Implementation of the Framework Convention on Climate Change in Georgia

Institutional mapping

&

Assessment of capacity needs for monitoring and reporting

Tbilisi, 2016

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Introduction

The objective of this study is to support Georgia in the implementation of its international commitments - implementation of best practices and innovative approaches – in compliance with the provisions of all three Rio Conventions (conservation of biological diversity, climate change and desertification issues). Besides, the study shall facilitate the forming of environmental information management and monitoring national system which, in its turn, will help the country to exchange information and efficiently solve environmental problems.

The methodology of the study is based on conducting in-depth interviews and collecting the information (baseline information, literature, law etc.) about key actors on the following issues: legislative framework, the mission, regulations, technical and human resources, implemented projects, current activities, experience, etc.

In the beginning the study covers the competencies and activities of Georgian governmental, nongovernmental and academic organizations in terms of collecting the information and reporting on climate change; besides, it describes the studies carried out by NGOs and academic institutions. Chapter four of the study assesses the capacity needs for monitoring and reporting; and the final chapter suggests the recommendations.

1. Framework Convention “On Climate Change” and relating international agreements: short review

1.1 Framework Convention on Climate Change

The objective of the Convention is stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The Convention acknowledges the priority of economic development of states-parties, however requires from them the implementation of measures ensuring sustainability of climate system. For this the parties are required to conduct preliminary actions in order to minimize “adverse effects of climate change". This means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on both, natural and managed ecosystems, which in their turn lead to climate change. At the same time the Convention introduces, so called “precaution” principle, meaning that where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures. The Convention puts the onus on developed countries to lead the way, whoever it is implied that each party makes contribution to the common cause. The Convention requires from the parties enhanced actions on adaptation and mitigation of climate change. Among specific actions required are the inventory of greenhouse gas emissions, and development of national reports.

- Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which was adopted in 1997 and entered into force on 16 February 2005. The Kyoto Protocol commits its Parties by setting internationally binding emission reduction targets. The main target was to reduce GHG emissions to an average of five percent against 1990 levels. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Morocco, in 2001, and are referred to as the "Marrakesh Accords."

- The Bali Road Map and Cancun agreement

The Bali Road Map was adopted at the Conference of the Parties and the 3rd Meeting of the Parties in 2007 in Bali. The Bali Road map consists of a number of forward-looking decisions aiming at emission reduction actions with participation of all states parties. The process focuses on enhancements of climate change mitigation, and one of the most important results was the initiation of a Nationally Appropriate Mitigation Action (NAMA) development process. This process gives an opportunity to developing countries to address greenhouse gas (GHG) emissions while remaining true to their sustainable economic development. The process is implemented within nationally appropriate initiative and includes the activities supported and enabled by technology, financing and capacity building. It must ensure economic development to reduce GHG emissions to levels below those of "business as usual".

"Nationally Appropriate Mitigation Action" required the development of "Measure, report and verify" (MRV) standard procedures. These issues were settled within Cancun Agreements' format implying to submit Nat Coms every four years and, biennial update reports (BUR). It should be mentioned herewith that the above mentioned reports shall be developed under standard MRV principles, covering the following issues:

- Transparency – the reports shall contain consistent, complete, accurate and detailed information;
- Compatibility – all the parties shall use standard form
- Reliability – data collection using standardized, science-based and consistent methods
- Applicability – the report shall contain information that would be applicable and valuable for all parties to the Convention
- Timeliness – report in compliance with established periodicity

The Agreement also provides for the development of a new tool – "International Consultation and Analysis" (ICA).

- Paris Agreement

In 2015 Paris Climate Conference was held. The objective of this Conference was to discuss a possible new global agreement on climate change, aimed at reducing global greenhouse gas emissions after 2020 (when current commitments on greenhouse gas emissions run out) and thus avoiding the threat of dangerous climate change. The Agreement aims to strengthen the global response to the threat of climate change by holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5 °C. It is assumed that putting the above bounds would significantly reduce the risks and impacts of climate change. To achieve this objective the Agreement provides for enhancing low greenhouse gas emissions development, for which appropriate finance flows are planned from 2020. All the above shall, in its turn, facilitate flexible adaptation of both, ecosystems and economy (particularly food production) to climate changes.

1.2 Climate change and biodiversity

It is universally accepted that biodiversity and climate change are interdependent phenomena. The most recent studies revealed that alongside with four key factors reducing biodiversity (habitat change, overexploitation, pollution, and invasive alien species), climate change ranks among the first (Global Biodiversity Outlook 3. 2010). It is also generally accepted that biodiversity supports sustainability of ecosystems and hence is the component of ecosystem services.

According to CBD Ad Hoc Technical Expert Group (AHTEG) negative impact of the increase in temperature is already there, even in the regions with thigh indicators. According to the same Group each 1C° increase in the global

average temperature may endanger 10% of species. Whereas the forecast changes by 2100 are more wide-scale, not ruling out the increase in 2.4 C° - 6.4 C°. The increase in temperature may lead to the increase of frequency of extreme weather events accompanied by changes in the distribution and intensity of precipitation. The changes in vegetation, flowering and migration schemes can already be observed worldwide. E.g. during recent 40 years the vegetation period in Europe starts in average 10 days ahead of usual. Such changes may lead to changes in food chains and ecosystem imbalance.

The conservation of biological diversity has an important function (alongside with preserving biodiversity) of climate change adaptation and mitigation. Besides the biodiversity plays important role in such processes as are the rivers' hydrological regime modification, the microclimate etc. Loss of biodiversity poses a potential threat to ecosystem services, like nutrients and water cycling, soil formation and retention, resistance against invasive species, pollination of plants (including agricultural), regulation of climate, as well as pest and pollution control by ecosystems. Clearly, the ecosystems management today is regarded as an important climate change mitigation tool. Handling these issues is one of most important tasks of our time. At the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (Nagoya, 2010), the Strategic Plan for Biodiversity 2011-2020 with its Aichi Targets, known as Aichi Plan was adopted. The 10^{th} and 15^{th} targets of this plan are linked to climate change mitigation and adaptation issues. They provide for conservation and restoration by 2020 of at least 15 per cent of degraded ecosystems, thereby contributing to the reduction of anthropogenic pressures on the Open Ocean, and minimization of ocean acidification. There may be some positive impacts, though the number of such precedents is not high. E.g. one third of 122, widespread in Europe, species of birds may show quantitative increase against the background of global warming.

Georgia has developed certain models of possible changes during upcoming 50-10 years. The authors of second communication to the Framework Convention "On Climate Change" have used several models of PRECIS scenarios, as well as MAGICC/SCENGEN software package. Besides, several global multi-models (e.g. HadAM3P and ECHAM4) were applied. Evaluations under the above models revealed that global warming is fully manifested in Georgia and, according to different forecasts, may reach 1.8C°- 3.9 C°. It is noteworthy, that maximum rise in temperature in East Georgia is expected in winter period, whereas in West Georgia – in summer.

It should be mentioned that temperature changes, equally as precipitation changes are different in different parts of Georgia. Reducing the amount of rainfall is expected throughout the country: in West Georgia maximum reduction of rainfall is expected in transitional seasons (spring, autumn), and in East Georgia – in summer and autumn (according to II National Communication to the Convention). According to different studies, most vulnerable regions in Georgia are semiarid zone and southern slopes of the Caucasus, especially Svaneti.

1.3 The Convention on Biological Diversity

The main objectives of the Convention are: the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits from the use of genetic resources. While containing general provisions and principles, the Convention requires from the states parties the implementation of the principles of sustainable use and conservation of biodiversity. The Convention commits the states parties to adopt measures relating to the use of biological resources to avoid or minimize adverse impacts on biological diversity so that to avoid, in a long term perspective, the loss of biodiversity, and its irreversible reduction. The Convention also provides the commitment of more general character which do not limit their sovereign right to exploit their own resources pursuant to their own environmental policies.

States parties are required, under the Convention, develop national strategies and action plans for the conservation and sustainable use of biological diversity. Georgia developed its first Strategy and action plan in 2005, which was

then updated in 2014. Beside, Georgia as a party to the Convention develops regular national reports to the Convention. Five national reports have been submitted to the Convention to date.

1.4 The Convention to Combat Desertification

The 1994 UN Convention "to Combat Desertification" laid the foundation to the international system of planning and implementing activities to reverse and prevent desertification/land degradation on a global scale basis. Georgia signed the Convention the same year, and in 1999 Georgian Parliament ratified it.

According to the Convention to Combat Desertification, the desertification may be caused by a variety of factors, such as climate change and human activities leading to land degradation in arid, semi-arid and dry sub-humid areas. Different aspects of combating desertification/land degradation include the issues of mitigating the effects of drought in affected areas, as well as the issues of sustainable land management (land use, land tenure, water resources integrated management, management of protected areas, agriculture, climate change adaptation supporting practices etc.).

Desertification/land degradation for Georgia is no only an environmental, but also social and economic problem. Excessive grazing, reduction of forest areas, unsustainable agricultural practices, and unsustainable land development for urban projects are key factors leading to land degradation. Although Georgia is not in close proximity to the desert areas, some of its eastern regions (Kakheti, Shida and Qvemo Kartrli) may face the threat of local desertification against the backdrop of expected global warming and in the case of systematic droughts. There may be some more susceptible to desertification regions in Georgia, revealing of which is equally important for efficient combat activities.

After the entry into force of the Convention Georgia actively participated in the Conferences of the Parties, and the meetings of Annex 5 countries, held under the aegis of the Conference. Georgia is included in Central and Eastern Europe region under the Convention.

