disease Burden Structure by Environmental Fractions (Georgia, DALYs, all ages, 2004)).

**Figure 23: Disease Burden Structure by Environmental Fractions (Georgia, DALYs, all ages, 2004)**



Environmental factors are responsible for a certain fraction in the burden of various disease conditions. E.g. environmental risk factors are accountable for majority of diarrheal disease burden, almost half of injuries/poisonings and asthma, one third on COPD and 1/6 of cardiovascular disease burden (Figure 24: Diseases with Largest Environmental Contribution<sup>15</sup> (Georgia, DALYs, all ages, 2004)).

**Figure 24: Diseases with Largest Environmental Contribution<sup>16</sup> (Georgia, DALYs, all ages, 2004)**



<sup>15</sup> For each disease fraction attributable to environmental risks plus non-environmental fraction comprise total disease burden

<sup>16</sup> For each disease fraction attributable to environmental risks plus non-environmental fraction comprise total disease burden

Children are more vulnerable to environmental risk factors. As a result they suffer a disproportionate share of the environmental health burden with regards to mortality and morbidity. In Georgia, where estimates are based on regional estimate of low and middle income countries of the European region, in children under 5 years of age 14% of mortality and 30% of overall disease burden is attributable to modifiable environmental risk factors ([See Annex 8: Percent of DALYs and Deaths Attributable to the Environment in Children under 5 Years by Selected Regions \(2004\)](#)). For children most harmful environmental risk factors are: unsafe water, inadequate sanitary and hygiene, injuries, indoor air pollution and lead exposure.

The majority of the Georgian population (93.6%) is exposed to one and/or more risk factors, 35.2% - to 3-5 risk factors. Such indicators in men are twice as high as in women. Nearly a half (49.7%) of the older population aged 45 and over is at a high risk of non-communicable diseases.

Life expectancy at birth shows expected years of life and assesses overall health status of the population. It is one of the key indicators of country's social-economic development. In the 1990s the average life expectancy rate in Georgia dropped down dramatically due to civil wars and economic crisis in the country. However, starting from 1995 it went upward and reached its highest index of 75.1 years in 2007. The year of 2008 marked the slight decrease of the trend mainly caused by the armed conflict with Russia and global economic crisis. This index again started to increase from 2010 and in 2011 totaled 74.5 years ([See Annex 9: Average Life Expectancy at Birth](#) and [Annex 10: Average Life Expectancy at Birth in Some Countries of EU \(2010\)](#)). The difference between female and male average life expectancy rate is very high in Georgia (7-8 years on average). Average life expectancy of Georgian population is almost identical to average rate (76.3 years) of European states, less than that in the EU states (79.8) and much higher than that in the CIS states (69.5 years).

As a result of death registration improvement, 2005-2011 was characterized by the growth of the number of deaths. As for the incidence<sup>17</sup> and prevalence<sup>18</sup> rate, they were also characterized by upward trends, which can be explained by the improvement of statistical accounting on one hand, and by the increase of the access to medical care on the other. ([See Annex 11: Mortality, Prevalence and Incidence Rate per 1,000 people](#)).

Maternal and child mortality rates represent good indicators while evaluating health system and overall development of the country. The last decade in Georgia marked the decrease of maternal and child mortality rates. This change was caused by the economic development of the country and reforms in the healthcare sector. In the given timeframe, infant mortality rate was reduced almost twice ([See Annex 12: Infant, Children \(under 5\) and Maternal Mortality and Millennium Development Goals](#)). Infant mortality rate in Georgia is higher than in developed countries of Europe (on average 4-5 children die during a year). Armenia, Moldova and Georgia have almost similar indicators (18-20 children per 1,000 live births).

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<sup>17</sup>**Incidence:** The frequency with which something, such as a disease, appears in a particular population or area. In disease epidemiology, the incidence is the number of newly diagnosed cases during a specific time period. The incidence is distinct from the prevalence which refers to the number of cases alive on a certain date per 100 000 population.

<sup>18</sup>**Prevalence:** The proportion of individuals in a population having a disease. Prevalence is a statistical concept referring to the number of cases of a disease that are present in a particular population at a given time 100 000 population.

Under 5 years mortality rate, along with infant and maternal mortality rates represent evaluation criteria for the achievement of Millennium Development Goals (MDG). From 2000 to 2010, in Georgia, mortality rate of children under age of 5 dropped from 24.9 to 12.0; maternal mortality rate went down from 49.2 to 27.4. However, increase of this rate in 2009, like in many other European countries, was caused by H1N1 flu pandemic and combination of medical and demographic statistics. ([See Annex 12: Infant, Children \(under 5\) and Maternal Mortality and Millennium Development Goals](#)). Comparison of this indicator with the European statistics shows that maternal and children (under 5) mortality rate is identical with the average indicator of some European states, but is higher than the average rate of EU countries.

Study of the mortality data of Georgia, reveals that cardiovascular diseases represented leading causes of death until 2010 ([See Annex 13: Five Most Frequent Cases of Mortality](#)). Mortality caused by cardiovascular diseases is very low as compared to the average rates of WHO European countries and EU states ([See Annex 14: Standardized Rate of Cardiovascular Mortality, 2009](#)).

Cancer presents a leading cause of mortality worldwide. In Georgia mortality rates of malignant tumors still remain high, main reason of which is late detection of cancer cases. More than 70% of the cases are diagnosed at advance (III and IV) stages. By location, breast cancer and cervical cancer in women and lung cancer and gastric cancer – in men represent leading malignant tumors in Georgia. In Europe, Georgia has the lowest standardized index of cancer mortality (in 2008 – 102.8 per 100,000 people).

Traumas and poisoning occupied the fourth place among the causes of mortality. However, since 2008 the cases of such deaths reduced ([See Annex 13: Five most Frequent Cases of Mortality](#)). Standardized rate of trauma and poisoning mortality in the country (35.7 per 100,000 people) is twice less compared to Europe (63.4) and three times less than the average ratio of CIS states (114.5). For years digestive system diseases represented the fifth causing reason of mortality.

Respiratory system diseases are the most frequent causes of morbidity in the country. It is significantly high than the other causes of incidence (38-40% of total morbidity). Acute respiratory infections are leading the morbidity structure (37% of new cases) ([See Annex 15: Five Most Frequent Cases of Incidence](#)).

Respiratory system diseases are characterized by high prevalence and incidence rates in children's population in Georgia. Growing tendency was observed during 2000-2010. In 2010 Incidence rate in children far exceeded (3.26-times) the country average level.

The second cause of morbidity is digestive system diseases, the number of which almost doubled in 2006-2011 years. Nosology groups for both adults and children show that the diseases related to the following organs were the most prevalent: oral cavity, salivary glands and jaws, esophagus, stomach and duodenum, as well as gallbladder, bile duct and pancreatic illnesses.

2006-2011 years marked the growth of circulatory system diseases in Georgia, which can be explained not only by the actual increase of the incidence, but also by the improvement of

data collection as compared with previous years. Hypertonic, ischemic and cerebral-vascular diseases account for the largest share of circulatory systems morbidity structure.

Mental health represents an integral part of the human health and is linked with many social, economic, biologic and external factors. From 2005 till 2008, as a result of economic and social stability in Georgia, the new cases of mental disorders were reduced both within the overall population and the children. Due to the stress received from 2008 armed conflict with Russia the incidence increased, however, from 2009 this trend started to go down again ([See Annex 16: New Cases of Mental and Behavioral Disorders in Georgia](#)). Incidence of mental and behavioral disorders in Georgia is one of the lowest not only in Europe but in the South Caucasus as well.

The recent years, also marked the increase of some other results of traumas, poisoning and exposure to external factors; out of which the occurrence of injuries, vascular system damages, external traumas and bruises are very common. Number of car accident victims accounts for 9-10% of traumas, poisoning and exposure to external factors, as for the mortality it is very high and varies from 48-66% by years ([See Annex 17: Occurrence and Mortality Rate of Some other Results of Traumas, Poisoning and Exposure to External Factors](#)). Georgia occupies the last position by the standardized ratio of car accident deaths (0.89 per 100,000 people) within Europe (average ratio of European countries totals 9.9).

### **3.6.2. Water**

Majority of the Georgian population uses underground waters for drinking. Ground waters (well and spring) are mainly used for that purpose, which unlike artesian water basins, is poorly protected from contamination.

Main contaminants of underground waters are organic substances, oil products, pesticides, heavy metals, etc. Pesticides are especially dangerous due to their high toxicity and ability to dissolve in water, accumulate and migrate. Microbiological contamination with thermally tolerant coliformal bacteria E.Coli and Faecal Streptococcus represents special threat, since ground waters are protected from sun UV radiation, which results in prolonged viability of those bacteria and high risk of waterborne infectious diseases for years.

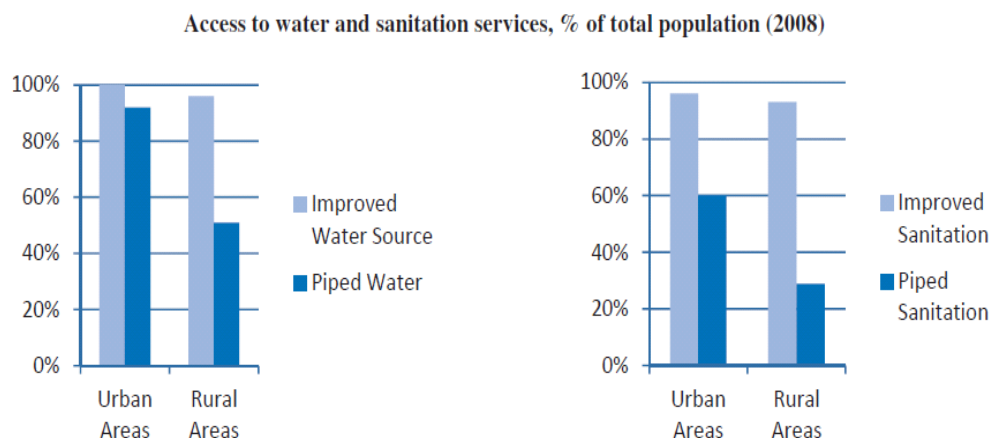
Surface waters are also subject to anthropogenic impact. According to monitoring data of quality of surface fresh waters, conducted by the National Environment Agency<sup>19</sup>, concentration of ammonia in water bodies in most cases exceeds maximum allowed concentration for humans and nitrite concentration exceeds the allowed concentration established for fish safety. Main contamination causes are municipal discharges (centralized or non-centralized) as well as illegal landfills on river banks. In some cases, rivers are contaminated by cattle farm discharge waters. In regions, where river filtrates represent ground water supply sources, there is a high risk of transfer of contaminants to the ground waters.

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<sup>19</sup>See web-site of the Agency: <http://www.nea.gov.ge/>

According to 4<sup>th</sup> assessment by the European Agency for Environment Protection<sup>20</sup>, in 2008 80% of the population of Georgia had access to improved water sources (90% of urban population, and 35% of rural) (Figure 25: Access to Water and Sanitation Services in Georgia in 2008).

**Figure 25: Access to Water and Sanitation Services in Georgia, 2008**



Source: JMP database; Interstate statistical Committee of the Commonwealth of Independent State (for piped sanitation): [www.cisstat.com/2base/frame01.htm](http://www.cisstat.com/2base/frame01.htm), February 2011.

Source: OECD (2011), Ten Years of Water Sector Reform in Eastern Europe, Caucasus

The OECD/EAP Task Force which has had supported EECCA countries to provide adequate water services to their citizens, assessed reforms implemented in the last 10 years in those areas in 11 countries: Azerbaijan, Armenia, Georgia, Ukraine, Belarus, Moldova, Russia, Kazakhstan, Kyrgyzstan, Uzbekistan and Tajikistan and Central Asia.

According to the above-mentioned research, in Georgia, between 1990 and 2008, access to drinking water increased by 17%<sup>21</sup>, of which improved water has been provided to 100% of urban population and 96% to the rural population. Together with Belarus, Georgia is a leading country among the listed 11 countries in terms of access of urban population to the improved water sources.

Despite abundant sources of surface and ground waters almost all regions of Georgia experience deficit of supply of drinking water of normative quality and sufficient quantity.

Inspection conducted by the Food safety, veterinary and plants protection service in 2007-2009 on the whole territory of Georgia showed that quality of drinking water supplied

<sup>20</sup>Ministry of Environment of Georgia, Setting targets for Georgia for the purposes of the Protocol on Water and Health (interim report project), Tbilisi 2011

<sup>21</sup>According to the JMP data of 2009 on drinking water and sanitary conditions

through the piped water supply systems does not meet the established requirements. In most cases, chemical indicators of epidemic safety (permanganate oxidability) exceeded allowable limits, and residual free chlorine was not recorded at all; microbiological contamination was detected as well (total coliformal bacteria and E.Coli exceeded established limits).

Especially bad situation was found in Poti, Zugdidi, Martvili, Senaki, Akhaltsikhe, Dmanisi, Lentekhi, Ambrolauri, Ozurgeti, Baghdati, Tskaltubo, Zestafoni regions. Main reasons for such violations were poor sanitary and technical condition as well as poor exploitation of the water supply system.

Sanitary reliability of small scale water supply systems in rural areas is very low. For instance, in 2006-2007, water supply of farms of Samtskhe-Javakheti and Shida Kartli was studied<sup>22</sup>. In both regions almost in all wells, springs or water reservoirs was found E. Coli and general coliformal bacteria, number of which exceeded established hygiene norms.

Problems of small scale water supply systems were also detected by the research of 2011<sup>23</sup>: 73% of Marneuli and Dusheti bore holes, water reservoirs, water pipelines to family farms were contaminated, including with St. Fecalis, which was found in 38% of samples in Marneuli and in 49% of samples in Dusheti. Reasons for contamination are low sanitary reliability of water supply sources, incorrect design and exploitation of wells and springs.

Low quality of water is directly related to high economic costs due to adverse effect on health and high capital costs. Unfortunately, such costs are not adequately recognized during a decision making process at the national or local level. Analysis of such costs in other countries and regions shows that return on investments into water supply and sanitation is 7:1 accordingly. Thus the development strategies should better integrate water supply and sanitation infrastructure development issues, as the most cost-effective actions aimed at achieving sustainable economic development.

### **3.6.3. Air**

Air pollution, especially inhalable particulate matter (PM<sub>10</sub>), exacerbates asthma symptoms and recent studies indicate that it can also contribute to the incidence of the disease.

Urban air pollution, especially particulate matter, also causes other significant health problems, reducing the life expectancy of residents of more polluted areas by over one year. After substantial decreases in outdoor air pollution in most of the WHO European region in the 1990s, progress in the last decade has been minimal. Over 92% of the urban population for who relevant air quality data is available live in cities where air quality guideline for PM<sub>10</sub> is exceeded.

Heat supply is a significant source of contamination in inhabited areas in Georgia. In the 1990s, the centralized heat supply system became inoperable in all inhabited areas of Georgia. At present time heat supply in buildings and houses is possible through individual

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<sup>22</sup>Scientific research of Georgian Agriculture hygiene, S/R Sanitation and Hygiene Institute, GtZ, 2007

<sup>23</sup>Sakvarelidze National Centre for Disease Control and Public Health and Natadze S/R Institute for Sanitation, Hygiene and Medical Ecology – results of joint research

heat supply systems or devices. In urban areas gas consuming individual devices are used. A part of such heaters is a technically safe construction that allows to take burned gases out of buildings, although cheaper heaters are used, that emit burned gases inside buildings.

In rural areas and village's wood is mainly used for heating and cooking purposes, although zinc wood fired – ovens are ineffective and cause air pollution. In many countries, over 80% of children are regularly exposed to second-hand tobacco smoke in the home and even more outside the home. Although regulations introducing spaces free of tobacco-smoke, following the principles of the framework convention on tobacco control, have proved to be highly efficient in reducing the impacts of tobacco on health, they have yet to be introduced or developed in large parts of the region.

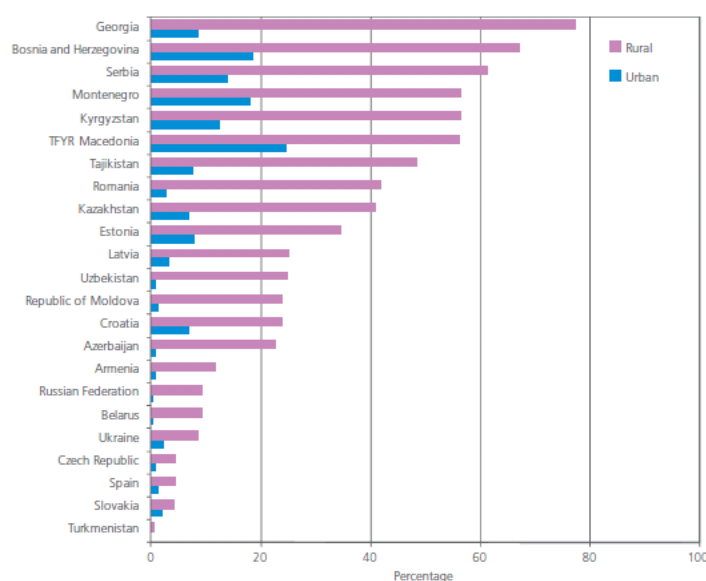
Due to the amendments made in the Georgian legislation, measures are quite fully outlined in the framework convention on tobacco control although much more is needed to be done for their comprehensive implementation. This primarily applies to the campaign on tobacco free schools and medical facilities, which is still conducted in Georgia with inadequate activity.

According to UNICEF data, in rural areas of Georgia 78% of children live in homes where solid fuel is used for cooking. This practice substantially raises risk of chronic obstructive pulmonary disease development not only for children but for housewives as well (Figure 26: Percentage of Children Aged 0-14 Years Living in Homes Using Solid Fuel for Cooking, 2005).

**Figure 26: Percentage of Children Aged 0-14 Years Living in Homes Using Solid Fuel for Cooking 2005. WHO European Region, 2005**



Fig. 37. Percentages of children aged 0–14 years living in homes using solid fuels for cooking, WHO European Region, 2005



Notes: TFYR Macedonia = the former Yugoslav Republic of Macedonia.

Data for Azerbaijan, Kazakhstan, Kyrgyzstan and Uzbekistan are for 2006; data for Croatia, the Czech Republic, Estonia, Georgia, Latvia, Slovakia, Slovenia and Spain are for 2003; data for Romania are for 2002; data for Turkey are for 1999; data for Turkmenistan are for 2000; data for Ukraine are for 2007.

Source: UNICEF (25), Measure DHS (26), WHO (27).

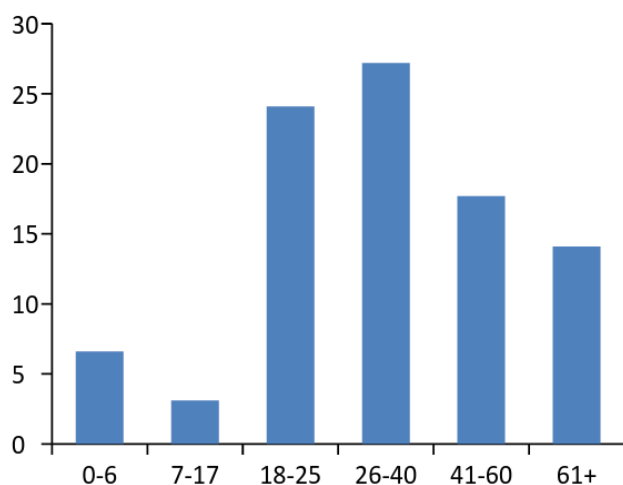
### 3.6.4. Injuries

Unintentional injuries are a leading cause of death in young people aged 0–19 years, with road traffic injuries contributing to the largest burden followed by injuries occurring in the home and in leisure settings. Inequalities between countries are extreme, with mortality and injury incidence rates differing by an order of magnitude between countries. The substantial overall reduction in traffic-related deaths over the last two decades shows that these injuries and deaths are preventable.