According to Article 4 of the Convention to Combat Desertification, the parties shall develop a coherent long-term strategy – National Action Program to combat desertification. In 2000 the first National Action Program to Combat Desertification was developed in Georgia, which was approved under Presidential Decree #112 of 2 April 2003. Under the first National Programme (2003) vulnerable to desertification regions – Kakheti and Kvemo Kartli - were identified. There are more, vulnerable to climate change and anthropologic impact, regions in Georgia. Respectively, their identification and development of adaptation activities is relevant.

In 2008, at the Conference of the Parties to the Convention the implementation strategy 2008-2018 was developed. It was on the basis of this Strategy that parties to the Convention, including Georgia, developed second national action program to combat desertification 2015-2022. Operational objectives of the program were set out in accordance with operational targets of 10-year strategy, and based on the structure of Georgia's Biodiversity Strategy and Action Plan. Besides, four national reports were developed within the Convention. These reports also cover the issues relating to climate change based risks.

1.5 The EU-Georgia Association Agreement

The EU-Georgia Association Agreement (Association Agreement between the European Union and the European Atomic Energy Community and their Member States, of the one part, and Georgia, of the other part) provides for a range of activities relating to climate change issues (Title 6- Other Cooperation Policies, chapter 4 - Climate action). Under the Agreement the Parties shall develop and strengthen their cooperation to combat climate change.

Cooperation shall be conducted considering the interests of the Parties on the basis of equality and mutual benefit and taking into account the interdependence existing between bilateral and multilateral commitments in this area. Cooperation shall aim at mitigating and adapting to climate change, as well as promoting measures at international level, including in the areas of:

- mitigation of climate change;
- adaptation to climate change;
- carbon trading;
- research, development, demonstration, deployment and diffusion of safe and sustainable low carbon and adaptation technologies;
- mainstreaming of climate considerations into sector policies.

Article 310 of the same Article provides for the development and implementation of:

(a) national Adaptation Plan of Action (NAPA);
(b) Low Emissions Development Strategy (LEDS), including nationally appropriate mitigation actions;
(c) measures to promote technology transfer on the basis of technology needs assessment;
(d) measures related to ozone-depleting substances and fluorinated greenhouse gases.

The Parties shall, inter alia, exchange information and expertise; implement joint research activities and exchange of information on cleaner technologies; implement joint activities at regional and international level, including with regard to multilateral environment agreements ratified by the Parties and joint activities in the framework of relevant agencies as appropriate.

Besides, Georgia will carry out approximation of its legislation to the EU acts and international instruments referred to in Annex XXVII to the Agreement.

1.6 The Covenant of Mayors

The Covenant of Mayors is the EU wide scale initiative. It was launched by European Commission after the European Union climate and energy package was adopted in 2008. The Covenant of Mayors European cooperation movement involving local and regional authorities. Signatories of the Covenant of Mayors voluntarily commit to increasing energy efficiency and the use of renewable energy sources on their territories. The signatories pledge to reduce CO2 emissions by at least 20% by 2020 thus participating in the development of green economy and improvement of living conditions. The EU institutions made an unprecedented step forward by including local governments thus stressing their crucial role in meeting the ambitious energy and climate change targets.

The main commitments taken by local authorities when joining the Covenant of Mayors are: to prepare a baseline emission inventory to be preceded by measures aiming at development of sustainable energy policy and appropriate institutional/governance skills. Besides, the signatories shall develop Sustainable Energy Action Plan (SEAP), implying the actions aimed at energy savings, and the development of clean and financially affordable energy use mechanisms. Part of the agreement are the tasks on: the creation of jobs, increase financial and social stability, healthy environment and improved living conditions, business promotion and growth of the economy competitiveness, improved utility services and infrastructure, collected in so called “best practices” database. Besides, the Catalogue SEAPs give essential feedback to acquaint with other cities’ ambitious objectives and ways of their achievement.

The Joint Research Centre of the European Commission, in close collaboration with the Covenant of Mayors Office, provides technical and scientific support to the signatories, equipping them with clear technical guidelines for preparations of Baseline Emission Inventories and Sustainable Energy Action Plans.

2. Reporting mechanism on implementation of the Convention on Climate Change at national level

2.1 Georgia's First National Communication

In compliance with the Convention provisions, Georgia submitted its first national communication to the Convention in 1999.[1] It contained the first greenhouse gas inventory and the policy and measures to mitigate greenhouse gas emissions. The document also contained the forecasts, trends of climate change and vulnerability assessments in economy. It is noteworthy that the expertise and experience of that time could not provide precise indicators of forecasts and models. That was why the re-evaluation and the preparation of forecasts was carried out later, within second National Communication. The methodology offered at the 9th Conference of the Parties in 2002 was applied to fulfil this work. It was on the basis of this guideline document that Georgia's second National Communication (2006-2009) was later developed.

2.2 Georgia's Second National Communication

Georgia's second national communication was developed in 2009. Greenhouse gas national inventory was carried out within its framework. Current and anticipated climate change scenarios were developed; adaptation projects were prepared, along with the planning of GHG abatement measures.

On the basis of existing data vulnerability of three Georgian regions (Black Sea coastal zone, Dedoplistskaro region and Qvemo Svaneti) to current and expected changes in climate was assessed. The following evaluation parameters were used; average values of mean annual air temperature, average value of air temperature absolute maxima/minima, average values of annual sums of precipitation, relative humidity, and some extreme weather events (high wind, drought, landslides and floods).

The authors of Second National Communication used various options of the PRECIS model including two GCMs (e.g. HadAM3P and ECHAM 4), and statistical software MAGICC/SCENGEN. Under the above models Assessment indicates that the maximum increases of global temperature are entirely reflected in the territory of Georgia and mean annual increase varies between 1,8 C° and 3,9 C°. It is remarkable that in Eastern Georgia the maximum increase of temperature is anticipated for winter, while in Western Georgia it is anticipated in summer. A decrease in precipitation is anticipated for the entire territory of Georgia; in Western Georgia a maximum decrease is anticipated more in transition seasons (spring and autumn), while in Eastern Georgia - in summer and autumn.

The adaptation measures were planned based on expected scenarios, covering, inter alia, the biodiversity and soil erosion issues. E.g. for Qvemo Svaneti it is rehabilitation and proper management of most damaged parts of forests; for Dedoplistskaro it is creation of a climate change monitoring system, to evaluate climate change impact on soil, flora, and fauna within protected areas, free from anthropogenic impact.

In contrast with Georgia's First National Communication, the Second Communication focuses on the assessment of vulnerability of different systems and economy to climate change, and the development of adaptation strategies and projects, a number of project proposals were prepares. Besides, national strategy to mitigate climate change was developed within the communication framework, part of which is GHG abatement measures in energy sector, compared to "business as usual" scenario.

[1] Georgia, as a non-Annex 1 party, was required to submit first national communication within three years after signing the Convention.

2.3 Georgia's Third National Communication

The Third National Communication to the UNFCCC was prepared in 2012-2015 and contains the information on greenhouse gas. The Third National Communication of Georgia to the UNFCCC was prepared by a large group of decision makers, experts, and other stakeholders, representing: Georgian Government, Government of Ajar Autonomous Republic, municipalities, academic and research institution and NGOs, as well as tourism, agriculture and health experts and advisors. Georgia's Third National Communication to the UNFCCC was completed and published with the support of GEF and UNDP. Within the project:

- greenhouse gas inventory for different economy sectors was carried out;
- Climate Change Adaptation Strategy for Adjara Autonomous Republic was developed;
- The reports on "Climate Change Impact on Agriculture in Kakheti" was prepared;
- Climate Change Adaptation Strategy for Upper Svaneti was developed;

The information on the project and relating documents are available on the UNDP web-page[2]. Regional overview papers are also available there:

- Climate change strategy of Adjara[3];
- Upper Svaneti Adaptation Strategy to the Climate Change[4].

UNDP has prepared some more important documents on climate change:

- Developing Climate Resilient Flood and Flash Flood Management Practices to Protect Vulnerable Communities of Georgia[5];
- Towards a Multi-Hazard Early Warning System for Georgia[6];
- Weather Index Based Flood Insurance to Municipalities in the Rioni Basin, 2015[7];
- Assessment of Pastures in Vashlovani National Park[8];
- Regional Climate Change Impacts Study for the South Caucasus Region Tbilisi, Georgia, 2011[9];
- Climate Change and Agriculture in Kakheti Region[10];
- Economic and Social Vulnerability in Georgia[11];
- Tbilisi Disaster Needs Assessment[12].

[2] Visit: http://bit.ly/1MFPOsd

[3] Visit: http://bit.ly/1MFPAkT

[4] Visit: http://bit.ly/1MFPp9a

[5] Visit: http://bit.ly/1MFQiyC

[6] Visit: http://bit.ly/1MFQluf

[7] Visit: http://bit.ly/1MFQoWQ

[8] Visit: http://bit.ly/1MFQsWP

[9] Visit: http://bit.ly/1MFQAFz

[10] Visit: http://bit.ly/1MFQI8e

[11] Visit: http://bit.ly/1MFR7HC

[12] Visit: http://bit.ly/1MFRiTr

3. The institutional structure for implementation of the convention at national level

Ministry of Environment and Natural Resources Protection is governing the climate change policy in Georgia. This institution, together with its subordinate LEPLs, is responsible for collecting appropriate information and developing the reports. Besides these services, the projects financed by international donors and NGOs play an important role in terms of collecting the information countrywide, and preparing the reports. Hence, this chapter overviews primarily the competences and capabilities of governmental structures, and then of other parties; the projects funded by different donors are also reviewed herein.

3.1 Governmental institutions

3.1.1 Ministry of Environment and Natural Resources Protection of Georgia and its subordinate LEPLs

One of the most important goals of the Ministry is to support sustainable development of the country in the field of environment; to organize environmental planning system; to elaborate and implement state policy, target programs, strategy of environmental protection for sustainable development, national environmental action programs and management plans in the field of environmental protection and natural resources; to protect and preserve unique landscapes and ecosystems, rare and endangered species of flora and fauna that are characteristic for the country, biodiversity, atmospheric air, water, land and mineral resources; to implement public administration (regulation, registration, supervision and control) on waste management and chemicals; to follow the Georgian legislation in the field of environmental protection and to implement the international commitments within its competence.

Besides, the Ministry is responsible, within its competence, for complying with Georgian Environmental Law, and meeting international commitments; the Ministry shall ensure public availability of environmental information, public participation in environmental decision making, environmental education and awareness-raising.

As of 2014 the Ministry coordinated the implementation of 15 international environmental Conventions, their 5 Protocols and three Agreements. The Ministry also participates in the activities under the aegis of eight international environmental conventions and protocols, to which Georgia is not a party yet.

For the purposes of this study it is important to review the following LEPLs, subordinate to the Ministry of Environment and Natural Resources protection:

(a) The Climate Change Service;
(b) National Environmental Agency;
(c) National Forestry Agency;
(d) Environmental Information and Education Center.

Finally, inter-ministerial committee established by Georgian Government and headed by Ministry of Environment and Natural Resources Protection is discussed.

(a) Main objectives of the Climate Change Service are:

- Participation in the developing and implementation of climate change governmental policy;
- Risk assessment of the effect of climate change on different economy sectors and ecosystems;
- Development and coordination of climate change mitigation national plan, and facilitation of its implementation;
- Organization of preparation of “low-emission development strategy”;

- Organization and coordination of the development and implementation of the national plan of adaptation of vulnerable to climate change ecosystems and economy sectors; monitoring of current projects on adaptation to climate change;
- Coordination of the development of Georgia's National Communications to the Framework Convention on Climate Change;
- Periodic national inventory of greenhouse gas and submission of the report to the Convention Secretariat;
- Ensuring the implementation of the policy under the Kyoto Protocol of the UN Framework Convention on Climate Change, promotion of Clean Development Mechanism (CDM) and coordination of the stakeholders;
- Exercise other powers stipulated by the law.

(b) National Environmental Agency is a legal entity of public law in the system of the Ministry of Environment Protection of Georgia. It was established as a legal entity of public law on 29th August, 2008. The agency represents an independent organization from public administration that implements its activities independently under state control. Official functions of National Environmental Agency are: to prepare and spread informational documents, forecasts, warnings regarding to existing and expected hydro-meteorological and geodynamic processes, also environment pollution conditions in order to provide state security, existing and expected hydro meteorological forecasting of rivers, water reserves and the Black Sea territorial waters, to asses conditions of geodynamic processes, engineering and geo-ecological conditions of environment and to prepare and spread information on environmental conditions, to create database of engineering infrastructure of coastal zone, to manage united state fund information on minerals, to establish and manage informational fund in geological, geodesic, cartographic and land resources state fund, to create and manage informational database on Georgian forest resources, to inventor and register industrial and scientific geological activities, to create and renew state balance and cadaster database on mineral deposits and exposures, to create environmental information database, to monitor coastal zone, to provide civil aviation with meteorological information. Structural entities of the Agency are:

- Administrative Department;
- Department of Hydro-meteorology;
- Department of Environment Pollution Monitoring;
- Department of Geological Hazards and Geological Environment Management.
- Special information department

(c) National Forestry Agency is a legal entity of public law in the system of the Ministry of Environment Protection of Georgia and its official function are: development and implementation of forest fund protection, reforestation and forest use state policy; protection of forests from fire, illegal felling, insects and diseases; development of activities on preservation and qualitative improvement of forests with soil conservation, water-saving, climate regulating, sanitary and recreational functions; providing forest resources' public registry system; monitoring of governmental programs and other legal activities on the territory of state forest fund, and control over the implementation in the established order; participation in international relations on sustainable forest management within its competence; cooperation with local and international academic and nongovernmental institutions.

(d) The sphere of activity of LEPL "Environmental Information and Education Center is to facilitate access to the environmental information; public participation in environmental decision making. Besides, among the functions of the Center are: to facilitate access of public to environmental law, as well as to promote environmental awareness raising of general public and support of training and improvement of skills of the appropriate professional.

State Coordination Committee for low-emission development strategies (LEDS)

The low emission development strategies (LEDS) implies the development strategic plans at national level to support reduction of the greenhouse gas (GHG) emissions in the process of economic growth. In 2013 the low emission development strategy implementation, funded under the US EC LEDS program, started in Georgia. On 26 July 2013 Georgian Government issued the resolution on setting up high level inter-ministerial committee and LEDS[13] and its working group, headed by Ministry of Environment and Natural Resources Protection. The program aims at supporting developing countries' efforts to pursue long-term, transformative development and accelerate sustainable, climate-resilient economic growth while slowing the growth of greenhouse gas emissions. The program shall:

- Define integrated development goals and objectives and long-term projections for sustainable development;
- Promote transformative economic growth;
- Support the country in the fulfillment of international obligations regarding climate change;
- Attract investments from different sources (both, governmental and private) to provide the country with low-emission technologies.

3.1.2 Ministry of Energy of Georgia

Ministry of Energy of Georgia implements State Energy Policy for Georgia, participates in the development of strategies and programs that address the priorities in the energy sector, monitors their implementation, and works out appropriate recommendations. The Ministry structure includes the Department for Energy Efficiency and Renewable Energy.

3.1.3 Ministry of Economy and sustainable Development of Georgia

The main functions of the ministry are to provide incentives for economic growth in the country utilizing an effective economic policy, based on current law. Basic spheres of activities of the Ministry are: economic policy, trade and investments, tourism, state property management, urban development and spatial structure, building, e-communications, information technologies, post, transport, standardization and metrology, accreditation.

Key objectives of the Ministry are: the analysis of economic situation in the country and development of economic policy to ensure sustainable economic development; development of the state policy main directions in the sectors governed by the Ministry; coordination of their implementation after their approval under the procedure established by law.

3.1.4 Ministry of Agriculture of Georgia

The core function of the Ministry is to develop and implement a unified government policy on the development of agricultural sector of Georgia. Along with other issues, the Ministry is in charge of agro-production, agro-processing, land conservation and productivity improvement, crops, livestock, fisheries, agro-engineering and veterinary, as well as promotion of upgrade and accessibility of agricultural technology.

"Georgian Amelioration" Ltd. is a subordinate to the Ministry entity, whose objective is to increase water supplied areas and improve efforts for maximal utilization of water supplied areas to achieve sector's viability and

[13] LEDS is a country-tailored strategic plan to support climate-resilient economic growth while slowing the growth of greenhouse gas emissions

sustainability. The company is the only supplier of irrigation and drainage services in the country. For enhancing effectiveness of amelioration systems and improving yields from meliorated lands, the company, within the framework modernization program, introduces modern irrigation technologies for rational use of water resources.

Under Governmental Resolution No. 162 of 13 February 2014, LEPL Agricultural Scientific-Research Center was established. The entire infrastructure of LLC "Agro" and N(N)LE "Agro-Cartu" bases have been assigned to government of Georgia.

3.1.5 Ministry of Regional Development and Infrastructure of Georgia

The Ministry is in charge of regional development policy, introduction of water supply systems, development of integrated state policy on development and designing of networks of secondary and international roads and scientific-technical progress.

Main tasks of the Ministry is the development of draft concepts and state programs, Georgian laws, legal texts to be signed by the President and the Government of Georgia and other legislations, and their coordination and monitoring, within its competence, after they are signed.

It should be noted that "Regional Development Program of Georgia 2015-2017" was developed under the aegis of the Ministry. The program includes the elements of adaptation to climate change, which is basically linked to disaster risk reduction[14].

3.2 Academic Institutions

3.2.1 Ilia State University

Ilia State University is one of the leading research and educational institution in Georgia. It is one of a rapidly growing institution of higher education which focuses on research in the field of natural sciences. It plays an important role in monitoring the climate change and its impact in Georgia. The University academic staff carries out scientific research aimed at evaluation of the situation in the world and in Georgia in terms of climate change, and the impact of climate change on biological diversity, agriculture and other economy sectors.

The academic staff has a rich experience in conservation projects. They, usually, participate in the development of state strategic papers, regulations, and conservation plans.

The University staff participate in a number of researches aimed at the assessment and forecast of climate change impact on biological diversity. E.g. the University is implementing "Levels of the upper forest boundary in Georgia" program, the purpose of which is to study the impact of climate change on the diversity of mountainous vegetation. They also participate in the studies within GLORIA program, monitoring more than 60 sites in the world. The program aims at the assessment of the process of thermophile plants migration to subnival belt (zone) (so called vertical migration).

3.2.2 Ilia State University Institute of Botany

Institute of Botany was founded in 1933 on the basis of Tbilisi botanical gardens. Main directions of its scientific research activities are:

[14] Visit: http://bit.ly/2404czZ

- Comprehensive systematic, phytogeographical, phytosociological, structural and botanical, ethnobotanical, economic and botanical studies of Georgian flora diversity; identification of natural vegetation resources; development of scientific basis and practical recommendations for its sustainable use.
- Sustainable development of one of the oldest and richest documentation fund of Ilia State University Institute of Botany Herbarium (Georgian National Herbarium);
- Study of Georgian soil microflora; isolation of biologically active substances-producing microorganisms from soil and their biochemical and physiological analysis; development of recommendations for restoring productivity of degraded lands.
- Study of the physiological basis of plant resilience and productivity; participation in environmental projects and environmental expertize of large construction projects etc.

In the climate change context the Institute participates in „Conservation Crop Wild Relatives of Georgia" project, aiming at conservation of wild relatives of agricultural varieties and creation of seed bank to ensure their survival under the climate change.