According to the WHO European status report on road safety,<sup>24</sup> general tendency of road traffic injuries in Georgia corresponds to the European average and is highest in the age category of 16–40 (Figure 27: Aged-specific Mortality Rates from Road Traffic Injuries in Georgia by Age 2009).

**Figure 27: Aged-specific Mortality Rates from Road Traffic Injuries in Georgia by Age 2009) (per100000)**

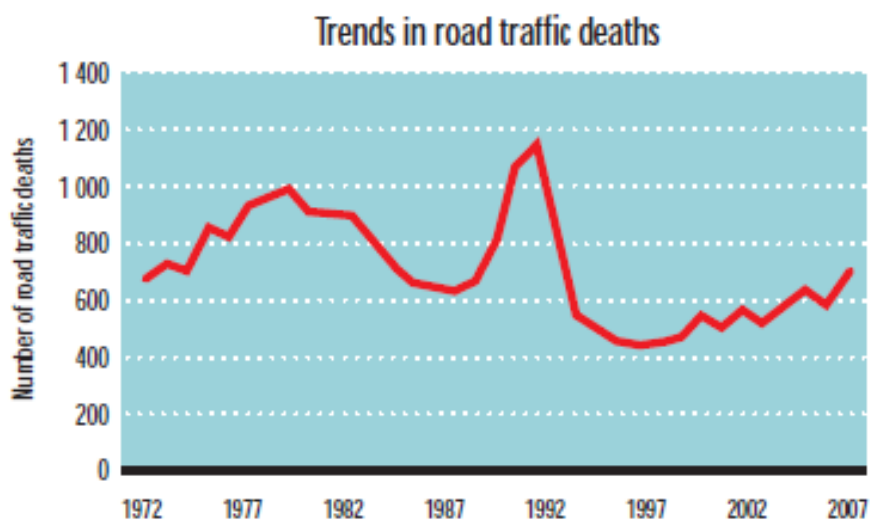
<sup>24</sup> European status report on road safety, 2009 [http://www.euro.who.int/\\_data/assets/pdf\\_file/0015/43314/E92789.pdf](http://www.euro.who.int/_data/assets/pdf_file/0015/43314/E92789.pdf)



Source: European status report on road safety, 2009

According to the data for 2007 on road traffic injuries in European region, among 10 countries with the highest mortality rates, Georgia ranks 9 and the indicator composes 16.8 (per 100 000). At the same time, mortality is characterized by an upward trend in the country road safety profile (Figure 28: Trends in Road Traffic Death in Georgia, 1972-2007).

**Figure 28: Trends in Road Traffic Death in Georgia, 1972-2007**



Source: European status report on road safety, 2009

As a result of the recently implemented measures, that considered not only improvements in the road highway infrastructure, but also significant improvements of road surfaces, renewal and expansion of public transportation, adoption of legislative amendment package, mandatory use of seat belts and prohibition of mobile telephone use while driving, situation substantially improved in Georgia. There is downward trend in road traffic accidents and numbers of road traffic injuries as well as road traffic deaths. Such a progress was reflected in the 2011 report of the task force working with the WHO liaison officer on road safety and road traffic injury prevention.

### **3.6.5. Chemical Substances**

The literature and reports indicate about the sources of POPs in Georgia mostly include abandoned pesticides storage and poorly constructed burial sites as a result of wide pesticide use in previous decades in Georgia; the chemical and power industries; burning of fossil fuels and waste on landfills. Other potential sources of POPs in Georgia are former Soviet military basis.

In addition to abandoned pesticide storage facilities, one of the persisting problems is pesticide burial sites within the country. Pesticide burial sites usually are covered only with a thin layer of soil, which provides poor protection. Sometimes, chemicals are washed out by rain.

Critical hotspots of persistent organic pollutants also include abandoned former Soviet military sites, where different persistent organic chemicals are stored on open ground, which also provide serious problem for the environment, since pesticides might be released into the water bodies afterwards<sup>25</sup>. However, in recent years situation with this regards has changed.

In 2008-2009 Georgia participated in fourth WHO Human Milk Survey using National Protocol for the monitoring of POPs in human milk in Georgia based on the Guidelines for Developing a National Protocol developed. In July-August, 2009, breast milk samples were collected from first-time mothers living in villages of the Mtskheta-Mtianeti and Kakheti Regions. The pooled sample was analyzed in the State Laboratory for Chemical and Veterinary Analysis of Food (CVUA) in Freiburg, Germany (qualified as the WHO Reference Laboratory for POPs in Human) for analytically simple and complex POPs, including PCDDs, PCDFs and PCBs. Result revealed such picture:

- PCDD/Fs mostly were below limit of quantification (LOQ) or not detected. However, OCDD exceeds LOQ and is of 11.7 pg./g lipid weight;
- PCB was below limit of quantification (LOQ) or not detected. However, some of them exceed LOQ, ng/g lipid weight: PCB 138 9.39, PCB 153 11.5 and Summed Indicator PCB 28.6.
- From basic POPs:

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<sup>25</sup> International POPs Elimination Program (2006), Survey of the POPs-related situation in the republic of Georgia, "EcoVzgliad" Union for Sustainable development, May 2006, Page 9.  
<[http://www.ipen.org/ipepweb1/library/ipep\\_pdf\\_reports/1geo%20georgia%20country%20situation%20report.pdf](http://www.ipen.org/ipepweb1/library/ipep_pdf_reports/1geo%20georgia%20country%20situation%20report.pdf)>

- o DDT group concentrations were the highest - 632.0 nag/g lipid weight
- o beta- Hexachlorocyclohexane level was - 92.6 nag/g lipid weight

Building of new enterprises are required to undergo procedures to evaluate their potential effect on the environment, that consequently excludes significant pollution of the environment and harmful impact on human health but this requirement doesn't apply to small and family run enterprises. At the same time in some of the regions along with mushrooming of small food enterprises their harmful effect on the environment is accumulated, in particular, research carried out in the country, showed significant pollution of water bodies by small enterprises (discharging milk brine into rivers and channels).

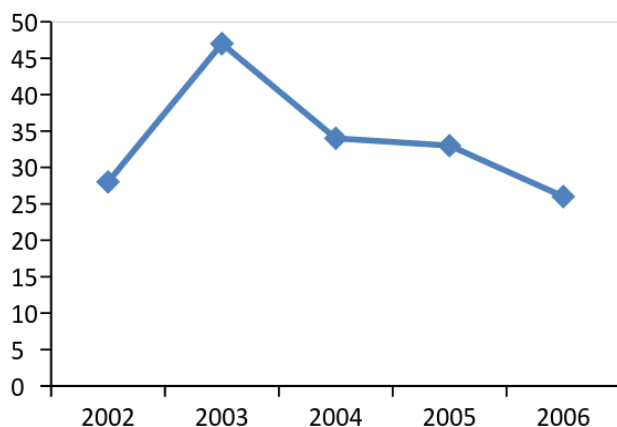
### 3.6.6. Occupational Health

Since 2002 research has been carried out within the framework of the State program on Health Promotion and Disease Prevention, Active Case Detection component of the Ministry of Health, Labor and Social Affairs of Georgia; the research focused on prevention of occupational pathology in workers exposed to hazardous factors.

In 2002-2006, 168 cases were diagnosed with occupational diseases at N. Mskhviladze scientific research institute of labor medicine and ecology, of them -150 (89.29%) - male and 18 (10.71%) – female (Figure 29: Trend of Occupational Diseases in Georgia, 2002-2006).

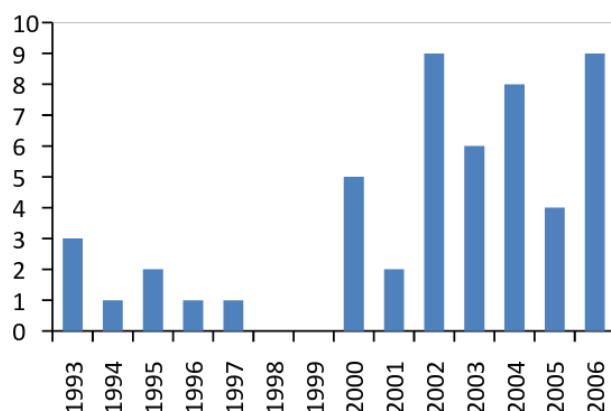
The majority of the cases fell on ages determined by the Association of Occupational Disease Development with working time-experience (Figure 30: Occupational poisoning by years).

**Figure 29: Trend of Occupational Diseases in Georgia, 2002-2006**



Source: NCDC

**Figure 30: Occupational Poisoning by years**



Source: Information of the N. Makhviladze Scientific-research Institute of Labour Medicine and Ecology, 2008.

The general spectrum of Occupational diseases in Georgia for 2002–2006 is the following:

1. Respiratory system Diseases (Workers of mines and quarries or pits);
2. Two sided cochlea neuritis with professional dull hearing (frequently in pilots, whose flying time exceeded 10 000 hours);
3. Different scale of manganese occupational poisoning (mainly in workers of “ChaiturManganese” in Chiatura and “Fero” in Zestaponi);
4. Different levels of vibratory diseases (mainly in drivers of crane or big volume auto transport means – “Beliz” drivers).

Besides these diseases, single cases of some rare occupational diseases were encountered.

As it is seen in Figure 30 incidence rate was quite low in 2001 because most of the enterprises were shut down in Georgia. After the privatization the existed enterprises resumed working that gradually resulted in increase of occupational diseases.

Starting from 2006 reported cases of occupational diseases has decreased, with reduction of incidence rates; the situation can be explained failure to detect cases at earlier stage. N. Makhviladze scientific research institute of labor medicine and ecology is mainly referred by patients who already have developed the stage of a disease, that allows to obtain any group of disability (disability group is determined only on the basis of the diagnose, made at the institute).

In 2007-2008 the Scientific Research Institute of Labor Medicine and Ecology carried out studies on health status of workers of joint-stock company “SAKCEMENT” at Kaspi cement factory.

The study results showed that employees experience exposure to hazardous (risky) factors (raw material, ore, interim and final products-cement, dust, chrome, intensive noise, increased temperature and thermal radiation), that leads to occupational diseases, namely, increase of the respiratory system diseases accompanied with temporary disability. In

particular, 13 employees were diagnosed with lung pathology (out of which 6 were tuberculosis, 6 – chronic bronchitis, 1 - asthma), 9 - allergic dermatitis, 5 – atrophic rhinitis of upper respiratory tract and 5 rhinopharyngitis, 5 - dull hearing, 7 – cardio-vascular pathology (ischemic heart diseases). All these pathologies may be associated with the characteristic hazardous factors of cement factory and be considered as preface to the development of occupational pathology.

Currently no comprehensive information on occupational diseases and occupational trauma (or poisoning) is available in Georgia. Only those patients who anticipate assistance from the side of the state (because of disability) are registered and diagnosed with occupational diseases, thus only they refer to respective medical facilities.

### **3.7. Waste Management**

#### **3.7.1. Solid Waste Management**

#### **3.7.2. Municipal Waste**

The exact annual amount of the waste originated in Georgia is not known. As per the assessment of 2007<sup>26</sup>, 3.4 million m<sup>3</sup> domestic wastes (i.e. approximately 800 thousand tonnes<sup>27</sup>) are originated in Georgia annually (See Table 4: Distribution of Domestic Waste in Different Regions of Georgia). 45% of the domestic waste is originated in Tbilisi (as of

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<sup>26</sup>Scoping Report is built on the results of the waste inventory on the territory of Georgia that was conducted with support of UNDP and the Ministry of Environment and Natural Resources Protection of Georgia in 2007.

As per the document elaborated in 2007 “Report of Waste Inventory on the Territory of Georgia”, the conducted waste inventory aimed at gathering the statistical information for developing the Waste Management Strategy, as well as the National Action Plan in the near future..

There was no inventory of similar scale undertaken in Georgia since 2007. Consequently, there is no document that could be used as a basis for obtaining comprehensive and official updated statistical data. Until January 2015, waste inventory and maintenance of relevant data base was not even legally defined for organisations.

Another matter of concern is the feasibility of undertaking additional studies for obtaining the updated information within the above project. As already noted, the maintenance of relevant statistical information was not legally defined until 2015. Consequently, even the attempt of gathering information from 90% of organisations about the quantity of waste produced in 2014 would be tentative only. On the other hand, as shown by the studies conducted in 2007, obtaining the newest information is a protracted process and requires additional funds.

With a view to conduct waste inventory in Georgia in 2007, a 7-expert group was established that worked on obtaining the statistics presented in the document for 4 months (approximately 600 man-days). The only methodology applied for obtaining the information about the amount of waste was as follows: all organisations producing certain amount of waste, as well as the organisations involved in the waste management process were sent a questionnaire asking them to submit the required information. This is obvious that 4 months is not sufficient for obtaining comprehensive information. As noted in the document, many organisations did not keep waste statistics at all.

At this stage, knowing in advance that the information (in particular, regarding the amount of waste produced by organisations, their hazard types and management tools) would only be approximate; there is no need for undertaking additional studies for waste inventory. For the purpose of developing the SEA Report, it would be more practicable to use the existing materials of waste inventory conducted in 2007 and, as need be, calculate an approximate amount of waste produced in 2014 using the amount of produced waste per capita and the population growth coefficient that is a worldwide common practice.

<sup>27</sup>The average density of domestic waste is taken as 250 kg/m<sup>3</sup>.

2007). Other important waste-originating regions are the Autonomous Republic of Ajara, Samegrelo-Zemo Svaneti, Imereti, KvemoKartli and ShidaKartli.

**Table 4: Distribution of Domestic Waste in Different Regions of Georgia, 2007**

Region	Number of population	Amount of the originated waste as per the inventory, m <sup>3</sup> /year	Amount of the originated waste per capita		Amount of the originated waste as per the expert's opinion, m <sup>3</sup> /year
			Inventory according to hectares	Expert's opinion	
Ajara A/R	377 200	327 676	0.87	0.95	358 340
Guria	139 300	14 890	0.11	0.5	69 650
Samegrelo-ZemoSvaneti	472 900	203 270	0.43	0.6	283 740
Imereti	700 100	191 650	0.27	0.7	490 070
Racha-Lechkhumi-Svaneti	49 100	1 850	0.04	0.4	19 640
Samtskhe-Javakheti	208 500	122 538	0.59	0.5	104 250
ShidaKartli	314 000	161 090	0.52	0.7	219 800
Mtskheta-Mtianeti	124 500	14 052	0.11	0.5	62 250
KvemoKartli	507 600	179 187	0.35	0.7	355 320
Kakheti	404 800	60 500	0.15	0.6	242 880
Tbilisi	1 103 300	1 095 000	0.99	1.1	1 213 630
Total	4 401 300	2 371 703	0.54	0.66	3 419 570

It should be noted that the information for the whole country is scarce (except that for Tbilisi). The major reason for this is that the relevant offices of the local management bodies fail to manage and control the current situation.

No waste registration system is developed, or if such system is found anywhere, it is anyway deficient. This is why the information about the amount of waste is often doubtful. The assessment criterion is considered to be the number of the population or capacity of the waste-transporting vehicles, and even this is not quantified on a regular basis. As per the inventory data, the total amount of domestic waste in 2007 was 2 767 311 m<sup>3</sup>/year, while it was 5,5mln. m<sup>3</sup>/year as per the data of the previous years.

In 2006, within the scope of another project, the quantitative analysis of the waste on the territory of Tbilisi was accomplished. The waste was registered in two ways: (a) calculation of the waste accumulation based on statistical data and (b) fixing of the amount of waste collected and transported to the landfills.

As the present work suggests, the theoretical data and the results of the calculated amount of waste delivered to the landfills were in fact identical. The theoretical values are little more the figures of the amount of waste delivered to the landfills. Such a difference must be due to the failure to register and deposit of all the waste to the landfills. The annual accumulation of the waste gained through these calculations except the construction waste is 285428 tonnes<sup>28</sup> a year making 1 111 712m<sup>3</sup>, almost equaling to the results of the inventory of 2007, which suggests that the amount of the domestic waste originated on the territory of Tbilisi is 1 095 000 m<sup>3</sup>.

### **3.7.3. Industrial waste**

The summarized results of the different categories of industrial waste inventoried in 2007 in different regions of Georgia shows that the largest part still to come on mining waste (85%). In various regions of Georgia hazardous pollution centers are creates the old, stored mining waste

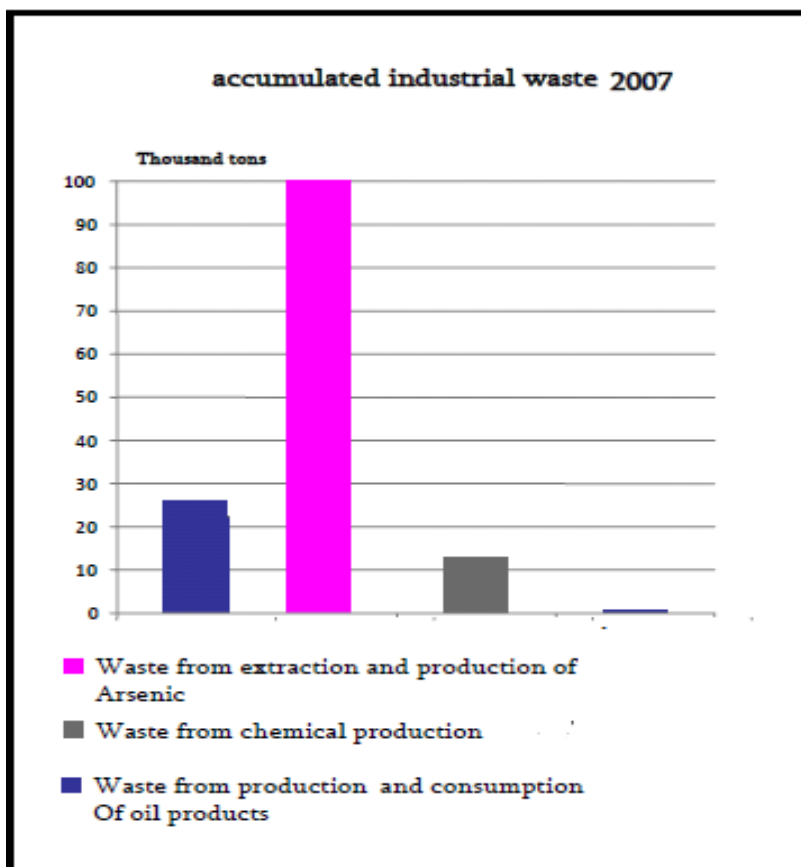
There are no separate landfills for industrial waste in Georgia that is why the part of industrial waste is disposed at landfills for municipal waste, while part of it is accumulated on the premises of enterprises, which produced the waste. In 2007 information was collected from 450 large and medium enterprises on industrial waste, accumulated by them. In total such waste amounted to 6 million tones.2.2% of described industrial waste (140 thousand tonnes) was hazardous waste (Figure 31: Accumulated Industrial Waste in 2007).

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<sup>28</sup> Information taken from “Conception of Tbilisi waste management” 2005 p 30.



**Figure 31: Accumulated Industrial Waste in 2007**



In the Soviet era, in terms of the full-capacity operation of the industrial sector, a particularly great amount of waste was originated and major hearths of pollution were originated in such cities, as Rustavi, Kutaisi, Zestaponi, Bolnisi and others, with many thousands of tonnes of industrial waste (slag, waste of treated and waste rocks, etc.) accumulated from the metallurgical and ferroalloy plants, mining complexes of plants and other enterprises. As a result, for many years, the areas adjacent to these enterprises were transformed into the geo-chemical provinces with increased concentration of toxic elements. Due to the diminished capacity of the industry sector in the following years, the intensity of this process was retarded; however, the threat of the negative impact on the environment still exists. Particularly worthwhile are the enterprises not operating at present or having changed their profile, but still keeping old accumulated waste. Below lists some of such enterprises:

1. Racha-Lechkhumi Region, near village Uravi, on the open area located more than 100000 Tonnes arsenic ores<sup>29</sup>. The borrow pit stopped operation in 1992 y;
2. Joint Stock Company “Kutaisi litopone Plant” - The plant stopped operation from 1967 y. On 8 hectares of the plants territory are located the barium and zinc-containing wastes.
3. Joint Stock Company “Madneuli” – village Kazreti. From 1967 on the territory are located - 1687000 tone enriched ore tails
4. Joint Stock Company “Chiatura manganumi” - From 1950 on the territory are located 6244481 tones of enriched ore tails and from 1980 y. 9000000 tones of sledges.