3.2.3 Ivane Javakhishvili Tbilisi State University

Ivane Javakhishvili Tbilisi State University is the oldest and one of the most respected institutions of higher education in Georgia. Academic staff of its rich tradition department of Exact and Natural Sciences has been carrying out climate change studies for tens of years, including in the fields of climatology, ecology, hydrology, geography, geology, glaciology, edaphology, etc. These are usually academic studies with participation of university students and doctoral students.

3.2.4 The Agrarian University of Georgia

After 2011 reform the Agrarian University of Georgia became a modern, high-quality research university. The University made a rapid progress and now it is recognized all over Georgia. As a result of megabuck investments, revised curricula and syllabuses in accordance with best western models, it ranks among leading, and quality educational centers. The Faculty of Agricultural and Natural Sciences offers seven undergraduate programs, covering, along with other directions, biology (including ecology) and forestry. Scientific capacity of this faculty is a significant resource for carrying out studies in forestry and climate change impact on the forests of Georgia.

3.2.5 Technical University of Georgia

Technical University of Georgia trains specialist in engineering and innovative technologies, and social, law and humanitarian sciences. Thus the University promotes the development of high-tech areas and socio-economic progress of Georgia and the world. In the climate change context the University activities cover the issues of forestry, engineering of water and soil, agro- engineering, water supply, energy and geology.

3.2.6 Institute of Hydrometeorology of Technical University of Georgia

Institute of Hydrometeorology was founded in 1953 on the basis of Tbilisi Magnetic Meteorological (Geophysical) Observatory (1844). During 1992-2005 the Institute was a member of Georgian National Academy of Sciences, and in 2006 it became a legal entity of public law. The Institute carries out fundamental and applied studies in meteorology (atmospheric physics), agro-meteorology, hydrology (hydrosphere physics), climate and climate change, and environment pollution; renewable energy sources, atmospheric control, hydrometeorological hazards and methods to combat them.

Along with other important researches, the Institute deals with: assessment of frequency and risk factors of floods and inundations on the rivers of Georgia against the background of regional climate change; identification and planning of climate adaptation activities, including agro-bio-diversity conservation; natural disasters risk reduction etc.

3.2.7 Vakhushti Bagrationi Institute of Geography

This is one of the oldest scientific-research institutions in Georgia, which is carrying out scientific researches and information collection since 30-ties last century. The directions of its studies are: physical geography of Georgia, study of natural resources, glaciology, hydrology, climatology, etc. Currently the institute is working in:

- Study of elemental processes in the nature (analysis and forecast);
- Development of tourist and recreational potential of Georgia – problems and prospects;
- Study and evaluation of Georgia's natural resources;
- Development of methodology principles of landscape planning and geo-ecological examination of mountain regions.

The object of special study is to examine the causes of natural disasters, including climate change induced ones.

3.3 Nongovernmental organizations

3.3.1 World Wide Fund for Nature Caucasus PO

World Wide Fund for Nature (WWF) is an international nongovernmental organizations, working in biodiversity conservation, research and restoration issues. It is the world's leading conservation organization, working in 100 countries. WWF's unique way of working combines global reach with a foundation in science, involves action at every level from local to global, and ensures the delivery of innovative solutions that meet the needs of both people and nature. Currently WWF organizes its work around three key areas: forests, freshwater ecosystems and oceans. WWF is also focused on endangered species, pollution and climate change issues. WWF in Georgia is represented as a regional office "WWF – Caucasus".

It is universally recognized that biological diversity and climate change are interlinked phenomena, and biodiversity ensures ecosystems' sustainability and hence is an important component of ecosystem services. WWF Caucasus carried out a study aiming at development of summary report on possible impact of climate change on Caucasus biodiversity. The report (Climate change in Southern Caucasus: Impacts on nature, people and society, 2008) identifies regional risks and expected results in terms of sustainable development, including energy production, poverty and political security[15].

Forest is one of the most important and vulnerable to climate change ecosystems in the world. Deforestation accounts for about 15 percent of the CO2 emissions (IPCC, 2007), making it the second major source after fossil fuel combustion. In order to forecast possible changes the forest ecosystems are being studied all over the world, as well as application of different climate models.

Similar studies were carried out in the Caucasus by WWF-Caucasus by means of using the CART (Classification and Regression Tree analysis) model, allowing for the processing of a wealth of information in a short period of time. As a result the report and forecast were developed (Strategic Guidelines for Responding to Impacts of Global Climate

[15] Visit: http://bit.ly/2403YbX

change in Forests in the Southern Caucasus (Armenia, Azerbaijan, Georgia) – 2011)[16], according to which the changes in forest health, vitality and productivity caused by long term changes in environmental parameters and increased risks of damaging events will have significant consequences for people living in the region.

WWF-Caucasus also implemented the project "Forest sector adaptation to climate change". Climate change mitigating activities were carried out within this project implying regeneration or rehabilitation of forest ecosystems in Chiauri area.

3.3.2 Caucasus Environmental NGO Network

Caucasus Environmental NGO Network (CENN) is a nongovernmental organization, actively operating in Georgia, Armenia and Azerbaijan since 2000. The goal of the organization is to develop a modern society that values and protects the environment. The Mission of the organization is to foster modern and sustainable development values and practices through bridging society and environment; to build strong and responsible civil society, good governance and accountable business. The activities cover different directions of environmental activities, including climate change issues. Studies and projects of the organization cover the following directions:

- Adaptation to climate change and prevention of natural disasters;
- Enhancement of regional and local cooperation in terms of mitigation of and adaptation to problems caused by climate change.
- Increased flexibility of local governments and communities, development of adaptation to climate change plans;
- Environmental education of the population including energy efficiency issue;
- Forest management and forest sector reform.

Much of the Organization's activities are linked with disaster risk reduction and climate change driven risk assessment and prevention. For instance, CENN carried out studies that allowed developing disasters risk reduction strategy for Tbilisi. Below is the list of some of the projects implemented by this organization:

- "Empowering Modern Research Practices of the Regional Agriculture-Related Institutions" - planning activities to improve the living standards of farmers to minimize the risks including climate change associated risks.
- „Enhancing Resilience of Agricultural Sector in Georgia" – evaluation of climate change impacts on different types of soils in target regions, and planning the activities to enhance soil conservation, sustainable land management, soil rehabilitation and sustainable irrigation of agricultural land.
- "DRR assessment in the region of Samegrelo-Zemo Svaneti" – the overall objective of the assignment is to study risks caused by natural hazards and their effects on people, buildings and structures, infrastructure, economic activities and public services exposed to hazards in the identified municipality of Samegrelo region, through assessing perceptions of communities and local government on exposure to risks
- „Climate Change – Building Resilient Communities and Adaptive Governance" – the overall objective of the action is to develop flexible and resilient societies in rural areas of Georgia capable of coping with the impacts of current climate variability and future climate change.
- „Strengthening the prevention and preparedness system: Phase I - Reducing Disaster Risks at local level" - The project aims at strengthening local capacity to empower affected communities and local authorities to prevent and reduce the natural disasters risks and promote sustainable rural development;
- „Climate Change Adaptation and Disaster Mitigation (CCADM)" - The overall goal of the project is to develop flexible and resilient societies and economies in rural areas of Georgia capable of coping with the impacts of current climate variability and future climate change;

[16] Visit: http://bit.ly/24046s3

- "Institutional Building for Natural Disaster Risk Reduction (DRR) in Georgia" - the Project objective is institutional capacity building in disaster risk reduction (DRR) via introduction of modern spatial approaches and technologies and risk communication strategy in spatial planning in Georgia.

The information on these and other projects implemented by CENN is available on the Organization web-page[17].

3.3.3 Regional Environmental Center for the Caucasus

Regional Environmental Center for the Caucasus (REC-Caucasus) is an independent, non-for-profit organization, established by Azerbaijan, Georgian and Armenian governments within the framework of the "Environment for Europe Process" based on the decision made at the Sofia Ministerial Conference in 1995 to work for environment and sustainable development in the Caucasus region. REC Caucasus is a unique and only regional organization in South Caucasus within which the Caucasus states work jointly in environmental sector.

The mission of the REC Caucasus is to assist in solving of environmental problems in the Caucasus region through the promotion of co-operation at national and regional level among NGOs, governments, business, local communities, and all other environmental stakeholders, in order to develop a free exchange of information, in line with the principles of the Aarhus Convention; offer assistance to all environmental NGOs and other stakeholders; and increase public participation in the decision-making process, thereby assisting the states of the Caucasus in the further development of a democratic civil society.

Among focal areas of its activities are adaptation to climate change and conservation of agro-bio-diversity. The Organization has implemented a number of projects aiming at study and evaluation of climate change impact in South Caucasus and in Georgia, vulnerability assessment, planning adaptation activities and education. Study results were presented in the reports[18].

The Organization actively participates in land erosion reduction and to combat desertification projects[19]. Much of the Organization's efforts are aimed at disasters risk reduction and prevention. Climate change factors are usually taken into account in these projects[20].

3.3.4 Association Green Alternative

Association Green Alternative is a nongovernmental organization, actively involved in environmental activities in Georgia since 2000. The mission of the Organization is to protect the environment, biological and cultural heritage of Georgia through promoting economically sound and socially acceptable alternatives, establishing the principles of environmental and social justice and upholding public access to information and decision-making processes. The organization goals are:

- Promote the creation of economic and political foundations for sustainable development;
- Support the inclusion of appropriate governmental agencies, business circles, academic institutions and individuals in environmental activities
- Creation of wide social alliances to support sustainable development, environment conservation and rehabilitation;

[17] Visit: http://bit.ly/1QmRL7w

[18] „Identification and implementation of adaptation response to Climate Change impact for Conservation and Sustainable use of agro-biodiversity in arid and semi-arid ecosystems of South Caucasus. Vulnerability Assessment of Selected Semi-Arid Regions and Agrobiodiversity to Climate Change in Georgia Tbilisi", 2012. http://bit.ly/1QmN3Xl

[19] Second National action Program to combat desertification http://bit.ly/1QmNEbE

[20] Visit: http://bit.ly/1QmNz7T and http://bit.ly/1QmNxNi

- Replacement or suspension of environmentally or socially destructive policies and projects and promotion of acceptable alternatives by lobbying at the local and national levels.

Among priority areas of activity of the Organization are: energy, mining, climate change, sustainable development of transport sector, conservation of biological diversity and combating illegal logging; protection of environmental, social and economic rights of local communities in the privatization process; waste management and water management. Along with these thematic directions, cross-cutting priority areas include: environmental governance; public access to information, decision-making and justice; instruments for environmental management and sustainable development; monitoring of the lending of the international financial institutions and international financial flow in Georgia. Green Alternative cooperates with other NGOs both in Georgia and out of it, including Climate Action Network (CAN-EECCA) and International Network for Sustainable Energy.

Experts of the organization participate in the studies aiming at evaluation of the impact that different factors (including climate change) have on different processes in. E.g. the coordinator of biodiversity program carried out a survey with the objective of studying the dependence of basic economy sectors on biological resources. Different aspects of climate change impact on economy were evaluated. The information is available on the web-address[21].

Important area of Green Alternative's activities is the support to sustainable energy in Georgia. Green Alternative's advocacy campaign includes renewable energy and energy efficiency specific projects and policies. In each project or policy campaign Green Alternative combines the campaign work (e.g. suspend or replace a socially and economically arguable and harmful projects) with the research work in policy, law and practices that is available on Green Alternative's web page[22]. The Organization has also published several studies aiming at environmental education and awareness raising of the public including the climate change context[23].

3.3.5 The Greens Movement of Georgia / Friends of the Earth – Georgia

The Greens Movement of Georgia / Friends of the Earth – Georgia is a nongovernmental, non-profit organization aiming to create socially sustainable society, protect humanitarian and ethno-cultural heritage, to improve environmental situation, to carry out environmental advocacy and awareness raising of the public.

Georgian Greens Movement was founded in 1989, an associate member of international organization "Friends of the Earth" since 1991, and full members since 1993. It represents "Friends of the Earth" in Georgia. The Greens Movement has its thematic groups and field offices in 41 regions of Georgia. Experts Council (ecological association) with the Organization that guides its environmental activities based on scientific guidelines. Basic principles of the organization are: participation in decision-making; implementation of model projects; lobbing and environmental awareness raising. Thematic groups of the Organization work in: biological safety and organic food; biodiversity and forest protection; monitoring international financial institutions; sustainable development, education for sustainable development and environmental education; projects' security; waste management; sustainable tourism; organic farming; fresh water, bogs and Black Sea coast protection; sustainable energy and landscaping architecture.

The experts of the Organization participate in a number of studies aiming to assess the impact of various factors (including climate change) on different processes in the country.

[21] UNEP and WWF, 2013. TEEB Scoping Study for Georgia. United Nations Environment Program (UNEP), Geneva, Switzerland. http://bit.ly/1QmPc5k

[22] See "Sustainable energy" section at: http://bit.ly/1QmQZr3

[23] See "Green policy and environment protection: think globally, act locally", 2013, at: http://bit.ly/1QmRyRQ

3.3.6 Centre for Biodiversity Research & Conservation NACRES

Center for Biodiversity Research and Conservation NACRES is a nongovernmental, non-profit organization, founded in Georgia in 1989. Ultimate objective of the Center is to safeguard the biodiversity of the country through conservation of endangered species and habitat restoration. The Activities of the Center base on scientific studies and implemented in different Georgian regions to promote sustainable use of resources, improving law enforcement, biological monitoring and community outreach, raising public awareness of wildlife loss. The Center is conducting surveys and research on species, (population) and ecosystems, revealing their status and basic threats in order to choose sustainable, based on sound science solutions for the protection and conservation of biological diversity.

In terms of climate change the activities are basically linked with assessment of risks biodiversity faces in Georgia and South Caucasus, with special focus on identifying vulnerabilities and building resilience to changing conditions of protected areas and basic ecosystems. Significant part of the activities is dedicated to ensuring sustainability of use of biological resources against the climate change background, and improvement of management, with the main focus on the conservation of the unique and globally important biodiversity of the semi-arid landscape in the south-east of Georgia. The Organization implemented a number of projects aiming at improving pastures management in Vashlovani, Lagodekhi and Tusheti Protected Areas. Main focus was on implementation of pastures sustainable management principles given the negative factors caused by climate change (precipitation reduction, increase in average annual temperature, changes in the vegetation season etc.). Important background information was collected within the framework of these projects on climate change impacts in the regions, soil erosion and degradation. Below are the projects in this area:

- Sustainable pastures management in Lagodekhi protected area" financed by Integrated Natural Resources Management in Watersheds of Georgia Program within "Global Water for Sustainability" Program (GLOWS)-USAID, and EU, TWINNING Gerogia 2014-2015;
- The Assessment of the state of Pastures in the Traditional Use Zone of Vashlovani National Park and the development of management plan" financed within "Sustainable Management of Pastures in Georgia to Demonstrate Climate Change Mitigation and Adaptation Benefits and Dividends for Local Communities" – EU ClimaEast, UNDP, 2014-2016;
- The assessment of the pastures in Tusheti National Park and Tusheti Protected landscape" financed within "Integrated erosion control in mountainous regions of the South Caucasus". GIZ and ECO Consulting Group , 2014-2016.

NACRES plays an important role in the development of strategic papers. According to CBD Ad Hoc Technical Expert Group climate change is a dominant driver of biodiversity loss, includin in the high biodiversity areas. Proceeding form the above, the climate change adverse impact require special attention in Georgia.

The development and implementation of Georgian National Biodiversity Strategy and Action Plan (NBSAP) is an important instrument of fulfillment of the Convention on Biological Diversity requirements. The First Georgian Biodiversity Strategy and Action Plan was adopted by Georgian Government in 2005. The document defines biodiversity conservation and sustainable use 10-year strategy, and 5-year action plan. After first 5-year period the Action Plan would be subject to updating for the next 5 year period, with consideration of the achievement and specific situation. The Plan was updated only in 2014 and again approved by Georgian Government.

In NBSAP updating process different thematic studies were carried out *inter alia* in assessing the interaction of climate change and biodiversity loss. This situation and trends, law, policy, achievements and shortcomings in these areas were analyzed. The assessment results were used for developing the mechanisms of mitigation and

adaptation to adverse impacts of climate change, which were reflected in the updated document[24]. The above study and development of further strategy and action plan was conducted by NACRES. The project was implemented with financial support of GIZ.

NACRES staff permanently participated in the development of climate change-relevant reports and document, such as: National Forest Concept,[25] National Action Plan to Combat Desertification;[26] and climate change impact assessment in different economy sectors (agriculture[27], tourism).

3.3.7 National Association of Local Authorities of Georgia

National Association of Local Authorities of Georgia was founded in 2004 within the EU and European Commission joint initiative and is a nongovernmental, non-profit and non-political organization uniting all local self-governments of Georgia. The Association aims at further developing the local self-governance system; among its priorities are: to provide competent services to the member self-government authorities; to promote raising the qualification level of civil servants and elected officials at the self-government entities *inter alia* in issues relating to adaptation to climate change.

The Association cooperates with many international organizations and European unions of local authorities to address the existing problems, such as: lack of the National Strategy on Climate Change, fragmentary character of existing actions, lack of coordination among initiatives on climate change; lack of knowledgeable professionals at the local level, etc.

In summer 2010, at the decision of Executive Council (consisting of representatives of local self-governments) the Center for regional policy and sustainable development was established. The Center aims to integrate environmental issues inter alia climate change in the agenda of local authorities. In December 2010 Executive Council unanimously approved the Center's action plan within which "Institutionalization of climate change adaptation and mitigation in Georgian regions" program was developed. It was elaborated in accordance with the Strategy Recommendation for Regional Development claiming that the "special commissions responsible for planning adaptation activities in vulnerable areas should be created at the level of local self-government".

Currently the program is a flagship initiative which integrates environmental and climate change considerations into agenda of the local authorities of Georgia. The Program envisages establishment of special units on climate change, environment and sustainable agriculture at the level of self-government to ensure, among other, implementation of a broad range of statutory functions of LAs on natural resources management, spatial planning and sustainable development stipulated in the Organic Law of Georgia on Local Self-Governance and sectoral legislation. The Program is being implemented with USAID financial support.

Baseline study report[28] was prepared within the program. Besides, sectoral (tourism, cultural heritage, agriculture, industry, health, energy, protected areas, infrastructure and natural disasters) assessments of vulnerability to climate change was conducted. In the end so called "Climate change adaptation guidebook" was drafted. The document is an assessment of climate change impacts both in general and for specific sectors of economy, environment, and social sector, and aims to provide with practical insights on climate change adaptation.

[24] National Biodiversity Strategy and Action Plan of Georgia: 2014 – 2020, available at: http://bit.ly/1QmXomj

[25] Visit: http://bit.ly/1QmYvlX

[26] Visit: http://bit.ly/1QmNEbE

[27] Visit: http://bit.ly/1QmN3Xl

[28] Baseline Assessment Of Climate Change Adaptation And Mitigation Practices On Local Level In Georgia http://bit.ly/1VmuECn

3.3.8 Georgian Red Cross Society

International Red Cross Movement is the world's largest humanitarian network, founded in 1863. It is implementing projects aiming at human rights advocacy, communities mobilization and public awareness raising; civic society development; gender, education and public health protection.