As a result of the inventory the following amounts and categories of waste are registered on the territory of Georgia (as of 2007):

1. Waste of oil products processing and use - 27 517, 55 t.
2. Black and color metal scrap - 1717.53 t.
3. Waste of chemical production and processing - 781118,46 t.
4. Polyethylene and plastic waste – 12,2 t
5. Glass tare – 204,08 t
6. Luminescence lamps - 68100 pcs.
7. Mining and processing waste - 5262766 t
8. Construction waste - 35678,65 t
9. Wood processing waste - 19592,59 m<sup>3</sup>
10. Alcohol and alcohol-free drinks processing waste – 44 996 t
11. Other organic and inorganic waste - 1490,68 t.

The amount of hazardous waste in the total waste categorized above is 908,736 tons.

#### **3.7.4. Medical waste**

As the results of the inventory of 2007 suggest, the total amount of medical waste accumulated at 268 medical-preventive establishments of the country per year is 9 449 258,3 kg, including: 8293489,3 kg of Class A waste, 1002622,2 kg of Class B, 103929,4 kg of Class C and 49217,4 kg of Class D waste<sup>30</sup>. If considering that the load of the medical-preventive establishments in the regions varies from 30 to 40%, 40% values of the data of Table 5 were calculated, and it was established that 2 427 755,52 kg medical waste is

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<sup>29</sup> According to the 2007 inventory data in Racha-Lechkhumi Region, near village Uravi in the open area was located more than 100000 t arsenic ores. However, the situation is changed nowadays.

<sup>30</sup>The Order of the Minister of Labour, Health Care and Social Protection # 300/N of August 16, 2001 about adopting rules on collection, storage and treatment of the medical waste sets regulations and norms about collection, storage, treatment and disposal of all kinds of waste coming from medical institutions. These rules and norms are worked out not only for medical institutions producing such waste, but also for operators who are responsible for collection and transportation of medical waste and also for the operators of landfills where this waste is disposed of. Under the chapter “Classification of medical waste” the document lists the following four categories of medical waste:

- Category A – Non-hazardous waste from medical institutions
- Category B – Hazardous (risky) waste from medical institutions
- Category C – Particularly hazardous waste from medical institutions
- Category D – Waste from medical institutions that according to its content equals to industrial waste

accumulated in the regions in one year, including 2 145 985,24 kg of Class A waste, 259335,08 kg of Class B waste, 21868,4 kg of Class C waste and 566,8 kg of Class D waste (See Table 5: The amount of Waste Originated at the Medical-Preventive Establishments in Different Regions).

**Table 5: The amount of Waste Originated at the Medical-Preventive Establishments in Different Regions**

#	City, region	Number of beds	Amounts of different Classes of originated waste, kg				total
			Class A	Class B	Class C	Class D	
1	Tbilisi	7122	2928526,2	354284,5	49258,4	47800,4	3 379869,5
2	Ajara A/R	1642	779129	93495,5	780	246	873650,5
3	Guria	345	163702,5	19644,3	50	70	183466,8
4	Racha-Lechkhumi and KvemoSvaneti	255	120997,5	14519,7	70	-	135587,2
5	Samegrelo-ZemoSvaneti	1230	583635	70036,2	-	651	654322,2
6	Imereti	2266	1075217	129026	117	120,5	1204480,5
7	Kakheti	775	367737,5	44128,5	300	306,5	412472,5
8	Mtskheta-Mtianeti	183	86833,5	14962,1	-	-	101795,6
9	Samtskhe-Javakheti	686	490899,1	58907,9	53144	-	602 951
10	KvemoKartli	1094	519103	62292,4	200	23	581618,4
11	ShidaKartli	909	431320,5	51758,5	-	-	483079
12	Poti	266	126217	15146	10	-	141373
13	Other establishments	1307	620171,5	74420,6	-	-	694592,1
14	Georgia	17841	8293489,3	1002622,2	103929,4	49217,4	9 449258,3

### 3.7.5. Biological waste

The inventory<sup>31</sup> of the biological waste mostly gives the information about the quantity of fallen animals, including: cattle, pig, sheep, goats, and poultry and captured stray dogs. This information was provided by the relevant veterinary offices in the region. The inventory experts have made their utmost efforts to obtain as much information as possible.

The summary amounts of the biological waste in different regions are as follows:

There are 347 cattle, 278 pigs, 272 sheep and goats, 5320 poultry and 93 captured stray dogs in four districts of Shida Kartli.

There are 2690 cattle, 475 pigs, 5113 sheep and goats, 10538 poultry and 1351 captured stray dogs fallen in one town and six districts of Qvemo Kartli.

No information about the cattle, sheep, goats or captured stray dogs is gained for two districts of Mtskheta-Mtianeti, while 50 pigs and 200 poultry are fallen there.

No information about the fallen sheep, goats or pigs is gained for Ajara A/R, while 220 cattle, 1611 poultry and 1351 captured stray dogs were fallen there. In addition, 3431 kg of perished animal products was seized from the trading objects.

As for Guria region, there were 7 cattle, 54 pigs, 115 sheep and goats, 1680 poultry and 94 captured stray dogs fallen in seven districts.

In Samegrelo region, there were 1237 cattle, 358 pigs, 351 sheep and goats, 5318 poultry and 636 captured stray dogs fallen in eight districts. In addition, 1097 kg perished animal production was seized from the trading objects.

Unfortunately, no information could be gained from some regions (Imereti, Samtskhe-Javakheti, Kakheti, Racha-Lechkhumi-Svaneti), and the information obtained from other regions is also very scarce. In particular, the ways of destruction or neutralizing the biological waste used in those regions are unknown and no hazardous diseases (anthrax, rabies, bird flu, etc.) caused by animal burial places or other reasons are registered.

### 3.7.6. Waste infrastructure and capacities

Waste treatment slowly develops in Georgia, and the entrepreneurs have the permits to treat only limited types of waste (See Table 6: List of Enterprises with Permits).

**Table 6: List of Enterprises with Permits**

Waste	Location of a treatment plant	Production using the treated waste
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<sup>31</sup> Information was taken from 2007 inventory results.

Polyethylene tare and moldings	Tbilisi	Ground and briquetted polyethylene waste
	Kutaisi	Ceramic tiles
Domestic waste	Rustavi	Segregated and briquetted waste, compost
Amortized vehicle batteries	Tbilisi	Lead moldings
	Rustavi	Lead moldings
	Gardabani region, village Aghtaklia, village Lilo	Lead moldings'
Used straps and elastomeric materials	Tbilisi	Black oil
	Khobi region, village Ojikhevi	Black oil
	Kaspi region, village Metekhi	Black oil
Waste oils	Tbilisi	Restored technical oils

At present, up to 10 small incinerators of medical and biological waste operate in Georgia. The capacity of mentioned incinerators ranges from 70 to 120 kg per hour. Incinerator cannot be used for commercial purposes. Permit owners are permitted to incinerate medical waste produced by them (See Table 7: Location of Existing Incinerators). If used efficiently, these capacities can be sufficient for Georgia. However, well-organized accumulation and transportation procedures of the medical waste from medical establishments to the incinerators can be seen in Batumi and Kobuleti only.

**Table 7: Location of Existing Incinerators**

Location of an incinerator	Type of waste to be destructed	Company with the incinerator's environmental impact permit
Tbilisi	Medical waste	LEPL L. Sakvarelidze National Center for Disease Control and Public Health
Tbilisi	Veterinary laboratory waste	Environmental Technology Ltd.
Tbilisi	Waste of the Institute of Bacteriophage, Microbiology and Virology	Environmental Technology Ltd.

Tbilisi	Medical preparations, pesticides, oil waste	“Kimiani” Ltd. (located on the territory of the Institute of Physical and Organic Chemistry)
Batumi	Medical waste	LEPL L. Sakvarelidze National Center for Disease Control and Public Health
Batumi	Medical waste	Municipal enterprise “Sandasuptaveba”
Kutaisi	Medical (epidemiological) waste	Imereti Regional Center of Health
Kutaisi	Veterinary laboratory waste	Kutaisi Regional Veterinary Laboratory
Akhaltzikhe	Veterinary laboratory waste	LEPL Akhaltsikhe Veterinary Laboratory

### 3.7.7. Landfills

Georgia is divided into 10 administrative units, which include 2 autonomous republics, 64 municipalities, and 5 self-governing cities. Each municipality has its executive agency and legislative body. Waste management projection is provided by the following authorities in Georgia:

- Ministry of environment and natural resources protection;
- Ministry of regional development and infrastructure;
- Municipalities.

Non-hazardous landfills (except Tbilisi and Ajara AR) are managed and controlled by the Solid Waste Management Company under the Ministry of Regional Development and Infrastructure of Georgia. Waste management (collection and transportation) is coordinated by municipal government which is authorized to approve budget and supervise budget expenditure. Because of small budget, municipalities collect only 25-35% of total amount of generated waste<sup>32</sup>.

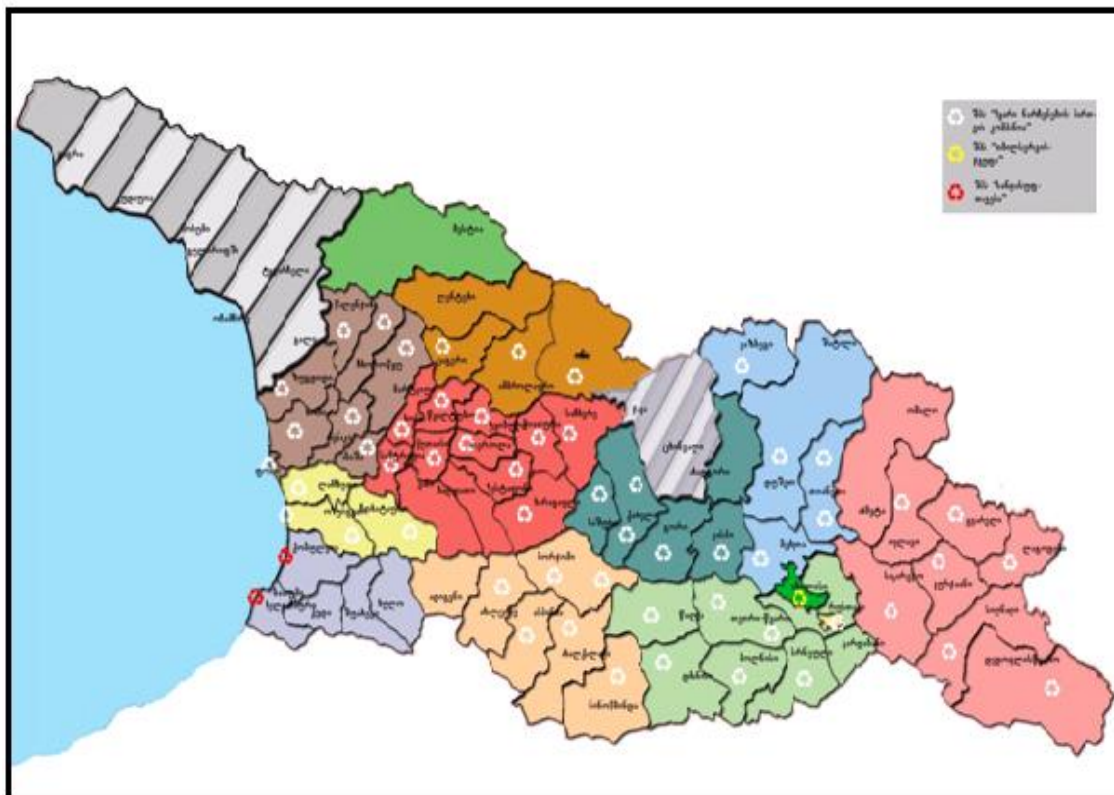
The goal of the Solid Waste Management Company is to introduce standards of solid domestic waste management to the regions, gradual closure of existing municipal landfills and building of new regional landfills compliant with the European standards. Currently is planned to construct a new regional landfill serving to Imereti, Racha-Lechkhumi and Kvemo Svaneti (2014-2017) and a landfill in Kvemo Kartli (2014-2017). In addition, feasibility studies for constructing landfills in Kakheti and Samegrelo-Zemo Svaneti are ongoing.

The company's capital consists of 53 existing/old landfills. Among them operation of two landfills in Rustavi and Borjomi are planned to be transferred to management of the company (Figure 32: Landfills registered in Georgia). 22 landfills have been renovated and

<sup>32</sup> Clean up Georgia - Report on Municipal Solid Waste Management in Georgia; 2012, p. 3

8 of them were equipped with new techniques. In 2014, 16 units of heavy technique (tractors) were purchased and 2 units of heavy technique were delivered by the municipalities, and they are distributed in the regions. The company has 9 regional offices, and there are special booths near the landfills where operators take control to prevent the access of people or domestic animals to the landfills.

**Figure 32: Landfills registered in Georgia**



## 4. PRELIMINARY POLICY ANALYSIS

This section identifies key strategic documents and environmental policy objectives forming a planning context for the preparation of the concerned strategic document as anticipated by the draft law on Environmental Assessment Article 25, paragraph 4 d) its relation to other existing or planned strategic documents;

The following section provides an overview of relevant strategic documents and their environmental objectives. The identified environmental objectives will serve as a basis for the development of the framework of reference for the evaluation of the Waste Management Strategy and the Action Plan in the context of SEA. Number of health and environmental objectives are set in the policy and strategic documents, which will be further evaluated in terms of compliance with Waste Management priorities.

#### **4.1. Identification of relevant policy objectives**

##### **4.1.1. Water**

In Georgia water is managed according to a conventional model, based on administrative boundaries. Water policy, represented by numerous legislative acts, does not have clearly defined objectives, which should be directed towards restoration and maintenance of the ecological functions of water bodies. In other words, water policy is not target oriented, unlike modern international approaches such as those used in the EU (the Water Framework directive). In addition, water management problems are linked to legislative inconsistencies, Water-related responsibilities are scattered among different state institutions, while horizontal, as well as vertical cooperation and coordination between these institutions is not very strong. In some cases, responsibilities are vaguely defined and there are certain overlaps.

##### **Draft Framework Law of Georgia on Water Resources Management (draft version)**

A new Framework Law on Water Resource Management is currently under preparation. The law will address all types of water bodies including groundwater; it will include provisions dealing with both water quality and quantity. The scope of the regulation of the law will cover water management at a river-basin level and incorporate all aspects of integrated water resources management, including a water classification system, water quality objectives and standards, water use, water resources planning, pollution prevention, monitoring and enforcement, flood risk management and public participation. Adoption of the new water law will be a significant step towards establishing internationally accepted water sustainability management practices.

Georgia, as the **European Neighborhood Policy of the European Union (ENP)** partner country, has committed to the harmonization of its water-related legislation to the EU water acquis. Full implementation of the EU-Georgia Action Plan will have considerable environmental benefits for Georgia in terms of establishing more sustainable use and management of water; more efficient and effective management of water at a river basin level; reduced flood risks; reduced pollution due to improved treatment of wastewaters; benefits for human health due to improved quality of drinking and bathing waters; benefits for ecosystems; establishment of instruments to address water scarcity; development of water pricing as a tool for cost recovery and steering consumer behavior; and building ownership among stakeholders as a result of public participation.

**The UNECE-supported National Policy Dialogue on Integrated Water Resources Management (IWRM)** in Georgia was launched in September 2010. National water policy



dialogue on IWRM assists governments of countries of Eastern Europe, the Caucasus and Central Asia in promoting implementation of the IWRM in line with the principles of the UNECE Water Convention, the Protocol on Water and Health, the EU Water Framework Directive and other UNECE and European Union instruments. The National Policy Dialogue on IWRM in Georgia will be focusing on three major topics: (1) preparation of the National Water Law based on the IWRM principles; (2) setting targets for implementation of the UNECE/WHO Protocol on Water and Health of the UNECE Water Convention and (3) transboundary water cooperation with the neighboring Azerbaijan. Other information relevant to the status of ratification of UN Conventions and international treaties relevant to water resources by Georgia are provided in the [Annex 18: The status of ratification of UN Conventions and international treaties relevant to water resources by Georgia](#)

In general, the UN Water Convention intends to strengthen national measures for the protection and ecologically sound management of transboundary surface waters and groundwater's. The Convention obliges Parties to prevent, control and reduce transboundary impact, use transboundary waters in a reasonable and equitable way and ensure their sustainable management. Parties bordering the same transboundary waters shall cooperate by entering into specific agreements and establishing joint bodies.

**National Environmental Action Program (NEAP 2012-2016)** sets short-term and long term targets for the water resource management. The long-term goal is to ensure safe water quality and adequate water quantity for human health and aquatic ecosystems. To achieve this goal it is necessary to reach the following four short-term targets and respective measures:

Target 1 – Establishment of an effective water management system

Target 2 – Establishment of effective pollution prevention and water abstraction control

Mechanisms

Target 3 – Reduction of water pollution from untreated municipal wastewater

Target 4 – Reduction of pollution from diffuse sources in agriculture

#### **4.1.2. Soil**

**National Environmental Action Program (NEAP 2012-2016)** sets target for soil protection stating to minimize soil contamination by establishing an effective and environmental friendly waste collection, transportation and disposal/storage/treatment system.

#### **4.1.3. Atmospheric Air and Climate**

Air quality in Georgia is regulated by law “On Air Protection” of Georgia. Main objectives of the law are to ensure that air quality is not harmful to human health and nature. The law regulates emissions and support public access to air quality data; promoting gradual implementation of the EU directives concerning air protection on the territory of Georgia.

Air quality norms (standards) are regulated by decree #297 “On Approval of Environmental Quality Norms” of Ministry of Labour, Health and Social Welfare of Georgia, setting limits for pollutants in air. Decree #54 on Government of Georgia, dated 14 January 2014, “On

Damage Calculation Methods Caused to Environment” sets fines for emissions above set limits. “Instruction on Rules for Air Protection in the Course of Landfill Operation” sets rules for air protection, prohibits uncontrolled burning of waste and sets rules for temporal storage of hazardous wastes on landfills.

Emissions from landfills are regulated by “Technical Regulation on the Construction, Operation, Closure and After-care of Landfills” (August 2015). Landfill operator shall monitor emissions during operation of landfill on monthly basis and following to closure of the landfill - in every six months. It also became obligatory to install gas collection system in all landfills receiving biodegradable waste and either use the collected gas as an energy source or flare it through flare line.

Georgia signed the United Nations Framework Convention on Climate Change (UNFCCC) in 1994. Under the Convention, Georgia has the following responsibilities:

- Adapt and implement relevant laws
- Envisage climate change issues in strategic documents
- Prepare National Communication under UNFCCC and carry out GHG Inventory
- Awareness rising in climate change issues
- Plan and implement actions for reduction on GHG emissions and mitigation measures

Under UNFCCC Georgia does not have the responsibility to reduce Greenhouse Gas (GHG) emissions; nonetheless, 9 cities of Georgia (Akhaltsikhe, Batumi, Bolnisi, Gori, Kutaisi, Rustavi, Tbilisi, Telavi, Zugdidi) signed EU “Covenant of Mayors” and under the documents the cities took responsibility to reduce emission of baseline year 2015 by 20% by year 2020. 4 cities (Tbilisi, Batumi, Kutaisi, Zugdidi) included waste management sector as one of the main objectives in the city level Strategic Energy Action Plan (SEAP).

#### **Sustainable Environmental Action Plan (SEAP) of Batumi (2011)**

In recent years the construction, tourism and trade boom in Ajara creates favorable conditions for the economic growth in the region. The increasing number/amount of municipal, commercial and industrial waste and wastewater requires the rehabilitation, re-equipment and modernization of the landfill. Dominant winds dissipate emissions from the landfill towards the sea, creating discomfort to tourists.

Actions set in the SEAP to reduce the GHG emissions are:

- Arrangement of gas extraction system at the Batumi operation landfill
- Arrangement of methane extraction and in situ flaring or utilization system at the new Ajara landfill

Collected methane can be used as a source of energy (electricity, gas), thus reducing its emission into the atmosphere, eliminating its smell around the site and decreasing the risk of self-flaring. One of the complications of this project is the correct assessment of daily production of gas that sometimes significantly differs from theoretical calculations.

#### **Sustainable Environmental Action Plan (SEAP) of Kutaisi (2011)**

Kutaisi landfill is one of the most problematic landfills in Georgia. Several unsuccessful attempts have been undertaken to improve its parameters and local population still suffers from its proximity. The Rioni River has washed out a considerable part of the landfill area little by little.

In the Kutaisi Sustainable Energy Action Plan only one measure is envisaged in the landfill management sector – establishment of a system for collection and burning of methane at the existing landfill.

#### **Sustainable Environmental Action Plan (SEAP) of Zugdidi (2011)**

The old landfill of Zugdidi was closed in 2010 and emission reduction started in 2012. Within the framework of the SEAP the only measure planned for the closed landfill is methane collection and flaring on site, which will result in significant decrease of GHG emissions in relation to current emissions of methane (CH<sub>4</sub>).

#### **Sustainable Environmental Action Plan (SEAP) of Tbilisi (2010)**

No landfills of Tbilisi were protected properly. A number of serious environmental problems were directly related to the operation of the landfills – none of them had groundwater protection or a leachate collection/treatment system, which caused serious air, groundwater, and water pollution.

The new Norio landfill started functioning in 2010 (Source: Sustainable Energy Action Plan – City of Tbilisi, 2011). The plan is to introduce modern technologies for waste separation that will decrease the volume of waste to be deposited on the landfill and increase the share of recycled materials.

Actions set in the SEAP are:

- Landfill Gas (LFG) Collection and Flare from Closed Landfill Sites (Gldani 2 and Iagluja)
- Landfill Gas (LFG) Flare from New Landfill Site (Norio Landfill (Source: Sustainable Energy Action Plan – City of Tbilisi, 2011))

#### **National Environmental Action Programme 2012-2016**

Main sector specific problem for air protection is:

- Pollution from transport sector
- Inadequate air monitoring system

#### **National Communication 2010-2013**

Main challenges for air protection are the following

- Air monitoring, data collection, processing and reporting does not allow to give a actual information on air quality, there is a need to restore and gradually automate and update the air monitoring network. Set a uniform system for environmental monitoring
- In Georgia emission Limits are set for 605 pollutants, while under EU directive limits are set only for 11 pollutants. Georgian air quality norms are not in harmony with the EU requirements, correspondingly it needs to be amended.

#### **Country Development Cooperation Strategy, Fiscal Year 2013-2017**

The documents made by the USAID covers five year programme to strengthen and support Georgia's democratic, free-market, Western-oriented transformation. One of the development objectives is "Inclusive and Sustainable Economic Growth" with intermediate result "More responsible management and development of Georgian natural end power" that covers:

- Increase of climate change mitigation
- Improvement of waste management

Main objectives for climate change mitigation are to create supportive market and regulatory climate for investment in renewable energy and clean production, assist municipalities in preparation of Action Plan to meet commitments to the Covenant of Mayors to lower GHG emissions.

Key barriers and opportunities to improving waste management in Georgia are:

- appropriate development and management of landfills that will reduce GHG emissions,
- analysis of possible Waste to Fuel projects to identify an additional source of renewable energy
- improve policy formulation and strategic planning related to waste management at national and local levels
- enhance the capacity of targeted municipalities
- establish and sustainably manage, monitor and maintain waste facilities and services, and
- support the development of Georgia's emerging recycling sector.

#### **4.1.4. Biodiversity and protected areas**

Main policy documents in the field of biodiversity and protected areas are: **National Biodiversity Strategy and Action Plan (2014-2020), Protected Areas Strategy and Action Plan (2010-2015), and partially NEAP (2012-2014)**. Based on the overview of noted policy documents it should be underlined that much more concrete objectives and actions in relation to waste management should be included in the future. Below there is a list of objectives, targets and goals defined in the mentioned documents:

- By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem functioning and biodiversity (Formulated on the basis of documents: National Biodiversity Strategy and Action Plan 2014-2020)
- Assess the feasibility of reducing Black Sea eutrophication and implement relevant effective measures (Formulated on the basis of documents: National Biodiversity Strategy and Action Plan 2014-2020)
- Significantly reduce pollution from agriculture by improving the institutional framework and restoring degraded agricultural lands and natural grasslands (Formulated on the basis of documents: National Biodiversity Strategy and Action Plan 2014-2020)
- Reduce the level of pollution of inland waters to ecologically acceptable levels (Formulated on the basis of documents: National Biodiversity Strategy and Action Plan 2014-2020)
- Polluter Pays Principle: costs of measures to prevent control and reduce damage to biological and landscape diversity shall be borne by the responsible party (Formulated on the basis of documents: Protected Areas Strategy and Action Plan 2010-2015)
- Develop and implement research programs within PAs (Consider a baseline study on pollution effects on forests and their biodiversity in risk areas 2013-2015) (Formulated on the basis of documents: Protected Areas Strategy and Action Plan 2010-2015)

- To develop a system of waste collection that includes installation of waste bins close to tourist infrastructure (i.e. camping sites, guesthouses and information centres) and distribution of sacks to households, to transport collected waste to central settlements (Omalo, Shenako, Dartlo) at least twice in a summer season, deposition of waste at special places and its removal from the Tusheti region at the end of the summer season.(Formulated on the basis of documents: Tusheti Protected Landscape Management Plan)
- To monitor waste illegally deposited by locals (or tourists); to prevent creation and eliminate illegal deposits. To develop a system of fines for producers of illegally deposited waste(Formulated on the basis of documents: Tusheti Protected Landscape Management Plan)
- To develop a system of waste removal from the Tusheti region(Formulated on the basis of documents: Tusheti Protected Landscape Management Plan)
- To elaborate a waste management plan (Formulated on the basis of documents: Tusheti Protected Landscape Management Plan).

#### 4.1.5. Geology

Long-term goals, short-term targets and respective activities for geology hazards and mineral resources use are presented in the **NEAP (2012-2016)**. Each thematic chapter in this document clarifies the environmental problems and causes, stakeholders, the actions taken to-date, national and international developments and an assessment of the regulatory framework. Each chapter concludes with a table of activities that clearly states what actions will be undertaken, who will take those actions and what the estimated costs are.

**Table 8: Environmental long-term goals (NEAP 2012-2016)**

Theme	Long-term goal
Disasters	Minimize the loss of human lives, negative impacts to human health and the environment, and economic losses
Mineral resources and groundwater	Safeguard the environment and human health from negative environmental impacts associated with the extraction of mineral resources;  Ensure provision of safe drinking water to the Georgian people and promote economic development through entering the international market

Long-term goals and short-term targets are as follows:

- Improvement/modernization of early warning system;
- Prevention/reduction of negative impacts of Geological Hazards in Georgia;

- Basic evaluation of the existing level of the natural disasters and identification of events;
- Identifying the possible damage of the geological catastrophes and identifying concrete preventive measures;
- Registering the development of the Geological processes on the territory of Georgia in a long-term perspective, cataloging, processing, analyzing and generalizing the data of statistical information about the damage caused by these processes and creating the electronic database;
- Drafting the basic maps of risk zoning for landslide-gravitational, Debrisflow/mudflow and erosive processes on the territory of Georgia in GIS system;
- Extending the geo-monitoring studies to every hierarchical level on the whole territory of Georgia and their permanent implementation starting from observation, control and assessment through prognosis and management, by using different methodologies
- Developing the organization methodology of the security-stationary polygons of the Geological catastrophes of a relevant nature for the second and third geo-monitoring levels and their operating to thoroughly study the regularities of origination of a concrete event and develop optimal measures;
- Assessment in force-majeure circumstances during the extreme activation of geological elements, fixing the risk of hazard, giving geological recommendations to the population and offices of extraordinary situations in the high risk area of elements; developing thorough conclusions about the established situation by specifying the preventive measures for the local administration and government;
- Drafting annual information bulletins of prognosis of geological catastrophic state and expected hazard, by developing proper mitigation and preventive measures and their urgent delivery to the relevant institutions at the regional and central levels.
- Identification and Clean-up of abandoned mining sites - Update an inventory of abandoned mining sites and assess their risk to human health and the environment. Priority should be given to mining sites that represent a direct threat to human health, either nearby or downstream of polluted streams. Where urgent measures are required, containment of pollution within the premises of the site is of primary concern.
- Introduction of sustainable practices for existing and new sites - Georgia should develop a framework for the sustainable extraction of mineral resources as a basis for the approval of requests for an extraction license.
- Improvement of the groundwater monitoring system - without a proper monitoring system, it is impossible to have a robust picture on the quantity and quality of specific groundwater bodies. Therefore, the ability to plan the rational use of groundwater resources, while considering national needs and opportunities for the international market, is complicated.
- Introduction of sustainable practices for mineral resources and groundwater extraction - Inadequate mineral resources and groundwater management may lead to deterioration of the reserves. Because of the importance of this resource to Georgia, introduction and

implementation of sustainable practices and modern methodologies for mineral resources extraction is crucial.

- Engineering-Geological and Hydrogeological assessment of territory for residual waste materials - There are frequent occasions when in EIA report there is not selected and assessed areas for residual waste ground created during the construction. There is no technical documentation for landfill areas. The problem is particularly acute in the construction of large infrastructure facilities. For example, there is a problem for remaining waste ground placing for Tbilisi-Batumi railway line modernization project, when a lot of waste material from tunnels and road was created; as well as during the construction of HPP cascade on riv. Adjariatskali. This is still a problem for a small territory such as Kharagauli municipality and Zemo (upper) Ajara, the arrangement of landfills are complicated. It is necessary to consider this issue from the beginning of the EIA report.
- Determination of Residual soil mineralogical-petrographic composition - At the same time it is necessary to determine in advance the residual soil mineralogical-petrographic composition, since this may be a primer, which is usable for various purposes in the future. The following setting is possible to arrange so-called “Technogenic” deposits, which will be used as mineral resource and the license will be issued for obtaining the mineral.

Georgia is actively involved in international processes directed towards disaster risk reduction and negative impact mitigation. Of these processes, it is important to highlight the Johannesburg (South Africa) World Assembly under the auspices of UN in 2002 and Hyogo (Japan) International Conference in 2005. Decisions adopted at these conferences create the basis for development of an effective early warning system, disaster forecasting and disaster risk reduction mechanisms in the country.

Disaster risk reduction is one of the three priorities of the **United Nations Development Assistance Framework (UNDAF)** in Georgia for 2011-2015. Measures to be implemented for disaster risk reduction with stakeholder participation are formulated in the aforementioned document, which is respectively based on the Hyogo Framework for Action. The existing Law on Mineral Resources (1996) needs to be revised to provide the proper basis, including environmental, health and governance interests, for sustainable extraction of mineral and groundwater resources. The revised law can also provide the legal basis for the inclusion of these interests in the license criteria. Creation of the appropriate legal basis for groundwater monitoring is essential for ensuring protection of groundwater resources. The elaboration of a special Code on mineral resources could also provide a comprehensive legal basis for sustainable extraction and use of mineral and groundwater resources.

The Law of Georgia on Soil Protection (1994 was amended in 1997, 2002) - the aim of the Law is to protect the soil from the contamination and sets the limits for the hazardous substances concentration in it. The regulates the usage of fertile soils for non agricultural purposes and strictly prohibits to undertake any kind of activity without removal of the fertile soil layer and makes compulsory to reinstate sites after open mining. It regulates uncontrolled pasturing of animals and protects forest as a mean to maintain the soil in a

favorable condition. Prohibits and regulates any kind of activity related to the storage of chemicals and hazardous substances could pollute or damage the soil properties.

#### **4.1.6. Socio-economy and demography**

Georgian social-economic development strategy is presented in document – “Georgia 2020”, adopted on 17/06/2014<sup>33</sup>. The strategy describes those priorities and problems which are important for achieving a long term sustainable economic growth. The strategy defines the following main priority objectives:

- Improve investment and business environment;
- Support development of innovations and technologies;
- Support export growth;
- Develop infrastructure and full use of transit potential;
- Develop labor force according to the labor market requirements;
- Improve social security system;
- Ensure available and qualified health care; and,
- Mobilize financial resources and developing financial brokerage.

The environmental protection and waste management system development is discussed in section – “Development of infrastructure and full use of transit potential”. According to the document, the introduction of modern systems for solid waste management, the construction of new sanitary landfill sites and the creation of terminal stations in accordance with the EU’s environmental and technical standards are main goals in this field.

The Strategy-2020 also mentions that the environmental impact on the country’s economy must be taken into consideration when planning infrastructure developments. Besides the Georgian government will facilitate the introduction of environmentally-friendly modern technologies and development of a “green” economy. Socio-economic development strategy of Georgia once again proves that environmental protection should be integral part of the process of economic growth.

#### **4.1.7. Public Health**

##### **The Parma Declaration on Environment and Health adopted at the 5th Ministerial Conference on Environment and Health in 2010**

In 2010, in Parma, the 5<sup>th</sup> Ministerial Conference on environment and health<sup>34</sup> adopted a Declaration on specific goals of improvement of environmental health. The Declaration, first time in history, determined commitments to reduction of environmental risks in children, and then reflected in regional priority goals:

- Regional priority goal 1: ensuring public health by improving access to safe water and sanitation
  - *Obligation (ii): by 2020, provide each child with access to safe water and sanitation in homes, child care centers, kindergartens, schools and healthcare facilities, and public recreational water settings, and to revitalize hygiene practices.*

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<sup>33</sup> <https://matsne.gov.ge/ka/document/view/2373855>

<sup>34</sup> The fifth Ministerial Conference on Environment and Health, Parma, Italy, 2010



addressing obesity and injuries through healthy environment, physical activities and healthy nutrition

- Regional priority goal 2: Addressing obesity and injuries through safe environments, physical activity and health diet

- *Obligation (iv): provide each child by 2020 with access to healthy and safe environments and settings of daily life in which they can walk and cycle to kindergartens and schools, and to green spaces in which to play and undertake physical activities; prevention of injuries by implementing effective measures and promoting product safety.*

- Regional priority goal 3: preventing disease through improved indoor and outdoor air quality

- *Obligation (iii): to provide each child with a healthy indoor environment in child care facilities, kindergartens, schools and public recreational settings, implementing WHO indoor air quality guidelines and, as guided by the Framework Convention on Tobacco Control, ensuring that these environments are tobacco smoke-free by 2015.*

- Regional priority goal 4: preventing disease arising from chemical, biological and physical environment

- *obligation (ii): protection of each child from the risks posed by exposure to harmful substances and preparation, focus on pregnant and breastfeeding women, and places where children live, learn and play;*

- *Obligation (iii): work to reduce identified risks of exposure to carcinogens, mutagens and reproductive toxins (including radon, UV radiation, asbestos, and endocrine disruptors); development of the National asbestos related diseases elimination programme (with the WHO and ILO<sup>35</sup> support) by 2015.*

The European Environment and Health Information System – ENHIS<sup>36</sup> was created to monitor Declaration commitments. This information system will develop and perform monitoring of environmental health indicators, which are based on the DPSExEA model.

### **Law on Public Health**

The Law of Georgia on Public Health came into force on 27 June, 2007. The main objective of the law is to:

- Promotion of the healthy principles of the life style;
- Provide healthy environment to population;
- Promotion of the reproductive principles for the families;
- Limitation of the disease dissemination;
- Ensure Biological Safety;
- Elaboration rules for disposal of the hazardous infections as well as their survey and control methodologies including transportation, management and utilization;
- To set up the rules for the laboratories working on especially dangerous pathogens and advise GoG on issuance of the special license for such activities;
- To set up Environmental Quality Norms and Maximum Permissible Concentrations for Water, Air, Soil, EMF, Noise etc;

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<sup>35</sup>International Labour Organization

<sup>36</sup>[www.euro.who.int/enhis](http://www.euro.who.int/enhis)

***The Georgian Healthcare System State Concept 2014-2020 “Universal Healthcare and Quality Management for Protection of Patient Rights”*** (approved by the Government of Georgia Ordinance N724 from 26 of December 2014) is a vision of healthcare system development that comprises basics of the sector development in relation to principles and values recognized at international and national levels. The document also demonstrates principle aspects of main characteristics of the healthcare sector, and strategic reforms and action plans to be implemented for the effective prevention and management of priority diseases. State health policy takes into account epidemiological, social and economic reality of the country, as well as political declarations and operational platforms recognized in the healthcare sector internationally. The aim of the state policy in the healthcare sector is to increase life expectancy of Georgian population, reduce maternal and child mortality, improve health status and quality of life; this aim could be attained through provision of universal access to quality medical services and modern pharmaceutical products, balanced distribution of financial burden and increasing financial protection in the healthcare sector, effective use of existing resources, adequate response to population’s health needs and development of flexible governance system.

Taking into account principles declared at international level, epidemiological image and social/economic reality of the country, the Ministry develops following 10 priority directions for the development of the healthcare sector:

1. Health in all policies – general state multi-sectoral approach.
2. Development of the healthcare sector governance.
3. Improvement of healthcare financing system.
4. Development of quality medical services.
5. Development of human resources in the healthcare sector.
6. Development of health management information systems.
7. Support of maternal and child health.
8. Improvement of prevention and management of priority communicable diseases.
9. Improvement of prevention and control of priority non-communicable diseases.
10. Development of public health system.

At the national level the concept is based on the following political and legal documents: Social-economic development strategy of Georgia “Georgia 2020”; obligations assumed in the framework of EU-Georgia Association Agreement; 2012, 2013 and 2014 governmental program “For Strong, Democratic, United Georgia”; Report on main developmental data and directions; laws of Georgia “On Health Care”, “On Public Health”, “On Medical Activities”, “On Patient Rights”, and by-laws derived from them; national healthcare policy and strategy for its implementation 2000-2009; national healthcare strategy “Accessible Quality Healthcare” – 2011-2015; “Healthcare System performance assessment Report” – 2013.

Health in all policies – general state multi-sectoral approach – 2010 Adelaide agreement “Health in All Policies” and the World Health Organization European Bureau strategy “Health 2020” emphasizes the necessity of inter-sectorial approach for the attainment of

health and welfare, and use of benefits, received by improving population health, for aims of other sectors. During following 6 year the Ministry of Labour, Health and Social affairs of Georgia aims to develop effective mechanisms and bilateral/multilateral action plans for inter-sectorial coordination through active participation of the Ministry of Education and Science of Georgia, the Ministry of Agriculture of Georgia, the Ministry of Corrections and Legal Assistance of Georgia, the Ministry of Defense of Georgia, the Ministry of Environment and Natural Resources of Georgia and other ministries in relation to following issues:

- prevention and control of communicable and non-communicable diseases;
- education of population;
- health of young generation and elderly population;
- healthy environment;
- water and food safety;
- preparedness for emergency situations and catastrophes;
- risk factor reduction and health promotion;
- reduction of injuries;
- improvement of health of individuals in institutions of confinement;
- support development of medical education and biomedical sciences;
- health services for internally displaced persons – refugees;
- etc.

**Pursuant to Millennium Development Goals and other documents adopted by the UN,** environment and healthcare sectors shall be responsible for development and implementation of the policy, which provides for prevention and control over adverse impact of environment on human health.

Despite certain reforms implemented at the legislative and institutional levels in Georgia, a unified information system still has not been created which would ensure exchange of information on quality of environment and human health conditions. There is no coordination of information flows between ministries, institutions, other government organizations, agencies, academia, private companies, and non-governmental organizations. Therefore, the information available to the public is limited, lessening their involvement in risk reduction and their support for policies addressing the environmental determinants of health. The scarcity of data reduces the possibility of carrying out risk analyses, setting priorities for action and monitoring their implementation.