Georgian Red Cross Society, at the EU financial support is currently implementing "Climate Forum East" project with the objective to strengthen the capacity of civil society organization networks to participate effectively in policy dialogue with local authorities, EU institutions and international organizations in Azerbaijan, Belarus, Georgia, Armenia, Ukraine and Moldova; to disseminate the knowledge in the area of environmental governance and climate change among the counties of the EU Eastern Partnership.

Experts involved in the project developed National Climate Vulnerability Assessment. The report contains the assessment of basic climate risks and vulnerability, and recommendations on adaptation activities to be carried out in Georgia[29].

Local plans of climate change adaptation for three Georgian regions are being developed currently within the project. Small pilot adaptation projects will be implemented later on the basis of these plans.

3.3.9 Sustainable Development Center REMISIA

Sustainable Development Center REMISIA is a nongovernmental organization with the key objective to promote climate change mitigation and adaptation process both on local and national, and regional and global levels. Among the objectives of the Organizations are introduction of state-of-the-art knowledge, new analytical methods and models as well as modern technologies; application of local know-how and knowledge; building capacity of local and national stakeholders. REMISIA focuses its efforts on those sectors, ecosystems and regions that are particularly vulnerable or contribute to the ongoing climate change global processes. Among the Organization projects are:

- Development of Sustainable Energy Action Plan for Tbilisi City
- Piloting of sustainable tourism development in Georgia through demonstration of renewable and energy efficiency options in Ushguli – high mountainous touristic village in Mestia, Zemo Svaneti
- Climate change and security issues within the context of East European security
- Development of Sustainable Energy Action Plan (SEAP) for the city of Batumi
- Enhancing Capacity for Low Emission Development Strategies/Clean Energy Program (EC-LEDS);
- Development of the draft concept "Nationally Appropriate Mitigation Action in building sector of Georgia (NAMA).

Information about the Organization reports and other data are available on the web-page[30].

3.3.10 "Global Waters for Sustainability" Consortium

"Global Waters for Sustainability" Consortium (GLOWS)[31] includes a number of organizations and is led by Florida International University. The Consortium was implementing the USAID financed "Integrated Natural Resources Management in Watersheds of Georgia Program (INRMW)" with the primary goal to improve the current and future

[29] Visit: http://bit.ly/1Vmw8MU

[30] Visit: http://bit.ly/1VmxreJ

[31] Visit: www.globalwaters.net

lives of people in Georgia by utilizing and managing natural resources more sustainably, including water, soil, vegetation, and the ecosystem, and that encompass them (the project completed in 2015).

The activities within the project included baseline assessment of climate change impact in Alazani-Iori and Rioni river basins to carry out pilot activities, including development of integrated natural resource management and implementation of the small grants programs. The organization involved in the implementation process, together with international and local partners empowered in integrated watershed planning through organizing trainings, sharing the knowledge and experience in order to increase the capacity for integrated management at community level.

3.3.11 Mercy Corps

Mercy Corps is an international nongovernmental organization founded in 1979. It is active in Georgia since 2000, endeavoring to help people living in hardship and conflict areas to build sustainable and secure communities.

Mercy Corps, together with CENN initiated "Enhancing local capacity and regional cooperation for Climate Change Adaptation (CCA) and Biodiversity Conservation (BC) in Georgia and South Caucasus".[32] The Report on the project reflects the CCA capabilities of Qvemo Kartli and Samtskhe-Javakheti regions both on municipal and community levels.

3.3.12 Sustainable Caucasus Association

The Mission of "Sustainable Caucasus" Association is the development of mountainous regions by supporting better cooperation and mutual coordination. Key objectives of the organization are: support sustainable development of Caucasus mountain regions; support the settlement of trans-boundary problems at national and local levels through the development of regional approaches.

A significant portion of the Organization's activities is dedicated to the climate change risk assessment facing Georgian mountain regions. In particular "Climate Change Action in Developing Countries with Fragile Mountain ecosystems From a Sub-Regional Perspecitve – Caucasus Component, 2015" was implemented, within which climate change adaptation capabilities of Georgia was assessed and problems identified. The report[33] on the project contains *inter alia* the assessment of adaptation capabilities of different economy sectors.

3.4 International organizations and initiatives

3.4.1 The United Nations Development Programme

The United Nations Development Programme (UNDP) assists Georgia in four major areas of development: Democratic Governance, Economic Development, Environment and Energy, and Crisis Prevention and Recovery. UNDP assists Georgian Government to meet its international commitments, to expand access to green solutions and make environmental issues an integral part of development. It promotes sustainable environmental management and focuses on the climate change strategies and disaster risk reduction.

[32] Visit: http://bit.ly/1VmyoDQ

[33] Visit: http://bit.ly/1Vmzv6u

3.4.2 The United Nations Environment Programme

The United Nations Environment Programme (UNEP) work encompasses: (a) assessing global, regional and national environmental conditions; (b) developing international and national environmental instruments; and (c) strengthening institutions for the wise management of the environment.

A number of studies dedicated to climate change assessment and adaptation issues have been carried out in Georgia under the aegis of UNEP. Among them are:

- Technology Needs Assessment and Technology Action Plan for Climate Change Adaptation: Georgia, 2012[34];
- Outlook on Climate Change Adaptation in the South Caucasus Mountains[35];
- Sustainable Consumption and Production Policies and Initiatives in Eastern Europe and the Caucasus: Review of Progress and Way Forward[36].

3.4.3 The World Bank

The World Bank is conducting the activities in Georgia aiming at Environmental Impact Assessment Policy; natural habitats; forestry policy; pest management and eco-migration. A number of projects on climate change issues were implemented, among which noteworthy are the following studies:

- Building Resilience to Climate Change in South Caucasus Agriculture[37];
- Georgia Country Environmental Analysis. Institutional, Economic, and Poverty Aspects of Georgia's Road to Environmental Sustainability[38];
- Reducing the Vulnerability of Georgia's Agricultural Systems to Climate Change[39];
- Assessment of Impact of Climate Change on Wheat in Armenia, Azerbaijan and Georgia[40];
- Georgia Climate Change And Agriculture Country Note[41];
- Governance of Local Forests in ENPI East Countries and Russia[42].

3.4.4 The United States Agency for International Development

Mitigation of climate change impact is one of the priorities of The United States Agency for International Development (USAID). Climate Action plan was initiated by President Obama on behalf of the US Government. USAID's programs support activities based on the best practices and focuses on the energy efficiency increase at local and national levels through which the reduction of anticipated emissions is planned. The support to the deployment of alternative energy (solar, hydro, biofuels) and energy efficiency technologies is planned. Besides, biggest municipalities will be assisted in the development sustainable energy action plans to enable them to comply

[34] Visit: http://bit.ly/1VmEmEM

[35] Visit: http://bit.ly/1Vmzv6u

[36] Visit: http://bit.ly/1VmEAvq

[37] Visit: http://bit.ly/1VmELqz

[38] Visit: http://bit.ly/1VmF30I

[39] Visit: http://bit.ly/1VmFc4p

[40] Visit: http://bit.ly/1VmFkAS

[41] Visit: http://bit.ly/1VmFrMT

[42] Visit: http://bit.ly/1VmFxE9

with the commitments under Covenant of Mayors and achieve the reduction of greenhouse gas emission by minimum 20%.

USAID assisted Georgian Government in the development and implementation of low emission development strategies (LEDS) in order to accelerate the transition to climate-resilient, low emission, sustainable economic development by strengthening in-country human and institutional capacity for LEDS development. Besides this program will help the municipalities to introduce and implement climate change mitigation procedures; the program will facilitate and encourage the private sector to invest in energy efficiency and green building, and strengthen Georgian government's capacities to identify key policies, programs and financing sources and assist with designing policies and implementation plans that will promote climate-resilient economies and lead to lower-emission futures in key sectors and areas of the economy.

3.4.5 Swiss Agency for Development and Cooperation

Swiss Agency for Development and Cooperation has a long-standing and fruitful engagement both in Georgia and in the region. The Agency concentrates on following three thematic focal points: economic development and employment, good governance and public services, and human security and protection[43].

The Agency actively cooperates with Georgian government to find solutions to global challenges linked to natural disasters and climate change. The focus is put on increasing Georgia's capacity in terms of risks assessment and cost benefit analysis. Special attention is paid to introduction of prevention oriented disaster management approaches both at central and local levels[44].

3.4.6 German Society for International Cooperation

German Society for International Cooperation (Deutsche Gesellschaftfür Internationale Zusammenarbeit, GIZ) was established in early January 2011 as a result of the merger of three organizations – German Society for Technical Cooperation (GTZ), German Development Service (DED) and "International Training and Development" Ltd. (InWEnt). GIZ provides assistance to the German Government in achieving its objectives in the field of international cooperation. At the same time it is primarily in charge of technical cooperation, e.g. advising Georgian partners and provision of appropriate small technics.

On behalf of the Federal Ministry for Economic Cooperation and Development (BMZ) GIZ has been helping Georgia since 1992 in transition to a social market economy, democracy and the rule of law. Within the framework of three priority areas, agreed under 2009 Development Agreement between Georgia and Germany, GIZ is implementing six regional programs in Georgia on the following topics: private sector development, support for legal and judicial reform, promotion of municipal development, the sustainable management of biodiversity, integrated erosion control in mountainous areas, and the management of public finance in the South Caucasus.

3.4.7 German Bank for Reconstruction

German Bank for Reconstruction (KfW) is financing a number of projects in Georgia in the following areas: environment and energy, sustainable economic development, democracy, civil society and public administration. KfW is assisting implementation of several projects on climate change topics *inter alia* the following:

[43] Details of three-year strategy are available at: http://bit.ly/1VmFEiX

[44] Visit: http://bit.ly/1VmFJ6q

- Adaptation to Climate Change in the Kura-Aras River Basin[45];
- Protection and Management of Natural Resources[46];
- Clean energy for the South Caucasus[47];

Besides, the information collected within some other projects with the KfW involvement could be used for reporting on desertification and biodiversity status. These are the following:

- KfW project factsheet on Energy sector[48];
- KfW project factsheet on Black Sea Transmission Network[49];
- KfW project factsheet on Protection and Management of Natural Resources[50].