Relevant and valid information on public health and environmental conditions over time is a prerequisite for risk assessment and rational decision-making in environmental health management. There is an urgent need on development of health and environmental information systems in close collaboration with relevant institutions that they can be combined to monitor environmental health effects, to assess environmental health impact, and to support decision-making in environmental health policy including. Improvement of health data quality, continuation of surveys to identify data quality problems, train personnel, establish computerized databases and implement procedures for data quality control.

In order to meet contemporary requirements of environmental health management and Parma Declaration commitments, Georgia need:

- To renewed National Environmental Health Action Plan (NEHAP) to ensure mutual consistency to the relevant international regulations and to set priorities for future action for environmental health management;
- To develop human bio monitoring system according to WHO recommended environmental health indicators and methodology.

#### **4.1.8. Solid Waste**

On January 15, 2015, the “**Waste Management Code**” came into force. The goal of the Code is to protect the environment and human health, establish legal basics in the field of waste management to introduce the measures helping prevent waste origination and promote their re-use, accomplish environmentally friendly waste treatment (including recycling and separation of the secondary raw material), generate energy from the waste and reach safe waste accommodation. The Code is based on Directive 2008/98/EC on waste of the European Parliament and Council November 19, 2008 and Directive 1999/31/ EC on landfills of April 26, 1991 and other waste-related international regulations of the EU.

In addition, the branch of waste management is regulated by the following legislative acts:

National Legislation:

- Constitution of Georgia
- The Law of Georgia on Environmental Protection
- The Law of Georgia on Local Self-Government Code
- The Law of Georgia on Ecological Expertise
- The Law of Georgia on Local Fees
- The Law of Georgia on Public Health
- Technical Regulation – “Methods to identify (calculate) the damage to the environment”.

Except the NEAP (2012-2016), there are number of national and regional strategic documents that set the objectives in the field of waste management. These strategic documents include:

#### **Strategy Recommendations for regional development in Georgia (2011-2017)**

The document states:

- It is necessary to elaborate a package of legislative initiatives facilitating the separation of the competencies between the local and central government in managing waste.
- Development of a municipal waste management strategy - the waste management strategy should be in compliance with the healthcare, environmental and decentralization policy of the country.
- Developing a standard methodology for calculating the service delivery fee.
- Municipalities should provide assistance by enabling the application of computer-based software for charging and collection fees whilst significantly improving, on its part, the administration of the collection of fees.

- Self-governing entities need to draft long-term (at least a ten year period) and short-term plans for waste management (collection, transportation, dumping), by envisaging such aspects as avoiding the piling up of rubbish, infiltration of leakage water on landfills, medical and special remains, construction waste and large volumes of refuse:
- Prior to constructing new landfills, existing landfill spots must be properly maintained and personnel trained;
- Illegal landfills must be closed;
- Rubbish collection must become containerized whilst closing rubbish bins.

### **State Strategy for Regional Development of Georgia for 2010-2017**

- The document sets the following requirements for municipal waste management:
- A relevant draft legislative act should be elaborated in order to regulate the waste management sector, define adequate standards and divide authorities amongst different institutions. Moreover, a package of normative acts should be elaborated in order to determine municipal standards and improve the quality of service in this sphere.
- The commercialization of waste management should be encouraged which will support the solving of problems existing in this sector.
- A standard methodology for the calculation of municipal service costs should be developed considering best practice and geographic location.
- Both state and local self-government entities should encourage the introduction of waste separation systems bearing in mind the risk of spreading infections or polluting the environment whilst transporting and depositing all types of waste together.

### **Regional Development Programme of Georgia (2015-2017)**

The programme sets the following objective in the field of waste management:

“The introduction of modern systems for solid waste management as well as the construction of new sanitary landfill sites and terminal stations in accordance with the EU’s environmental and technical standards is equally important.”

## **4.2. Preliminary analysis of environmental and health objectives**

Table 9 below presents a preliminary evaluation of the compliance of the objectives of the Strategy and potentially of the Action Plan with the environmental and health objectives of national policy and strategic documents<sup>37</sup>.

**Table 9: Environmental and Health Objectives**

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<sup>37</sup> + positive correlation, - negative correlation, 0 neutral

Environmental and Health Objectives		Waste Management Strategy Priorities							
		Waste Management legislation in harmony with EU requirements and International Conventions	Waste Management Planning system established and implemented nationally and locally	An effective and environmental friendly waste collection, transportation and disposal/treatment systems established	Waste prevented, reused, recycled and/or recovered	Waste Management Costs covered in accordance with the Polluter Pays Principle	Extended Producers Responsibility promoted and implemented	Waste Data and Information Management system established	Capacities strengthened for the national and local public sector, as well as private companies and general public to meet the requirements of the WM
Water	Establishment of an effective water pollution prevention mechanism			+	+				
	Reduction of pollution from diffuse sources in agriculture			+	+				
Soil	Minimize soil contamination			+	+				
Air and Climate Change	Adopt and implement necessary laws related to air quality protection	+							
	Envisage landfill gas collection facilities in WM plan		+/-	+	+				
	Collect landfill gasses and use them as renewable energy source			+	+				

	Enhance capacities of targeted municipalities to meet commitments for GHG reduction								+
<b>Biodiversity and Protected Areas (PAs)</b>	Elaboration of waste management plans for Protected Areas		+						
	Educate locals and develop effective system of waste management		+						+
	Adopt laws and regulations which ensure the effective regulation of the pollution of inland waters	+							
<b>Geological Hazards</b>	Reduction of Geological Hazards by assessment of territory and establishment modern Geological Hazard monitoring system and early-warning systems	+	+	+	0	0	0	+	+
<b>Hydrogeology</b>	Improvement of the groundwater monitoring system	+	+	+	0	0	0	+	+
<b>Mineral Resources</b>	Identification and Clean-up of abandoned mining sites	+	+	+	0	0	0	+	+
<b>Public</b>	Ensuring public health by			+	+				

<b>Health</b>	improving access to safe water and sanitation								
	Preventing disease arising from chemical, biological and physical environment			+	+				
<b>Waste</b>	Development of a municipal waste management action plan		+						+
	Draft long-term and short-term plans for waste management (collection, transportation, dumping) for self-governing entities		+						+
	Prior to constructing new landfills, existing landfill spots must be properly maintained and personnel trained			+					
	The introduction of modern systems for solid waste management as well as the construction of new sanitary landfill sites and terminal stations in accordance with the EU's environmental	+/-		+					



	and technical standards								
Social-economy	Improve investment and business environment			+					
	Support development of innovations and technologies, including in the field of waste management			+	+				

## 5. KEY ENVIRONMENTAL ISSUES

This section should provide information about the nature and scale of potential environmental effects of the concerned strategic document as anticipated by the draft law on Environmental Assessment:

*Article 25, paragraph 2*

- a) information on the scale of possible environmental impact on the environment and public health;*
- b) information on the scale and possible impact on the protected areas; and paragraph 4:*
- c) the types of environmental impacts to be examined and reported.*

The information that follows addresses the above draft requirements to the extent possible at the scoping stage given the early preparation stage of the Action Plan.

The Table 10 below indicates the identified main environmental, including health, problems, which are relevant to the Waste Management Strategy and further Action Plan which will be further addressed by the next stages of the SEA process. The identification of key issues is based on preliminary analysis of the state of the environment of the concerned territory, and inputs obtained through early consultations with selected stakeholders.

**Table 10: Key environmental/health issues**

Environmental and health receptors	Specific concerns and problems	Geographic areas of concern	Likely linkages to the Strategy
Surface	• Lack of drains for	• Landfill	• Banning of illegal dumpsites to

<b>and ground water</b>	<ul style="list-style-type: none"> <li>rain water collection</li> <li>• Agriculture runoffs</li> <li>• Leakage of contamination from landfills</li> </ul>	adjusting areas <ul style="list-style-type: none"> <li>• Iagluja landfill</li> <li>• Mining areas (Racha, Bolnisi, Kazreti, Chiatura)</li> <li>• Rural areas</li> <li>• Riverbanks</li> </ul>	minimize contamination of surface and ground waters <ul style="list-style-type: none"> <li>• Construction of landfills meeting standards</li> <li>• Reduces number of septic in rural areas</li> <li>• Mechanisms (including monitoring and regulation) to minimize and reduce mining waste</li> <li>• Mechanisms to reduce contamination from the old pesticide storage sites</li> <li>• Reduce use of pesticides</li> <li>• Mechanisms to minimize industrial waste</li> </ul>
	<ul style="list-style-type: none"> <li>• Pollution of surface water with organic matter, nutrients, heavy metals, pesticides</li> <li>• Industrial wastewater discharges</li> <li>• Municipal wastewater discharges</li> <li>• Storm water runoffs</li> <li>• Agricultural runoffs</li> <li>• Leakages from landfills</li> </ul>		
<b>Soil</b>	<ul style="list-style-type: none"> <li>• Contamination of soil by:</li> <li>• organic, inorganic, microbiological pollutants</li> <li>• chemical waste from industry</li> <li>• organic and inorganic fertilizers from agriculture</li> <li>• PoPs</li> <li>• leakages from landfills</li> <li>• construction waste</li> <li>• mining waste</li> </ul>	<ul style="list-style-type: none"> <li>• Legal and illegal landfills</li> <li>• Waste storage facilities</li> <li>• Obsolete industrial waste dump sites</li> <li>• Mining sites (Chiatura, Racha, Svaneti, Kazreti, Zestaphoni)</li> <li>• Iglia</li> </ul>	<ul style="list-style-type: none"> <li>• Improved control of soil contamination risks on existing landfills</li> <li>• Rehabilitation and remediation of old contaminated sites</li> <li>• Implementation of waste minimization and recycling measures</li> <li>• Construction of new landfills meeting standards</li> </ul>
	<ul style="list-style-type: none"> <li>• Land use activities for construction</li> </ul>	<ul style="list-style-type: none"> <li>• All territory of country</li> </ul>	<ul style="list-style-type: none"> <li>• Potential to reduce land use for waste disposal</li> </ul>

<b>Atmospheric Air and Climate</b>	<ul style="list-style-type: none"> <li>Poor data collection and processing of landfill emissions</li> </ul>	<ul style="list-style-type: none"> <li>All landfills</li> </ul>	<ul style="list-style-type: none"> <li>Registration of landfill emissions</li> <li>To have accurate data to use emission as renewable energy sources</li> </ul>
	<ul style="list-style-type: none"> <li>Landfill gas emissions are not collected</li> </ul>	<ul style="list-style-type: none"> <li>Landfills in Georgia</li> </ul>	<ul style="list-style-type: none"> <li>To reduce air pollution and use as energy sources</li> </ul>
	<ul style="list-style-type: none"> <li>Adopt and implement necessary laws related to air quality protection</li> </ul>	<ul style="list-style-type: none"> <li>Georgia</li> </ul>	<ul style="list-style-type: none"> <li>Measures to create relevant legal base for air protection</li> </ul>
	<ul style="list-style-type: none"> <li>Self burning of waste</li> </ul>	<ul style="list-style-type: none"> <li>All landfills in Georgia</li> </ul>	<ul style="list-style-type: none"> <li>Collection of gases</li> </ul>
	<ul style="list-style-type: none"> <li>No use of waste as energy source</li> </ul>	<ul style="list-style-type: none"> <li>All landfill</li> </ul>	<ul style="list-style-type: none"> <li>Collect and use of emission as energy source</li> </ul>
	<ul style="list-style-type: none"> <li>Lack of capacity of targeted municipalities to meet obligations under Covenant of Mayors</li> </ul>	<ul style="list-style-type: none"> <li>Tbilisi, Batumi, Zugdidi, Kutaisi</li> </ul>	<ul style="list-style-type: none"> <li>Development of management plans (including waste)</li> <li>Awareness raising campaigns</li> </ul>
	<ul style="list-style-type: none"> <li>Lack of proper list of pollutants to be monitored for ensuring effective air quality control</li> </ul>	<ul style="list-style-type: none"> <li>Georgia</li> </ul>	<ul style="list-style-type: none"> <li>Air pollutants generated from waste to be relevant with EU standards and requirements</li> </ul>
<b>Biodiversity/PA</b>	<ul style="list-style-type: none"> <li>Lack of capacity of Municipalities to meet waste management obligation in terms of protected areas</li> <li>Limited capacity of the municipalities to collect and take the waste out from PAs (depending on PA category)</li> </ul>	<ul style="list-style-type: none"> <li>Whole network of PAs Whole network of PAs, especially Tusheti, Ajameti, Lagodekhi, Tbilisi, Gochkadili PAs</li> </ul>	<ul style="list-style-type: none"> <li>Develop waste management plans for municipalities including chapter on protected areas</li> </ul>
	<ul style="list-style-type: none"> <li>Absence of legal landfills or areas for waste collection near PAs</li> <li>Lack of trash bins at PAs</li> <li>Lack of segregation of toxic substances</li> </ul>	<ul style="list-style-type: none"> <li>Tusheti, Lagodekhi, Tbilisi, Ajameti, Gochkadili PAs</li> </ul>	<ul style="list-style-type: none"> <li>Construction of landfills meeting standards</li> <li>Putting waste separation containers on PAs</li> </ul>
	<ul style="list-style-type: none"> <li>Degradation of biodiversity due to pollution</li> </ul>	<ul style="list-style-type: none"> <li>Whole network of Pas, especially Tusheti</li> </ul>	<ul style="list-style-type: none"> <li>Mechanisms to prevent biodiversity from pollution</li> </ul>

		protected areas	
	<ul style="list-style-type: none"> <li>Decreasing number of animal species</li> </ul>	<ul style="list-style-type: none"> <li>Whole network PAs</li> </ul>	<ul style="list-style-type: none"> <li>Decrease waste risks to animals</li> </ul>
	<ul style="list-style-type: none"> <li>Decreasing number of visitors</li> </ul>	<ul style="list-style-type: none"> <li>All of PAs with the most potential impact on Tusheti and Lagokhi PAs, Gochkadili Canyon</li> </ul>	<ul style="list-style-type: none"> <li>Clean up protected areas from waste</li> <li>Awareness raising among locals and visitors on the adverse effect of pollution on the environment</li> <li>Develop comprehensive management plans for reducing waste loads on PAs</li> </ul>
<b>Geological Hazards</b>	<ul style="list-style-type: none"> <li>Risk of geological hazards</li> </ul>	<ul style="list-style-type: none"> <li>Racha-Lechkhum-Kvemo Svaneti (Project implemented)</li> <li>Iagluja</li> <li>Ajara</li> </ul>	<ul style="list-style-type: none"> <li>Conduct geological assessment of new Landfill polygons and adjacent territory for the preparation of project documentation</li> </ul>
<b>Mineral Resources</b>	<ul style="list-style-type: none"> <li>Waste form excavation and processing of mineral resources</li> <li>Waste material from construction</li> <li>Lack of use inert materials for secondary use</li> </ul>	<ul style="list-style-type: none"> <li>Mining places (Chiatura, Racha, Kazreti etc)</li> <li>Kharagauli Municipality</li> <li>River basins (Tskhenistskali, Adjaristskali, Kvirila et. al)</li> </ul>	<ul style="list-style-type: none"> <li>Mechanisms for using mining and constructing waste as secondary construction material</li> </ul>
<b>Socio-economic aspects</b>	<ul style="list-style-type: none"> <li>Absence of waste survey system</li> <li>Insufficient budget for municipalities to manage waste</li> <li>Absence of socio-economic policy for the waste management</li> <li>Absence of society solvency for waste management</li> </ul>	<ul style="list-style-type: none"> <li>Georgia</li> </ul>	<ul style="list-style-type: none"> <li>Evaluation of all costs (tangible and intangible) and benefits of waste management in Georgia</li> </ul>
	<ul style="list-style-type: none"> <li>Change in the population size/household waste (most of waste (80%) is generated in household</li> </ul>	<ul style="list-style-type: none"> <li>Georgia</li> </ul>	<ul style="list-style-type: none"> <li>Separation of waste and reuse</li> <li>Awareness raising for reuse of waste</li> </ul>
<b>Public Health</b>	<ul style="list-style-type: none"> <li>The nature of raw waste, its composition as it decomposes (e.g., toxic, allergenic and infectious substances), and its</li> </ul>	<ul style="list-style-type: none"> <li>Legal and illegal landfills</li> <li>Identified hot spots</li> <li>Industrial and mining sites</li> </ul>	<ul style="list-style-type: none"> <li>Preparation of priority pollutants list</li> <li>Rules and regulation of pollutants</li> <li>Occupational health and safety regulations</li> <li>Environmental health</li> </ul>

	<ul style="list-style-type: none"> <li>components (e.g., gases, dusts, leakages, sharps);</li> <li>The nature of waste as it decomposes (e.g., gases, dusts, leakages, particle sizes) and their change in ability to cause a toxic, allergenic or infectious health response;</li> <li>The handling of waste (e.g., working in traffic, shoveling, lifting, accidents);</li> <li>The processing of wastes (e.g., odor, noise, accidents, air and water emissions, residuals, explosions, fires);</li> <li>The disposal of wastes (e.g., odor, noise, stability of waste piles, air and water emissions, explosions, fires).</li> </ul>	<ul style="list-style-type: none"> <li>Rustavi, Chiatura</li> <li>Zestaphoni</li> <li>Kvemo qartli</li> <li>Imereti</li> </ul>	<ul style="list-style-type: none"> <li>monitoring</li> <li>Environmental Health impact assessment system</li> <li>Reporting</li> <li>Information accessibility on environmental health</li> <li>Public private partnership in waste management for improving environmental health conditions</li> </ul>
<b>Solid Waste</b>	<ul style="list-style-type: none"> <li>Lack of landfills relevant to international standards</li> <li>Illegal dumpsites</li> </ul>	<ul style="list-style-type: none"> <li>Georgia, especially rural areas</li> <li>Ajara region</li> <li>The gorges of river</li> <li>Roadsides, village</li> </ul>	<ul style="list-style-type: none"> <li>Construction of landfills meeting international standards</li> </ul>
	<ul style="list-style-type: none"> <li>Hazardous waste</li> <li>Construction waste</li> <li>Mining waste</li> <li>Medical waste</li> </ul>	<ul style="list-style-type: none"> <li>Old industrial sites</li> <li>Iagluja</li> <li>Most landfills</li> <li>Industrial areas within all territory of the country (Rustavim, Chiatura, Kazreti, Racha)</li> <li>Mining sites (Racha, Chiatura, Kazreti)</li> <li>Minicipla</li> </ul>	<ul style="list-style-type: none"> <li>Mechanisms for waste treatment</li> <li>Separation of waste</li> <li>Regulation on mining waste</li> </ul>

		<ul style="list-style-type: none"> <li>Landfills</li> <li>Tbilisi National park</li> </ul>	
	<ul style="list-style-type: none"> <li>Lack of separation of hazardous waste from household waste</li> <li>Lack of waste separation</li> </ul>	<ul style="list-style-type: none"> <li>All territory of country</li> </ul>	<ul style="list-style-type: none"> <li>Waste separation</li> </ul>
	<ul style="list-style-type: none"> <li>Operation of landfills without permit</li> <li>Landfills don't meeting standards</li> </ul>	<ul style="list-style-type: none"> <li>Most of landfills</li> </ul>	<ul style="list-style-type: none"> <li>Mechanism for landfills' regulation</li> </ul>
	<ul style="list-style-type: none"> <li>Absence of monitoring on landfills in terms composition</li> <li>Lack of evaluation of the damage of existing landfills</li> <li>Absence of monitoring evidencing the failure to meet the exploitation standards of landfills</li> <li>Emission of harmful pollutants (dioxides and furans) in the air during burning of waste</li> <li>Absence of information on the amount of waste on landfills</li> <li>Self burning</li> <li>Absence of reporting on waste</li> </ul>	<ul style="list-style-type: none"> <li>All territory of country</li> </ul>	<ul style="list-style-type: none"> <li>Develop normative acts/sub laws</li> <li>Develop waste monitoring and reporting system</li> <li>Public awareness</li> <li>Registration of produced waste</li> <li>Construction of hazardous storage sites meeting standards</li> <li>Cost-effective mechanisms of waste management on municipal level</li> </ul>

## 6. POTENTIAL TRANSBOUNDARY IMPACTS

This section provides information about the potential for transboundary environmental effects of the concerned strategic document as anticipated by the draft law on Environmental Assessment

*Article 25, paragraph 2*

*c) information on the transboundary impact on the environment and public health.*

Considering the nature and expected character of measures included in the National Waste Management Strategy and the Action Plan, no significant transboundary impacts are anticipated.

## 7. STAKEHOLDER ANALYSIS

This section provides information on stakeholders as anticipated by the draft law on Environmental Assessment:

*Article 25, paragraph 4*

*g) information on those people who might be impacted by strategic document;*

*i) Information on those agencies which can provide comments and views on strategic document within their competence.*

This section provides information concerning the consultation process associated with the SEA for the National Waste Management Strategy and the Action Plan. Consultation with the concerned public, relevant institutions and authorities is a standard component of the SEA process. To facilitate a participatory SEA process, initial analysis was carried out by the SEA team in order to identify all potentially relevant stakeholders.

Considering the nature of the concerned strategic document, the whole population of Georgia can be regarded as potentially affected by the implementation of the National Waste Management Action Plan.

**Table 11: Key Stakeholders in SEA on the Strategy and the Action Plan**

Stakeholder (institution/representative)	Interest/concern
The Ministry of Environment and Natural Resources Protection of Georgia (MEPNR)	Key institution at the national level dealing with environmental related issues including water protection, air protection, climate change, biodiversity protection, soil protection, waste management, EIPs etc. MEPNR is responsible for the state management and protection of water, air, soil, biodiversity, forest resources etc as well as for implementing the state control and setting up monitoring systems for relevant media. Other state responsibilities are

	scattered among different state institutions like LEPL National Environmental Agency, LEPL National Forest Agency and LEPL National Agency of Protected Areas
	State policy in the field of the waste management is being developed and implemented by the MEPNR. Specifically, the MEPNR is responsible for developing the requisite regulations, as well as revision of the EIA reports for waste processing, treatment or disposal and issuing the environmental impact permits. A subordinate body of the ministry, the Environmental Inspectorate is responsible for enforcement of the permit conditions.
<b>The Ministry of Labor, Health and Social Affairs of Georgia (MLHSA)</b>	Responsible for ensuring a safe environment for public health. The MLHSA develops environmental quality standards, including those for drinking water, surface waters, groundwater and coastal waters. MLHSA has established mandatory rules regulating the management of medical wastes at medical facilities. The Ministry of Labor, health and Social Protection of Georgia together with the Ministry shall regulate and control the management of healthcare waste, under the national legislation of Georgia
<b>The Ministry of Regional Development and Infrastructure of Georgia (MRDI)</b>	<p>The MRDI also manages the state-owned water servicecompany “Joint Water Supply Company of Georgia” Responsible for implementing the regional development policy including coordination and support of the development of water supply systems.</p> <p>The Ministry of Regional Development and Infrastructure of Georgia is responsible for construction, operation and closure of non-hazardous waste landfills, as well as construction and management of waste transfer stations in accordance with the requirements of this law and relevant sub-legislation.</p>
<b>The Ministry of Agriculture of Georgia</b>	<b>The Ministry of Agriculture of Georgia</b>



(MoA)	together with the Ministry of Environment and Natural Resources Protection of Georgia regulates and supervises the management of animal waste under legislation of Georgia.
The Ministry of Economy and Sustainable Development of Georgia (MESD)	<p>The Ministry of Economy and Sustainable Development of Georgia and a relevant unit within its system, together with the Ministry of Environment and Sustainable Development of Georgia shall elaborate draft(s) of sub law(s) determining the requirements for the transport of waste and present them to the Government of Georgia for approval, regarding:</p> <ul style="list-style-type: none"> <li>a) the standards of vehicles to be used for waste transport,</li> <li>b) the containers to be used for waste transport,</li> <li>c) the expertise of hazardous waste transport drivers.</li> </ul>
“Solid Waste Management Company” Ltd under the Ministry of Regional Development and Infrastructure of Georgia	Operates all landfills in Georgia except in Tbilisi and Achara AR
The municipalities	<p>The municipalities in accordance with the provisions of the Waste Management Code and the Code of Self-governance shall be responsible for municipal waste management (including elaboration of municipal waste management plan).</p> <p>Construction, operation and closure of non-hazardous waste landfills within the administrative borders of Autonomous Republic of Ajara and city of Tbilisi is a competence of the relevant units of Tbilisi Municipality and Autonomous Republic of Ajara</p>
LEPL National Environmental Agency of the Ministry of Environment and Natural Resources Protection of Georgia (MEPNR)	Responsible for the monitoring of the state of the environment including water (surface and groundwater), soil, radiation, hydrology etc.

Biodiversity Protection Service of the Ministry of Environment and Natural Resources Protection	Responsible for country's biodiversity (monitoring, pollution, conservation)
Environmental Impact Permits Department of the Ministry of Environment and Natural Resources Protection	Responsible for issuing Environmental Impact Permits. According to draft law "Environmental Assessment Code" this department will be responsible for reviewing and approving SEA scoping report and SEA report of strategic documents
Waste Department of the Ministry of Environment and Natural Resources Protection	Responsible for elaboration of the Waste Management Strategy and Action Plan
Agency of Protected Areas of the Ministry of Environment and Natural Resources Protection	Responsible for protected areas management countrywide
Protected Areas Administrations (Tusheti, Lagodekhi, Tbilisi, Gochkadili, Ajameti, Borjomi-Kharagauli)	Directly involved in dealing with problems of waste management at PAs
LEPL Environmental Information and Education Center	Responsible for collecting and sharing environmental information to wide public in Georgia
LEPL National Environmental Agency Department of Geology Department of Hydrometeorology Department of Environment Pollution Monitoring	The Ministry of Environment Protection, namely its LEPL National Environmental Agency (NEA), conducts the state environmental (Geological, Hydrometeorological) monitoring. Specifically, NEA carries out various disaster (landslide, Debrisflow etc.) related geo-monitoring study-assessments throughout Georgia, provides timely evaluation of the situation in case of force-majeure caused by the extreme reactivation of geological and hydro-meteorological hazards and delivers respective recommendations NEA conducts hydrogeological monitoring of Groundwater
NGOs "CENN", "Green Alternative", "NACRES", "RECC", "Green	The NGOs having experience and competence in waste management and

Movement/Friends of Earth” etc	awareness raising activities regarding waste
National Center for Disease Control and Public Health	Possesses Health Statistic, Public Health monitoring data and analysis
Institute of Sanitary, Hygiene and Ecology	Possesses data on water, air, soil quality in GEO
N. Makhviladze Scientific-research Institute of Labour Medicine and Ecology	Possesses data on occupational health and chemical safety
CENN/USIAD	Implements project “Waste management technologies in the regions” (Kakheti and Ajara)

## 8. INITIAL RECOMMENDATION

This section provides preliminary indication of measures to address potential negative environmental effects of the concerned strategic document as anticipated by the draft law on Environmental Assessment:

*Article 25, paragraph 4:*

*d) Information of measures, which should be considered for mitigating, preventing and compensating negative impact in case of implementing strategic document*

Considering the early stage of the planning process, the SEA initial recommendations are formulated with limited knowledge of the actual content of the Waste Management Action Plan. The below outlined topics will be further elaborated based on the results of the SEA further analyses and consultation process.

- Considering development and implementation of Waste Minimization Plans or waste minimization measures;
- Considering banning of illegal dumping and development of regulation for illegal dumping especially in rural areas;
- Considering development and implementation of Waste Awareness and Education Plans;
- Considering measures for preventing pollution of soil, surface and ground waters from landfills by imposing the requirement to apply Best Available Technologies;
- Considering establishment of emission collection systems at landfills;
- Considering establishment of proper system for preventing smell from landfills;
- Considering development and implementation of Waste Information Management System for improving waste data collection and reporting;
- Considering in municipal waste management plans waste collection measures for

protected areas;

- Considering the assessment of potential geological risks and hazards when selecting sites for waste management facilities (landfills, incinerations, recycling plants), and when constructing and operating landfills and other waste management infrastructure;
- Considering improvement of the groundwater monitoring system;
- Identification and Clean-up of abandoned mining sites;
- Considering Determination of Residual soil mineralogical-petrographic composition for secondary use;
- Considering use of waste as an energy source;
- Considering the development of an effective tariff collection system for waste;
- Considering the development of proper waste management systems for municipalities to manage municipal waste effectively in terms of finances and capacities available to them;
- Considering the measures for preventing and avoiding waste related diseases and occupational safety in waste management activities;
- Considering the measures for eradicating old spots of industrial waste and pesticides stocks.
- Considering development of waste disposal and handling guidance for safe waste transportation, recycling, disposal and management.
- Considering the preparation of Closure Plans for those illegal dumps and operational dumpsites that will be subject to closure.

## **9. GAPS IN INFORMATION AND CHALLENGES\**

This section identifies key missing information and uncertainties needed to improve the accuracy of the SEA analysis of the concerned strategic document as anticipated by the draft law on Environmental Assessment:

*Article 25, paragraph 4*

*e) baseline surveys and investigations which should be carried out and methods and criteria to be used for prediction and evaluation of impact.*

Experts identified the data and information which prevented them from conducting proper analysis. This includes but is not limited to:

- Absence of the Waste Management Database;
- Lack of data on groundwater and soil monitoring;
- Absence of the closed (abandoned) mining waste facilities inventory results;
- Lack of data with regard to waste generated or dumped on Protected Areas;
- Lack of reliable, clear, timely and systematic environmental monitoring data in order to identify potential risks to Public Health;

- Lack of national survey reports, analysis, scientific researches detecting potential environment and health correlation for the formulation environmental and healthcare actions and policy;
- Absence of consistent and rational approach to human biomonitoring (HBM) as a complementary tool for evidence based public and environmental health measures;
- Lack of national regulations and guidance manuals, promoted by certification and inspection programmes for the sound management of occupational health and safety;
- Lack of reliable air emission data;
- Poor monitoring of air emission on landfills in order to get adequate and systematic data on air quality;
- Lack of information on municipal budgets for waste management;
- Lack of information on the cost of waste management by municipalities;
- Lack of information on the quantity and structure of waste by municipalities.

## **10. PLANNED APPROACH TO THE EVALUATION OF EFFECTS**

The SEA for the National Waste Management Action Plan is conducted as ex-ante, while the draft Action Plan is not yet available, and only limited information about the nature of its specific measures exists. Therefore the actual approach for the assessment of environmental effects of the Action Plan will be developed along with the gradual development and disclosure of its components. The general SEA approach will be as follows:

### 1. Evaluation of compliance with the environmental policy objectives

Individual components of the Action Plan will be evaluated as to whether they are not contradicting environmental objectives stipulated by the national and international strategic documents. Preliminary overview of the relevant environmental policy objectives is provided in Section 4 of this Scoping Report.

The evaluation will be based on the expert judgment of the SEA team experts and verified through the SEA consultations.

### 2. Evaluation of potential environmental effects

The individual proposed measures of the Action Plan will be examined to identify the potential for environmental impacts/effects (both positive and negative) by the SEA team experts in a transparent manner. The potential of the Action Plan measures for influencing environmental baseline trends or causing specific environmental impacts/effects will be evaluated in two steps.

First, all specific measures presented in the Action Plan will be analyzed in terms of their potential for affecting the environment and public health. The identified effects/impacts can be summarized in a table as indicatively proposed below. Each potential effect/impact will be characterized, to the extent possible, in terms of geographical scale of the effect; the probability of the effect, the duration of the effect; whether changes in the baseline are permanent or temporary, reversible or irreversible, direct or indirect; the frequency of the effects, and direction of change (positive, adverse or neutral). Following this, the

significance value can be assigned for each effect/impact. The summary of this work can be presented in the form of an evaluation matrix:

Evaluation scale:

-2	significant negative effect
-1	moderate negative effect
0	no effect expected
+1	moderate positive effect
+2	significant positive effect
?	high uncertainty

Action Plan measures/specific projects (if any)	Potential environmental effect	Description of the potential environmental impact
<b>Example:</b> Construction of regional waste recycling facility X in the location Y...	-1/?/ >>	Development of the facility X in the location Y can increase traffic intensity on the road Z, which goes through important habitat H1. The fragmentation effect can have negative impact on population P1...the negative effect will likely take place only during the facility X construction period, the operation of the facility (after the construction is completed) is likely to cause permanent increase of the traffic intensity in the concerned road... etc.
Measure 1.2	...	...
Measure 1.3	...	...
Measure 2.1	..	...

Second, the measures identified as having potential for environmental impact/effect will be assessed for cumulative and synergic environmental and health effects through a more detailed evaluation matrix II separately for each key environmental / health issue (identified in the scoping stage). This will be developed further to link to the assessment of alternatives and the suggestion of mitigation/enhancement measures and monitoring measures as is presented below.

Environmental issue and/or objectives (identified in the	<b>E.g. : Terrestrial biodiversity</b> <ul style="list-style-type: none"> <li>• Condition and extent of valuable natural areas</li> <li>• Habitat fragmentation</li> </ul>
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scoping stage):		
Planning proposals with the likely significant impacts on the issue	Likely risks and significant impacts	Alternatives and mitigation and enhancement measures for consideration
List here all the Action Plan proposals/ measures that scored -1 and -2 in the “identification table” above	<p>Explain if the proposal <b>opens any significant risks</b> or if it <b>adversely affects environmental trends</b> in the env. issue addressed. When doing so outline:</p> <ul style="list-style-type: none"> <li>• Assumptions that form the basis for your prediction</li> <li>• Describe the likelihood and key uncertainties</li> <li>• Explain why the impact is regarded as significant – e.g. by outlining implications on the env. policy targets, economic consequences, impacts on certain social groups, etc.</li> </ul> <p>Where possible, substantiate your conclusions by references to literature, examples, calculations, maps, etc. (these can be annexed to illustrate the impact).</p>	<p>Propose reformulations of the planning proposal or conditions for its implementation. When doing so consider any of following questions:</p> <ul style="list-style-type: none"> <li>• Is the proposed development really needed – generally and in the proposed scale? (i.e. development demands in the society cannot be met without this development)</li> <li>• Where should such developments go and where they need to be stopped?</li> <li>• Are there any better processes or technologies?</li> <li>• Should the proposal be implemented as a priority, delayed or cancelled at all?</li> <li>• What conditions can be prescribed for implementation of this proposal – i.e. detailed design, scope of project-level EIA, etc.?</li> </ul>
Example: Construction of waste recycling facility X in the location Y...	<p>Development of the facility X in the location Y can increase traffic intensity on the road Z (see the attached map 1), which goes through important habitat H1. The fragmentation effect can have negative impact on population of birds P1. The P1 is an important species listed in IUCN red list... According to a recent study (xyz) the locality is one of the few remaining nesting grounds in Georgia. The truck traffic associated with waste transport will likely to cause noise and other disturbance of the nesting birds, which can have negative effect on the</p>	<p>Since relocation of the facility X is not a feasible alternative due terrain configuration (as found out through consultation with the local construction authority) the following conditions shall be ensured during the project level planning:</p> <ul style="list-style-type: none"> <li>• The construction phase must avoid nesting period of P1 (March – May).</li> <li>• The possibility of transporting the bulk materials to the facility shall be limited to diversion (service) route D (in order to avoid increase in traffic on the road Z).</li> <li>• The construction of the facility service road D shall be accompanied with developing a green belt ensuring limitation of the disturbance to the</li> </ul>

	reproduction of the population.	concerned habitat..... The project level EIA shall ensure analysis of sensitivity of the concerned habitat and examine efficiency of different mitigation measures to prevent negative impact on the concerned population...
Measure 1.3		
Measure 2.4		
...	...	...
<b>Cumulative impact of all planning proposals that may have likely effects on this environmental objective</b> Summarize the worst-case scenario & the best-case scenarios for the future evolution of the environmental situation (your topic – e.g. biodiversity) if all direct and indirect impacts (described above) of the relevant components of the Action Plan take place.		
<b>Priority mitigation measures and alternatives to be considered</b> Highlight any mitigation measures that are repeated for many planning proposals and can be therefore integrated into the Action Plan as general conditions for implementation. Highlight also any especially important alternatives/mitigation/enhancement measures identified in the table above.		
<b>Key issues for further studies or monitoring (addressing uncertainties):</b> Please describe information gaps or uncertainties limiting your assessment and suggest what studies or future monitoring (indicators) shall be conducted/applied to allow for more precise judgment in the future (during the Action Plan implementation).		

## 11. FUTURE STEPS IN SEA

This section outlines further steps of the SEA process and indicates the content of the SEA Report as anticipated by the draft law on Environmental Assessment:

*Article 25, paragraph 4*

*h) suggestions about the structure, content and length of the SEA Report.*

As indicated above (chapter 1.2), the scoping is an initial phase of SEA, conducted in order to identify key relevant issues that the SEA further analysis shall focus on.

This draft SEA Scoping Report will be distributed to the relevant stakeholders for comments and will serve as a basis for the public consultation. The received comments will be recorded and reflected in the final version of the SEA Scoping Report.

The results of the scoping (represented by the Scoping Report) are reflected in the further phase of the SEA process and in preparation of the main SEA Report. The SEA Report (including recommendations to prevent or minimize potential negative environmental effects



of the Action Plan) will be prepared by the SEA team and presented together with the draft Action Plan at a final SEA public consultation event.