3.4.8 The Covenant of Mayors

The Covenant of Mayors is the world's biggest urban climate and energy initiative, launched after the European Union climate and energy package was adopted in 2008. the Covenant of Mayors supports the efforts deployed by local authorities in the implementation of sustainable energy policies. The signatories are committed to implement sustainable energy policies to meet and exceed the EU 20% CO2 reduction objective to contribute to building environment friendly economy and improvement of living conditions. Through the Covenant of Mayors, the EU institutions have made unprecedented step forward - directly involved local and regional authorities thereby recognizing their important role in the implementation of ambitious energy and climate goals.

In order to meet the CO2 reduction target, signatories commit to prepare a baseline emission inventory, to be preceded by appropriate actions to develop local sustainable energy policy and adequate institutional/governance skills. Besides, the signatories commit to developing Sustainable Energy and Climate Action Plans (SECAP) defining the activities and measures set up to achieve the energy efficiency targets; besides, part of the agreement is the creation of steady jobs, increase of financial and social stability, creation of prosperous and healthy living environment, business development and economic competitiveness, improved utility services and infrastructure, which are collected in so called "best practices" database. Besides, unique source of information is the catalogue of "Energy Action Plans", containing the information on the ambitious goals of other signatory cities and ways to accomplish them.

The Joint Research Centre of the European Commission, in close collaboration with the Covenant of Mayors Office provides scientific and technical support signatories in order to assist delivery of their Covenant of Mayors commitments, particularly the preparation of Baseline Emission Inventories and Sustainable Energy Action Plans. The initiative has been supported by USAID. A number of projects have been implemented with the USAID financial support, in particular:

- Institutionalization of climate change adaptation and mitigation in Georgian regions;
- Baseline Assessment of Climate Change Adaptation and Mitigation Practices on Local Level in Georgia;
- Environmental Assessment: Integrated Natural Resources Management in Watersheds of Georgia;
- Low-emission development strategies capacity enhancement clean energy program: Energy Action Plan for Gori municipality[51].

[45] Visit: http://bit.ly/1VmG0pT

[46] Visit: http://bit.ly/1VmFWq4

[47] Visit: http://bit.ly/1VmFSXi

[48] Visit: http://bit.ly/1VmK9tY

[49] Visit: http://bit.ly/1VmKe0K and http://bit.ly/1VmK9tY

[50] Visit: http://bit.ly/1VmFWq4

3.4.9 "ClimaEast" Experts Facility fund

ClimaEast is a European Union funded project package assisting the Eastern Neighborhood Partnership Countries and Russia in approaches to climate change mitigation and adaptation. The Program has a number Projects that seek to foster improved climate change policies, strategies and market mechanisms in the partner countries by supporting regional cooperation and improving information access to EU climate change policies, laws and expertise.

A number of projects have been implemented within the program[52] supporting the promotion of Climate Smart Agriculture practices, and the activities aiming at biological diversity conservation and use of natural resource given the climate change.

Expert Facility is "ClimaEast's technical assistance instrument that supports countries with concrete tasks as they develop and implement effective climate policy.

3.4.10 "Sustainable biodiversity management in the South Caucasus" programme

Sustainable biodiversity management in the South Caucasus is supporting developing and implementing strategies to facilitate the sustainable management of biodiversity by state, private sector and civil society actors. GIZ consultations priority is creating framework conditions for biodiversity sustainable management. Environment related political decisions, strategies and laws are being improved within the program. It focuses on improved management and sector knowledge in Georgia Government.

3.4.11 "Integrated erosion control in mountainous regions of the South Caucasus" programme

Erosion and land degradation are serious problems in mountainous regions of the South Caucasus; these processes aggravate against the background of climate change. The number of natural disasters increased creating serious problems to local population. Besides, pastures degradation and excess logging cause adverse impact on biodiversity. Integrated erosion control in mountainous regions of the South Caucasus aims to develop strategies for integrating erosion control into national regulations on sustainable land use and the conservation of biodiversity. The program shall contribute to that integrated erosion control concept is taken into account in legal acts, relating to sustainable use of land and biological diversity conservation. The program envisages harmonization of the needs of municipalities and ecosystems requirements. Satellite imagery-based method is used to assess erosion and the condition of pasture land, and mapped in the pilot regions as a basis for identifying suitable erosion control measures. These measures are: targeted reforestation of small areas, community forest management and mechanical and biological erosion protection measures. A number of projects are being carried out within this program, which aim at collecting important information on climate change situation, as well as land degradation and erosion in the country. Among projects funded within the program are:

- "Integrated erosion control in mountainous areas of South Caucasus". GIZ and Eco consulting, 2014-2016[53];
- "Updating Biodiversity National Strategy and Action Plan (NBSAP). Within the project NBSAP was updated and biodiversity loss issues were included in it among other issues. Overall analyses of the situation was conducted and specific activities planned to halt climate change driven loss of biodiversity[54].

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[51] Visit: http://1.usa.gov/1VmQTYP

[52] Visit: http://bit.ly/1VmRKZu and http://bit.ly/1VmRQjD

[53] Visit: http://bit.ly/1VmSBt7

[54] Visit: http://bit.ly/1QmXomj

3.4.12 V-NAMA strategy for municipal transport of Georgia

The project aims to support vertically integrated Nationally Appropriate Mitigation Action – V-NAMA) process. V-NAMA is a climate oriented attractive opportunity for Georgia for a number of reasons:

- Committed to gas emission reduction at national (INDC) and local (CoM) levels: municipal transport V-NAMA program is critical to achieve the target;
- Significant health benefits, improved quality urban life, reduced traffic jams and compliance with the commitments under the EU-Georgia Association Agreement in terms of, e.g. air quality;
- One of the best developed available program/NAMA concept;
- National importance of municipal transport – at the crossroads to determine urban future; car oriented or an individual oriented mobility;
- Integration of mitigation and adaptation activities in one program – this may turn out attractive for green climate fund.

4. Assessment capacity needs for monitoring and reporting

4.1 Relationships between organizations

Climate change and its adverse impact on ecosystems and economy is a serious threat, perceived in the context of sustainable development. As mentioned above, Ministry of Environment and Natural Resources Protection is in charge of climate change policy in Georgia. This state institution, together with its subordinate Legal Entities of Public Law are responsible for the collection of appropriate information and development of the reports.

Besides, internationally funded projects and nongovernmental organization are of primary importance in terms of collecting the countrywide information and developing reports. Moreover, it is within these projects that various national reports are developed. It should be mentioned that all three reports submitted to the Framework Convention on Climate Change were developed in this format, and donors were GEF and UNDP. The situation is similar in terms of developing LEDS, NAMA, CDM and INDC documents.

It is noteworthy that vast majority of the documents on climate change have been developed within various projects, and do not enjoy the status of a state document. Naturally, this situation harms the information collection and exchange process.

It is necessary to note that Georgia has no strategy, and single guideline action document or a mechanism to facilitate climate change response, including the development and implementation of adaptation and mitigation plans[55]. The reports submitted to the Framework Convention on Climate Change, as well as the plans developed by NGOs, working in climate change mitigation and adaptation, do not undergo any systemic assessment; current projects are not being monitored. Adaptation plans, developed within the format of reports to the Framework Convention on Climate change, are not shared by state institutions and are the priority of NGOs and international organizations. The plans, as a rule, are focused on disaster risk reduction.

The mechanisms that facilitate a single approach to climate change issue, shall be introduced in the country. The examples of such mechanisms are the EU climate adaptation platform (Climate-ADAPT) and EU Adaptation Strategy:

[55] The only exception is LEDS national coordination committee

- Climate Adaptation Platform (Climate-ADAPT) – this platform aims to support Europe in adapting to climate change and helps users to improve decision making process by improving the awareness quality of decision makers and the public.
- EU Adaptation Strategy - Adopt comprehensive Adaptation Strategies supports the development of adaptation plans, single approaches, and implementation financial mechanisms.

4.2 Information sources

National Environmental Agency, based on the functions defined by law, conducts the forecast of current and expected extreme weather and geodynamic processes and phenomena *inter alia* in the Black Sea, river basins and inland waters; The Agency is also responsible for the development and dissemination of information on the results of the assessment of geodynamic processes, and geotechnical and ecological state of the geological environment. So, one may say that National Environmental Agency is the basic source of information, required for the assessment and forecast of climate change.

It should be mentioned that the Agency information is a pay service not, and not easily accessible for all stakeholders. The exception are Ministry of Environment and Natural Resources Protection and other state institutions. However, this exception does not apply to legal, or natural persons of public law. National Environmental Agency is a self-financing body, and "selling" information is one of the income sources. Besides, its information is of technical character and is a raw database of climatic parameters (e.g. the temperature or precipitation data are presented in tables from various stations).

National Environmental Agency collects the biodiversity information in a limited format and covers mainly Black Sea and river basins, and fish fauna situation assessment.

It is the Biodiversity Service of Ministry of Environment and Natural Resources Protection that basically collects biodiversity information. This Service does not have information collection capabilities and therefore outsources in this matter. In order to collect data, Biodiversity Service requires the information from appropriate public institutions (e.g. Agency of Protected Areas, National Forest Agency or National Environmental Agency. The Biodiversity Service carries public procurement in order to collect information or conduct biodiversity monitoring and receive appropriate services (announces tenders, etc.) In the end this information accumulates as a report and is stored in its office, and is available as a summarized data at internet address: http://biomonitoring.moe.gov.ge/. Studies carried out within present report revealed that Biodiversity Service had not presented any information Georgia's national communication. However, the information kept at this Service is used when developing reports within the Convention on Biological Diversity, and relevant information is available at the Convention site.