The indicative time-frame for the SEA process is as follows:

**SEA Pilot on Waste Management Strategy and Waste Management Action Plan**  
**Work Plan**  
**(Tentative)**

September	<p>First draft of the SEA Scoping Report on Waste Management Strategy and Action plan – 18 of September</p> <p>SEA Scoping workshop - 21-22 September</p> <p>SEA Scoping consultation – 22 September (<a href="#">See Annex 19: Table of Comments</a>)</p> <p>Translation of the first draft of SEA Scoping report in Georgian – 28 September</p> <p>Make Georgian version of the first draft SEA Scoping report public for comments – 8 October</p>
.October	<p>Incorporate comments received and finalize draft SEA Scoping report on Waste Management Strategy and Action Plan -15 October</p> <p>Discussions with the Waste Management Planning Team to integrate recommendation of the Scoping Report in Waste Management Action Plan</p> <p>Assessment and preparation of the first draft of SEA Report on Waste Management Action Plan by the SEA team including the Non-technical summary 25 October</p> <p>Final consultation meeting on the first SEA Report on Waste Management Action Plan</p>
November	<p>Translate the draft SEA report in Georgian – 5 November</p> <p>Discussions with the Waste Management Team to integrate drafts SEA recommendations in the Waste Management Action Plan</p> <p>Incorporate comments received and finalize SAE Report on Waste Management Action Plan - 10 November</p> <p>Discussions with the Waste Management Team on integrating SEA recommendations in the WMAP</p>

December	Finalization of SEA Report on Waste Management Strategy to submit to the ENECE
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The content of the SEA Report will be developed according to the requirements of the draft law on Environmental Assessment to accommodate the following items:

- a) the content and the main objectives of the strategic document and its link to other strategic documents;
- b) the relevant aspects of the current state of the environment, including health, and the likely evolution in case if strategic document will not be implemented;
- c) the characteristics of the environment, including health, in areas likely to be significantly affected;
- d) the environmental, including health, objectives established at international, national and other levels which are relevant to the strategic document and the ways in which these objectives and other environmental, including health, considerations have been taken into account during its preparation;
- e) the likely significant environmental impact of implementation of strategic document;
- f) the description of how the assessment was undertaken including difficulties encountered in providing the information to be included such as technical deficiencies or lack of knowledge;
- g) the likely significant transboundary environmental impact;
- h) the analysis of the measures to prevent, reduce or mitigate any significant adverse effects on the environment, including health, which may result from the implementation of strategic document;
- i) an outline of the reasons for selecting the alternatives dealt with;
- j) the measures envisaged for monitoring environmental impact of implementation of strategic document;
- k) a non-technical summary of the information provided

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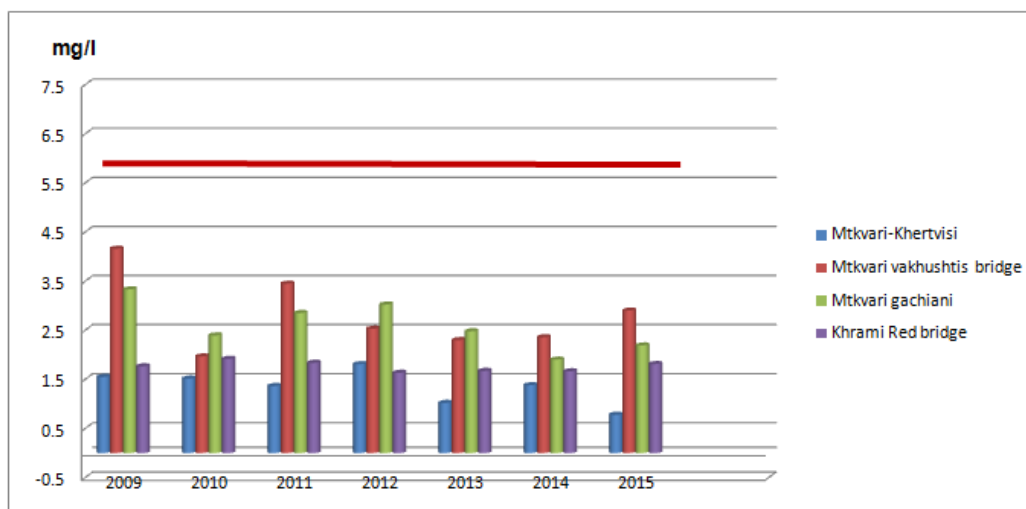
## ANNEXES

### Annex 1: Surface River Monitoring Stations for 2011-2015 years

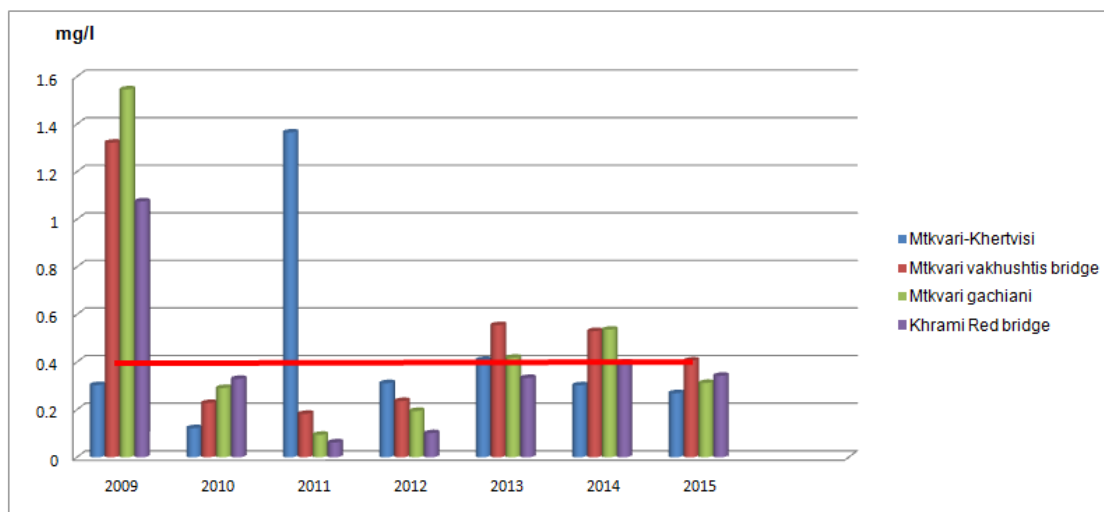
Surface river monitoring stations for 2011-2015 years provided by the National Environmental Agency of the Ministry of Environment and Natural Resources Protection of Georgia

Years	Rivers	Number of s River monitoring sites	Number of Lakes and reservoirs
<b>2011</b>	22	40	4
<b>2012</b>	22	40	4
<b>2013</b>	24	44	4
<b>2014</b>	32	69	8
<b>2015</b>	52	116	11

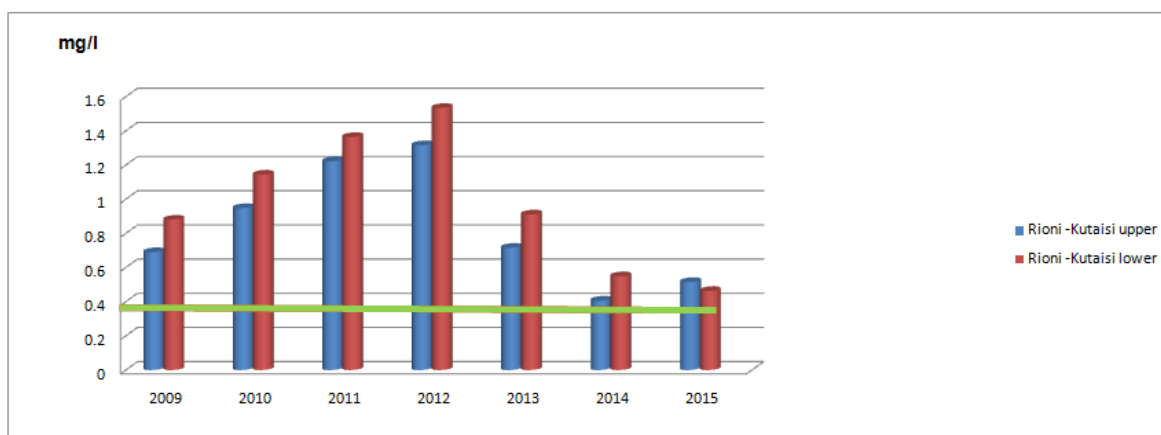
### Annex 2: Trends of Pollution of the Rivers of the Caspian Sea and the Black Sea



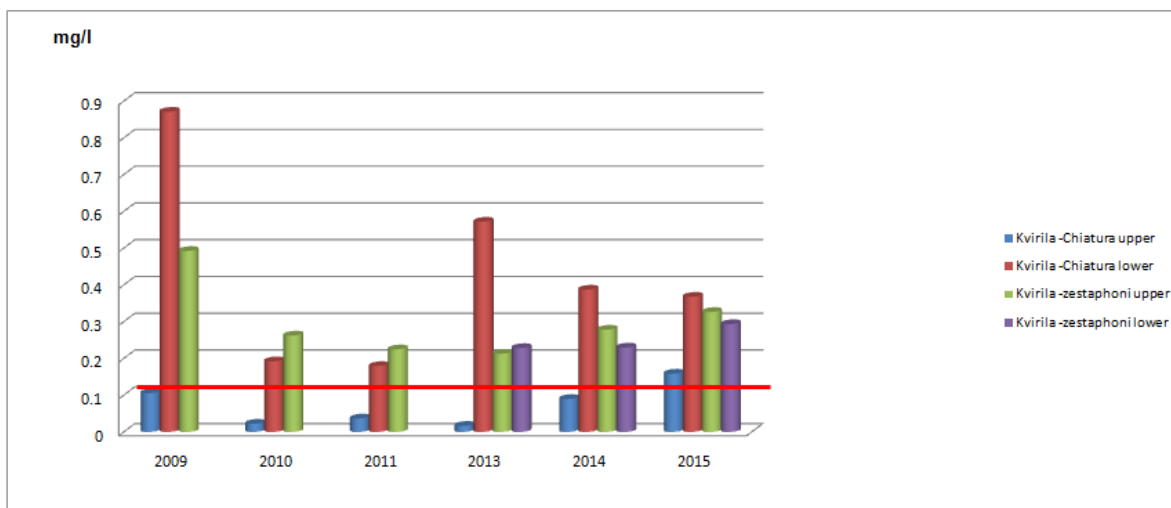
**BOD5** - average annual concentration for 2009-2015 years in Mtkvari river data from National Environmental Agency (the red line reflects the maximum permissible concentration, which is issued by the government Resolution №425 2013 December 31. Tbilisi)



**Ammonia-** average annual concentration for 2009-2015 years in Mtkvari river data from National Environmental Agency (the red line reflects the maximum permissible concentration, which is issued by the government Resolution №425 2013 December 31. Tbilisi).



**Ammonia-** average annual concentration for 2009-2015 years in Rioni river data from National Environmental Agency (the red line reflects the maximum permissible concentration, which is issued by the government Resolution №425 2013 December 31. Tbilisi).



**Manganese-** average annual concentration for 2009-2015years in Kvirila river (The **Chiatura mine**) data from National Environmental Agency (the red line reflects the maximum permissible concentration, which is issued by the government Resolution №425 2013 December 31. Tbilisi).

#### Annex 4. Groundwater Monitoring Stations for 2014-2015

Groundwater monitoring stations for 2014-2015years provided by the National Environmental Agency of the Ministry of Environment and Natural Resources Protection of Georgia

Years	Number of monitoring sites
2014	2
2015	16

#### Annex 4: Number of Soil Monitoring Sites for 2013-2015

Number of soil monitoring sites for 2013-2015years provided by the National Environmental Agency of the Ministry of Environment and Natural Resources Protection of Georgia



Years	Number of monitoring sites
2013	7 including outdated pesticides in close proximity to the former storage (one storage in the Kakheti region)
2014	17
2015	30

Annex 5: Average Monthly Expenditures per Household by Years in GEL).

Distribution of Average Monthly Expenditures per Household by Years in GEL									
	2006	2007	2008	2009	2010	2011	2012	2013	2014
On food, beverages, tobacco	146	154	177	167	169	192	195	219	230
On clothes and footwear	15	15	18	17	17	17	19	23	25
On household goods	10	12	14	13	17	18	20	27	29
On healthcare	23	27	37	46	61	55	59	69	75
On fuel and electricity	28	34	43	44	50	59	66	66	72
On transport	24	28	33	34	43	46	52	63	65

t									
On education	9	12	13	16	18	17	22	23	23
Other consumption expenditure	40	45	54	61	68	70	79	96	108
Non-cash expenditure	82	74	89	82	82	93	91	85	90
On agriculture	8	9	9	9	11	15	16	20	21
On transfers	11	13	13	15	18	20	23	27	36
On saving and lending	19	21	32	37	42	52	97	121	145
On property acquisition	12	10	19	14	23	34	27	33	36
<b>Expenditure, total</b>	<b>426</b>	<b>454</b>	<b>552</b>	<b>555</b>	<b>620</b>	<b>688</b>	<b>766</b>	<b>871</b>	<b>956</b>
<b>CPI (Inflation)</b>									
<b>Annual Average to the Annual Average</b>	<b>109</b>	<b>109</b>	<b>110</b>	<b>102</b>	<b>107</b>	<b>109</b>	<b>99</b>	<b>100</b>	<b>103</b>

Annex 6. Population of Georgia in 2008-2015 (Source: National Statistics Office of Georgia; 2015 data)

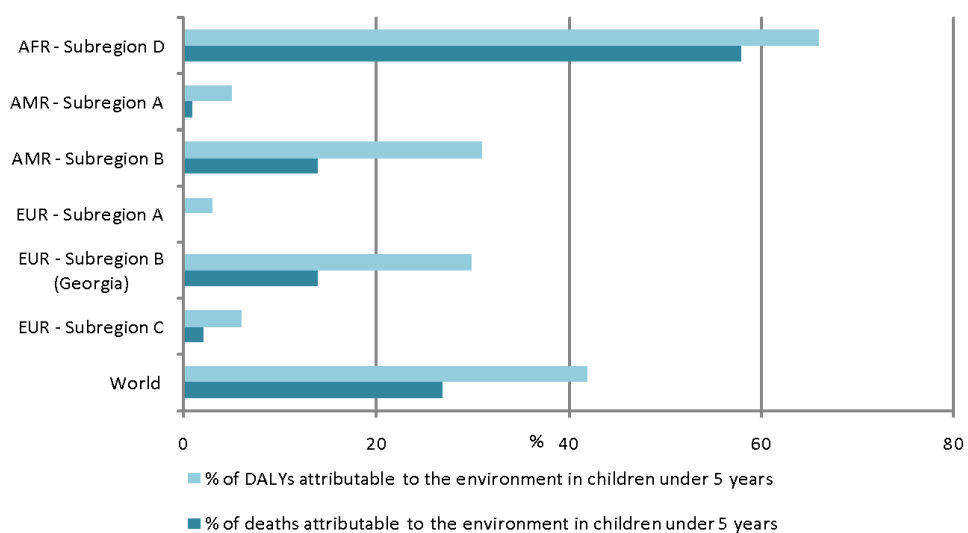
	2008	2009	2010	2011	2012	2013	2014	2015
Population for the beginning of the year (thousands)	4 382.1	4 385.4	4 436.4	4 469.2	4 497.6	4 483.8	4 490.5	3 729.5
of which:								

Urban (thousands)	2 303.8	2 309.1	2 350.5	2 371.3	2 391.7	2 410.8	2 411.7	2 140.4
Rural (thousands)	2 078.3	2 076.3	2 085.9	2 097.9	2 105.9	2 073.0	2 078.8	1 589.1

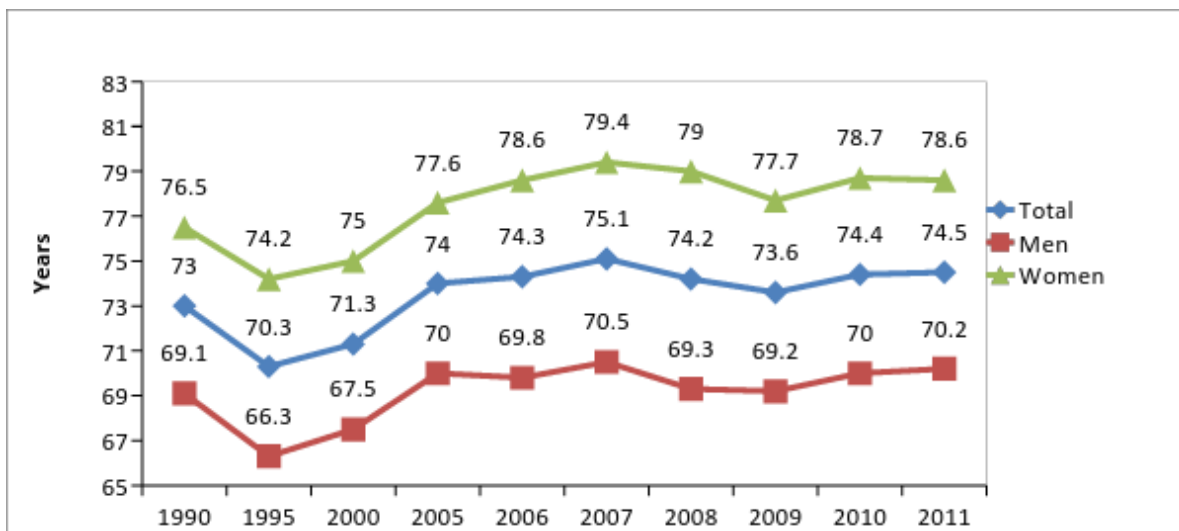
Annex 7. Accrued and Accumulated Revenues for 2013 (Source: State Audit Office of Georgia; Efficiency audit of solid municipal waste management; 2015, p. 45)

2013	Average Customers Quantity	Fee	Accrued Revenue	Accumulate d Revenue	Accum ulated Rev. in %
Tbilisi (6 month)	898,422	2.50	13,476,330	12,426,040	92%
Batumi	93,324	1.30	1,455,854	968,686	67%
38 Municipaliti es	486,251	0.20- 1.00	2,657,729	1,231,815	46%

Annex 8: Percent of DALYs and Deaths Attributable to the Environment in Children under 5 Years by Selected Regions (2004)).

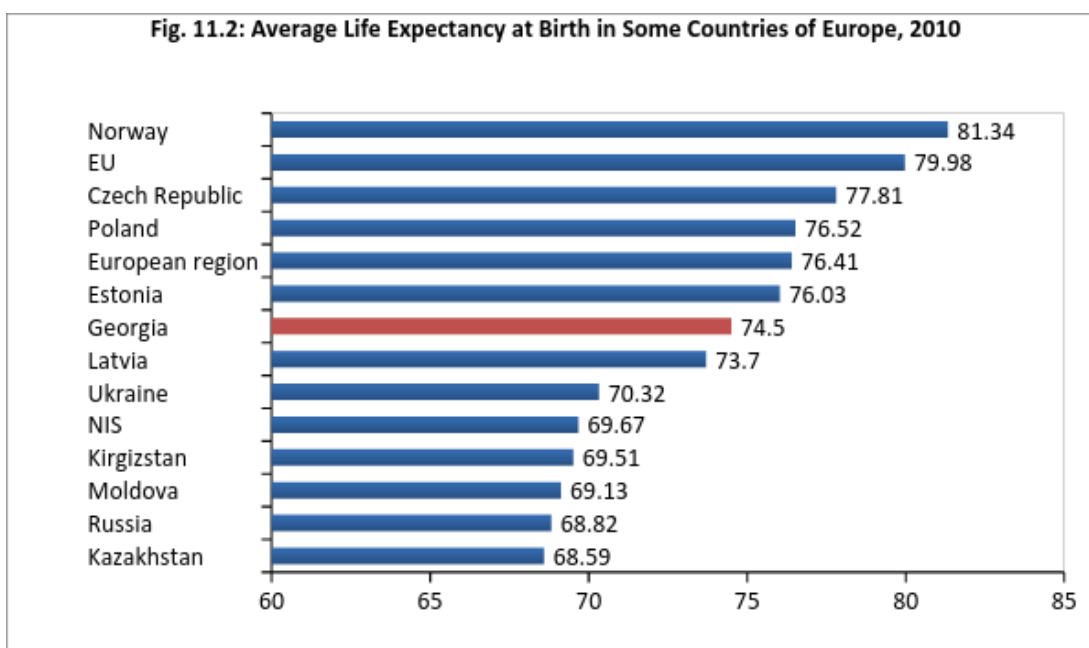


Annex 9: Average Life Expectancy at Birth



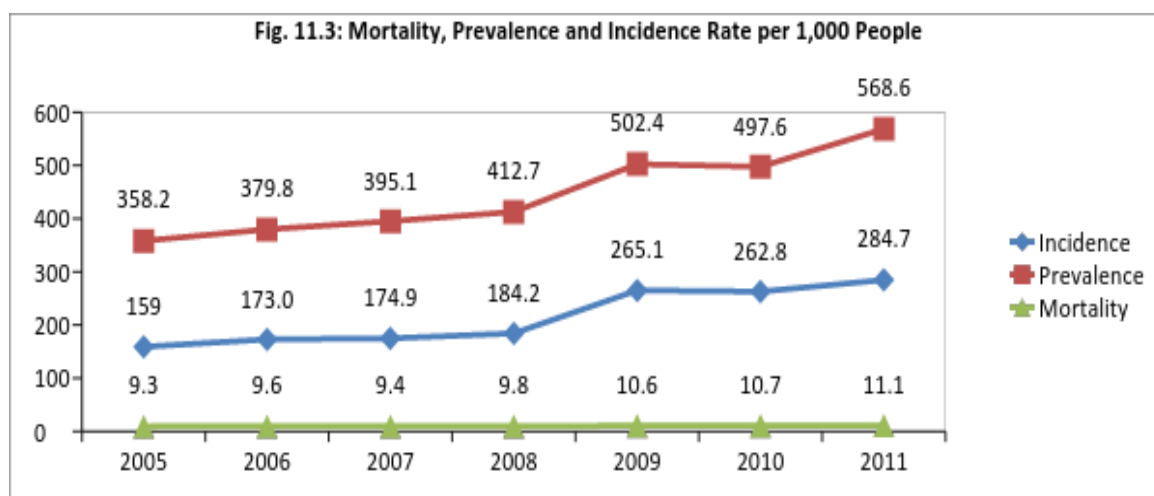
Source: NCDC

#### Annex 10: Average Life Expectancy at Birth in Some Countries of EU (2010))



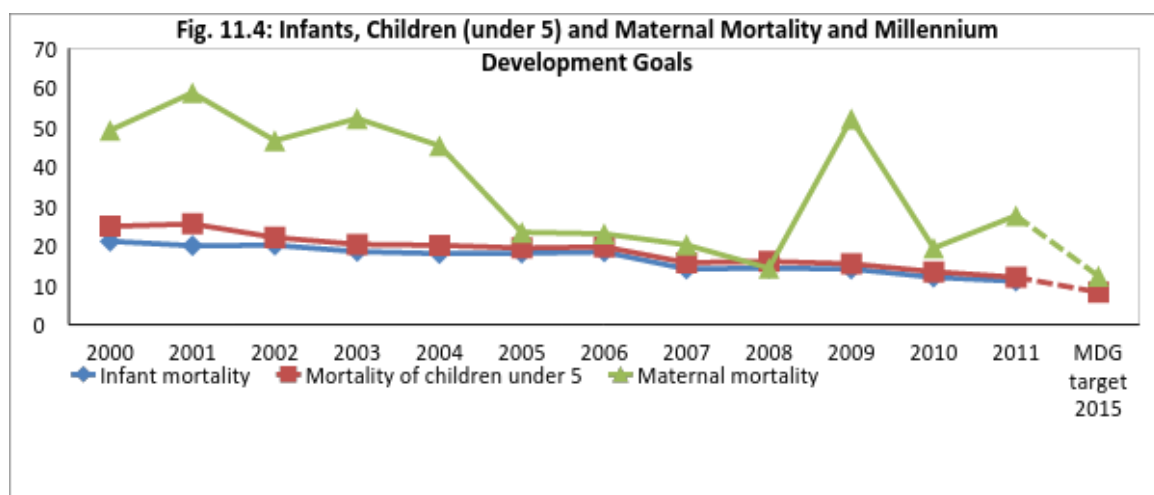
Source: WHO/European Bureau. European Health for All Database (May, 2012)

# Annex 11: Mortality, Prevalence and Incidence Rate per 1,000 people



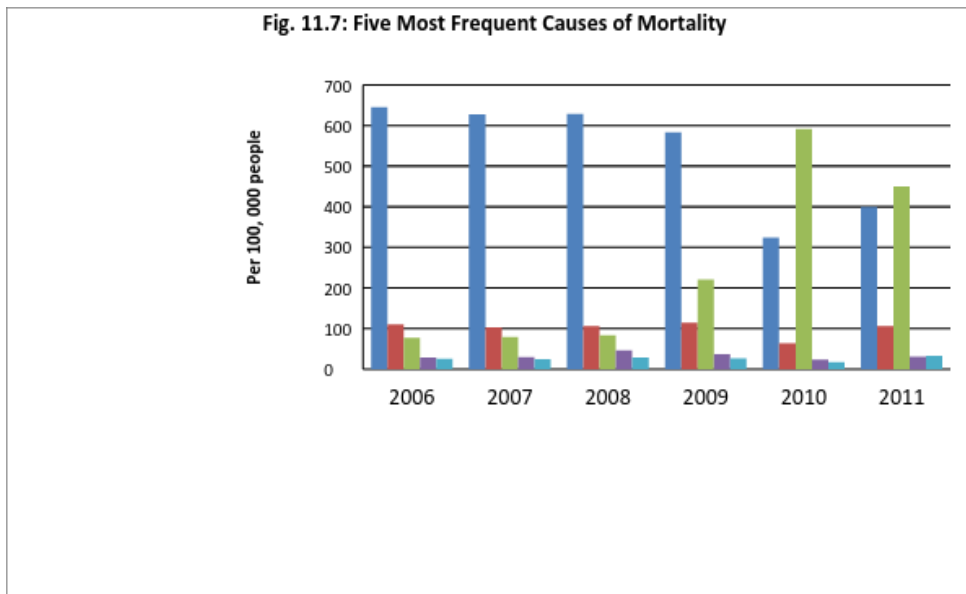
Source: NCDC

# Annex 12: Infant, Children (under 5) and Maternal Mortality and Millennium Development Goals



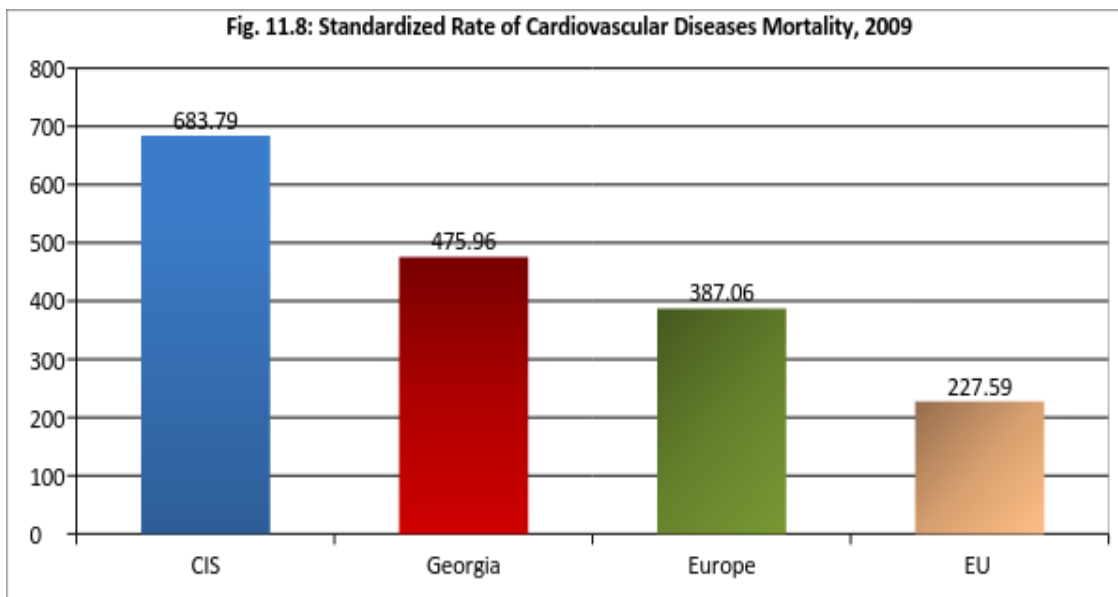
Source: NCDC

# Annex 13: Five Most Frequent Cases of Mortality



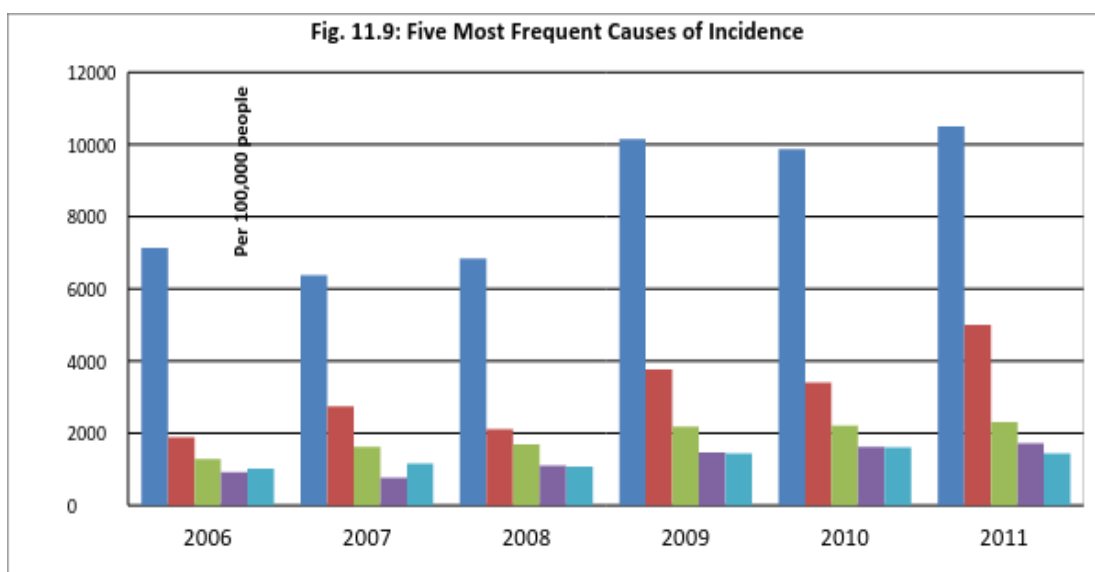
Source: WHO, World Health Statistics, 2012. NCDC (Georgian statistics)

#### Annex 14: Standardized Rate of Cardiovascular Mortality, 2009

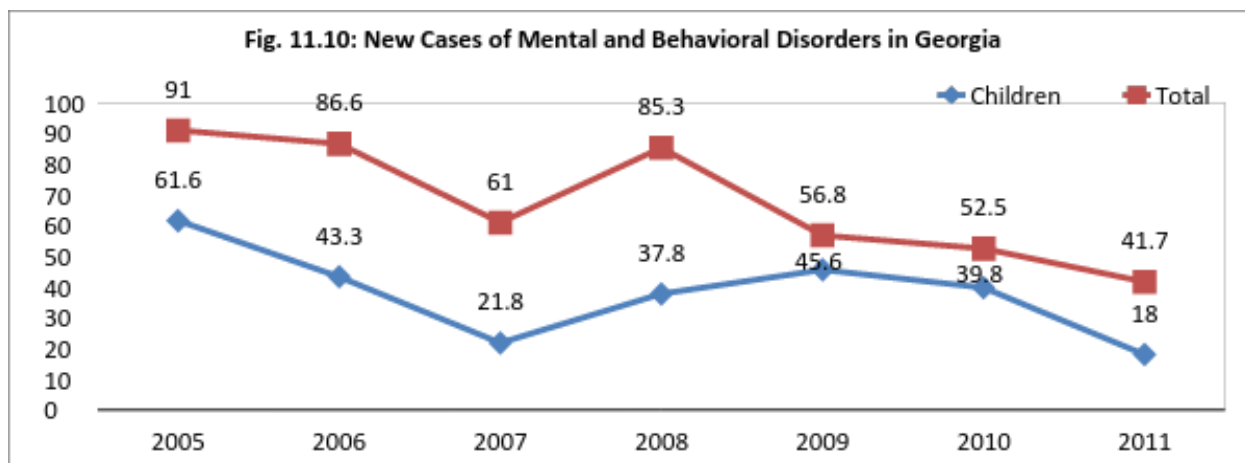


Source: WHO/European Bureau, European Health for All Database (May, 2012)

Annex 15: Five Most Frequent Cases of Incidence (*Source: NCDC*)



Annex 16: New Cases of Mental and Behavioral Disorders in Georgia



*Source: NCDC*

Annex 17: Occurrence and Mortality Rate of Some other Results of Traumas, Poisoning and Exposure to External Factors

	2005	2006	2007	2008	2009	2010	2011
<b>Occurrence of some other results caused by traumas, poisoning and exposure to external factors</b>	<b>732.7</b>	<b>675.2</b>	<b>654.3</b>	<b>666.1</b>	<b>955.5</b>	<b>1062.3</b>	<b>801.0</b>
<b>Incidence of car accident victims</b>	<b>127.2</b>	<b>161.1</b>	<b>167.5</b>	<b>206.7</b>	<b>188.7</b>	<b>169.8</b>	<b>148.1</b>
<b>Mortality caused by some other results of traumas, poisoning and exposure to external factors</b>	<b>28.4</b>	<b>28.6</b>	<b>30.2</b>	<b>46.5</b>	<b>36.7</b>	<b>23.3</b>	<b>30.9</b>
<b>Car accident mortality</b>	<b>13.3</b>	<b>15.3</b>	<b>16.8</b>	<b>19.8</b>	<b>16.8</b>	<b>15.4</b>	<b>11.7</b>



y							
Percentage of car accident deaths in the overall mortality caused by some other results of traumas, poisoning and exposure to external factors	47%	54%	56%	43%	46%	66%	38%

Source: NCDS, Ministry of Internal Affairs

Annex 18: Status of ratification of UN Conventions and international treaties relevant to water resources by Georgia (information is taken from the official web pages of the Convention and treaties - [www.unece.org/env/water/text/text.html](http://www.unece.org/env/water/text/text.html))

UN Convention / International Treaties	Country Status to the Convention*
Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UN Water Convention)	N
Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes	S
Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters to the UN Water Convention and to the 1992 Convention on Transboundary Effects of Industrial Accidents	S

Ramsar Convention on Wetlands of International Importance	<b>R</b>
Convention on Biological Diversity	<b>AC</b>
Convention on the Conservation of European Wildlife and Natural Habitats	<b>R</b>
Convention on Environmental Impact Assessment in a Transboundary Context	<b>N</b>
Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context	<b>S</b>
Convention on the Transboundary Effects of Industrial Accidents	<b>N</b>
Convention on the Protection of the Black Sea Against Pollution	<b>R</b>
Basel Convention on the Control of Transboundary Movements of Hazardous, Wastes and their Disposal	<b>R</b>
Convention on the Conservation of European Wildlife and Natural Habitats	<b>R</b>
United Nations Framework Convention on Climate Change	<b>R</b>
Kyoto Protocol to the UN Framework Convention on Climate Change	<b>R</b>

\*Status of the UN Conventions relevant to fresh water (N = not signed; S = signed; R = ratified; AP = approved; AC = accession)

#### Annex 19: Table of Comments and their reflection in SEA scoping report

Comments from the SWMC (Solid Waste Management Company) of Georgia are provided in written form in the file - [WM strategy draft \(SWMCG კომენტარები\).pdf](#).

<b>Author of comment</b>	<b>Comment</b>	<b>Response</b>
SWMC	Page 11. Iron pollution in the Luhumi River – requesting source of information	The source is provided in the report's Chapter 3.1.1 Surface Water - The Luhumi (arsenic ion).

SWMC	Page 14. Sanitation services change to sanitation administrative centers	Sanitation services are mentioned on page 15 chapter 3.1.3 Water supply and use - source of information is <a href="http://water.gov.ge/eng/about-us/company">http://water.gov.ge/eng/about-us/company</a>  LLC “United Water Supply Company of Georgia” was founded on January 14, 2010. The company provides water and wastewater services throughout whole Georgia. See also regulation of the company, in all documents is mentioned Service centers.
SWMC	Page 19. Please review revised information and respond whether you agree with them	Considered and accepted.
SWMC	Page 19. Request to update information on existing non-hazardous landfills managed by solid waste management company	Considered and revised.
SWMC	Page 21. Request to indicate source of data on Table 1 and Table 2	Updated. Source is: Third National Communication of Georgia on Climate Change
SWMC	Page 21. Request to update information	Considered and not accepted due to the argumentation available in the corresponding section of the report.
SWMC	Page 22. Request to correct information on Norio landfill	Considered and not amended as the report relies on the information from the Third National Communication of Georgia on Climate Change.
SWMC	Page 26. Reflect comment if you consider relevant	Considered and revised.
SWMC	Page 32. Reflect comment if you consider relevant	Excavation of mineral resources in Chiatura, Kazreti, Uravi, Tsana affects the Environment.
SWMC	Page 53. Table 4 – correct title of the table	Considered.
SWMC	Page 53. Table 4 – information considered outdated	Please, see footnote 25.

SWMC	Page 54. Information provided considered outdated	Please, see footnote 25.
SWMC	Page 56. Information 10000 tones of Arsenic ore to be revised	Please, see footnote 28
SWMC	Page 56. Add information about Tsana	The report provided just few examples. Wording is revised to reflect this.
SWMC	Page 56. Order of the Minister of Labor, Health Care and Social Protection # 300/N of August 16, 2001 – document is abolished	Considered, yet should be noted that the information is from 2007.
SWMC	Page 58. Information on biological waste should be updated	Please, see footnote 30.
SWMC	Page 58. Table 6 – information should be updated or the indicated year of the information	Considered, however it should stressed that the SEA scoping report is based on the information that was available at this stage.
SWMC	Page 59. Number of incinerators should be adjusted	Same response as above.
SWMC	Page 59. Table 7 should be updated	Same response as above.
SWMC	Page 60. Who is in charge of management of non-hazardous landfill in Tbilisi and Ajara AR	Considered and changed accordingly.
SWMC	Page 60. Information on the page is revised, please, review if you agree	Considered, yet pending.
SWMC	Page 61. Information on the page is corrected, please, confirm if you agree	Considered, yet pending
SWMC	Page 65. Norio landfill or Lilo landfill?	Considered, but cannot be accepted as this is the official information from the Sustainable Energy Action Plan – City of Tbilisi, 2011 (it mentions Norio).

SWMC	Page 65. National Communication 2010-2013 – is there any new one?	The National Communication covers three year periods, the next one will be done is 2017, covering years 2014-2016
SWMC	Page 65. Better to mention other state strategic documents	The comment is too general, no proposal was provided as to which documents shall be mentioned here
SWMC	Page 66. Exist other state strategic documents with regards to waste management	Considered, but cannot be accepted as the comment mentions ‘waste management documents’, whereas the text is about <b>policy documents in the field of biodiversity</b> (and targets related to waste).
SWMC	Page 73. Technical Regulation – “Rules and Standards to construct and exploit the Solid domestic waste landfills – abolished	Changed to new.
SWMC	Page 73. Regional development strategy of Georgia	Added strategy document: State Strategy for the Regional Development of Georgia for 2010-2017
SWMC	Page 76. Appropriate planning of landfills to reduce GHG emissions – deleted	Considered and deleted, as it was a repetition.
SWMC	Page 80. Key issues – management of protected areas out of responsibilities of protected areas	Considered and could be agreed on partially. This issue depends on the category of protected areas. For example, if it is protected landscape or multiple use area than Agency of Protected Areas is not a management authority. In case of protected landscape municipality is the responsible for its management, accordingly they have to care about waste issues as well.
SWMC	Page 80. Changed to lab capacity instead of list of pollutants to be monitored	Considered and found unacceptable, as the way it is presented now is more accurate.
SWMC	Page 80. Lack of landfills near PA – to be check with SWMC about the correctness of this	Considered and cannot be agree upon, as it is not correct at least for the Tusheti PAs where there are no

	information	landfills or waste collection places near the PA.
SWMC	Page 81. Check correctness of the information	<p>Considered and wording is improved:</p> <ul style="list-style-type: none"> <li>• Racha-Lechkhum-Kvemo Svaneti is example when the riverbank erosion affects the Arsenic Repository in Tsana (riv. Tskhenistskali). Nowadays, riverbank protection measures are implemented.</li> <li>• Geological Assessment of new Landfill polygons and adjacent territory for the preparation of project documentation</li> </ul>
SWMC	Page 82. Landfill regulation already exist	Considered, yet pending
SWMC	Page 82. Consider updating information if applicable, if not, please, provide explanation	Considered, yet pending
SWMC	Pages 83-86. Update stakeholders list	Updated
SWMC	<p>Page 87. Needs adjustment</p> <ul style="list-style-type: none"> <li>• Considering development of waste disposal and handling guidance for safe waste</li> <li>• Transportation, recycling, disposal and management.</li> <li>• Considering the preparation of Closure Plans for those illegal dumps and operational</li> <li>• dumpsites that will be subject to closure</li> </ul>	Considered, yet pending
WMS, MOE	Revision of the short summary of the draft scoping report (Georgian version)	Revised both versions
WMS, MOE	Revision of the key environmental and health issues in Georgia (Georgian version)	Revised

WMS, MOE	Considering Resolution of the Government of Georgia № 421 TECHNICAL REGULATION ON THE CONSTRUCTION, OPERATION, CLOSURE AND AFTER-CARE OF LANDFILLS, August 11, 2015	Considered and updated throughout the report.
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