One of the important sources of information is National Agency for Protected Territories. This office collects biodiversity information within its competence (different category protected areas). This task is performed by administrative staff of appropriate protected territories. The type and form of information is usually defined under so called annual action plans and is submitted to head office as a report. Finally the information enters the "Chronicle of Nature", and is available in internet http://www.apa.gov.ge/ge/.

It is noteworthy that no information on the state of biodiversity was required from the National Agency for Protected Territories when developing National Communication to the UNFCC. The Agency submitted to the report developers group, based on their own request, only the information about natural disasters within protected territories.

National Forestry Agency, which is responsible for the forest fund management also collects important information on biodiversity. Under current regulations the Agency rangers, during forest inventory, are obliged also to record various species living in this forest. This information is reflected in so called "forest district" inventory card and further submitted to the head office. Regrettably, there no single mechanism of processing and systematization of these data. Use-nonuse issue in regard to this information is also open.

4.3 Overlapping of competences and problems identified

As mentioned above, Georgia is facing serious problems in terms of collecting background information. While climate and geographic data collection and processing mechanisms are in place, significant portion of biodiversity data at national level are outdated. New surveys are perfunctory due to the fact that financial resources for detailed studies are limited. There is particular lack of information on climate change.

Collection of background information is not a priority of current projects either. Lack of a unified methodology for assessing is another drawback causing data and assessments inconsistencies. Prepared documents often are generic and do not contain any detailed information. Climate and land erosion issues are more or less well covered in National Communications to the UNFCC, whereas the information on interconnection of biodiversity and climate change is quite scarce.

Most of the existing plans do not consider one of the major tasks under the UN Framework Convention on Climate Change – development of ecosystems adaptation mechanism. These initiatives are usually limited to the proposal of artificial forestation, which really is not enough. These issues need to be reflected in sectoral and local adaptation plans in coordination with Ministry of Environment and Natural Resources Protection.

The data in biodiversity reports either indirectly indicate to interconnection between climate change and biodiversity, or are inadequate. A "good" example is Nitraria schoberi and Lepus tibetanus. Finding of these species on the territory of Georgia, according to many reports, is due to the climate change. On the other hand their appearance in Georgia may be the invasion caused factor. Sources of information are also unknown. The issue of spread of forest diseases also raises doubts, as most of the reports link this phenomenon with climate change. On the other hand the spread of forest pests and increase in infected forests areas in general are expectable phenomena against the background of climate change. However, more detailed and robust studies are needed to confirm the connection of forest situation in Georgia with climate change.

Almost no information is available on the problems that may emerge between climate change impact and ecosystem services. Equally imprecise is the picture of impacts on ecosystems caused by climate change. The existence of these data is critical for identifying real picture and planning appropriate measures. The absence of such picture often causes incorrect assumptions and, respectively, incorrectly focused programs and projects.

Current situation is aggravated by the fact, that there is lack of intensive exchange of information between different institutions. The process need joint efforts of all state institutions. E.g. many programs and projects on reduction of climate change adverse impact and adaptation are ongoing in Georgia. Most of them enjoy international support and are aimed at planning and implementing mitigation and adaptation activities. Though most of adaptation plans and sectoral strategies developed (or being developed) within different projects are subject to public and institutional discussion, the process is formalistic. Even in case of detailed discussion, only medium level government officials, who are a kind of information "conductors" for their state institutions, participate in it. Consultations are often all-purpose, not connected to the development of the documents.

The implementation of the plans is a separate question. Their official status is not defined and are often advisory in nature. Not only there are no joint coordination mechanisms, but there are no any type of governmental mechanisms of their implementation. One may say that most of mitigation and adaptation plans exist in their own "isolated space" and accomplished works do not derive from existing plans. The activities under the plans are often implemented but only based on current needs, and rather within separated government programs that have nothing to do with coordinated work. For example, significant part of works planned under rehabilitation of water supply and irrigation systems are not considered adaptation activities, but purely social programs. The focus is not put on introduction of new technologies. Often this issue is limited to general slogans without specific recommendations.

Special mentioning deserves the fact that most of the reports within these projects were prepared without taking into account the MRV principles, which is a serious drawback. The only exception is so called biennial update report (BUR) within which an appropriate national system that meets specific MRV needs was developed.

4.4 Cooperation between stakeholders and problems

As mentioned above, most of the documents relating to climate change have been developed under internationally financed programs or by Nongovernmental organizations. Various studies are being carried out within these projects, reflecting climate change impact on different economy sectors, identifies possible future risks and aims at carrying out activities to reduce them. Besides, many projects imply a range of aspects relating to mitigation and adaptation plans development and implementation. Traditionally, experts working with various governmental, academic and nongovernmental organizations, as well as representatives of central and municipal authorities, and local community are involved in the studies within the projects, which facilitates the improvement of the results.

The results are often satisfactory. However the results of the studies are not shared as a rule, which reduces the effectiveness of the projects and leads to duplication. Most of the current projects do not cover such important issues as facilitation of agro-bio-diversity and ecosystems to climate change. These topics, which are very important in terms of country's sustainable development and the population's social and economic state, are represented only nominally. For example, only artificial forestation is usually envisaged in such projects, which may have more mitigation purpose. Although, given the scale of Georgia, these activities shall not be regarded as the ones that affect global climate.

Often, biodiversity and climate issues are mentioned in the project title, or project tasks and objectives, but in fact no studies in this direction are carried out under the project, which the authors of projects explain by lack of data.
The existence of skilled personnel at local level is extremely important for carrying out baseline studies and developing different plans. Knowledgeable specialists at governmental and municipal level are absolutely necessary. These people shall have clear understanding of adaptation and mitigation plans, inclusion of local community and implementation of approved plans.

Special challenges are faced at regional level. Regardless educational campaigns some information vacuum can be seen. Local decision-makers do not realize a clear link between social problems, biodiversity and climate change caused risks. Different mitigation and adaptation plans are, in fact, observed as imposed by the international community "obligation" that is not binding, as a sort of a luxury that only developed and rich countries can afford. The development of these plans (especially in the regions) is perceived as a secondary need, whereas the priority is to cope with social problems (e.g. social aid to the population, infrastructural projects, rehabilitation of schools, hospitals and roads, financial assistance to socially indigent population etc.). They do not realize there are links between these problems and climate change.

The situation is being changed due to current educational campaigns. Some projects (e.g. NALA, CENN and Mercy Corps) conducted trainings for local authorities and the population to ensure higher inclusion in vulnerability assessment, and plans development processes.

Some of the projects have included health and energy issues. Traditionally, various activities are planned in this context, but most of them are aimed at disaster risk reduction and give not enough baseline information. More information shall be collected to develop precise and reliable models and forecasts. The focus shall be put on the assessment of the state of ecosystems and study of biodiversity aspects, since the provision of ecosystem services depends on it. The results shall be included in the amended or updated programs.

Significant shortcoming of the existing programs is lack of knowledge of new technologies and their applications. Introduction of new technologies is a pressing problem. Though many projects refer to the need to implement new technologies, final recommendations are general in nature and need to be more specific. It requires more effort on the part of institutions and projects for the implementation of new technologies.

Proceeding from the scale of Georgia and current situation, and in view of adverse impact of climate change on Georgia's ecosystems (especially mountainous regions) and economy, adaptation is number one priority of the country. Mitigation measures are also very important, but they will have very little impact on global processes given the scale of Georgia. Proceeding form the above, the national adaptation plan development process needs to be accelerated. The question is particularly relevant for the regions, where adaptation plans are perceived as private initiative.

Project capacities shall be applied in the development of adaptation plans. Another pressing issue is the establishment of coordination council with the tasks of: monitoring adaptation plans, integration of adaptation plans in sectoral strategies and plans; implementation of adaptation plans at state level and coordination of appropriate activities; appropriate budgetary provision and obtaining international financing, and identification of priorities. The development of an integrated plan will allow to fit all the problems in a single frame. Besides, mainstreaming and focus on this issue, especially in the regions, will allow its better understanding. Availability of the strategy, and its state/governmental status will add credibility to the process, especially in the regions.

Current projects have enough capacity to cope with problems facing agro-bio-diversity against the climate change background, particularly in terms of preservation of native species. The issue is quite problematic. Currently native species are being replaced by modern, high-yielding varieties. Farmers turn to monoculture production, which is much more profitable. On the one hand introduction of new species create new risks, since most of them are vulnerable to climatic conditions and less adapted to Georgian reality. On the other hand preservation of local species is crucial for genetic biodiversity and breeding new varieties; however more and more farmers, based on economic reasons, give up cultivating native species which leads to their disappearance. These are the challenges to be considered in adaptation plans, and mechanisms developed ensuring preservation of the above species using the potential of current projects.

Sectoral studies and strategies based on them will play important role in terms of progress and adaptation to climate change. Economy sectors, such as energy, agriculture and forestry highly depend on mountainous regions. E.g. 80% of electricity in Georgia is generated by hydropower stations, most of which are located in mountain areas, or receive water resources from mountain rivers. As for forestry sector, more than half of forest fund is in the mountains, and, as mentioned above, is especially vulnerable to climate change. Respectively, all these sectors deserve additional measures, especially in mountain areas, with special focus on sectoral and regional activities in appropriate documents and strategies. This will facilitate the improvement of situation in mountain regions, sustainable development of mountain-depended sectors and adaptation to climate change.

Recommendations

1. National Communication to Framework Convention on Climate Change and biennial update reports shall include detailed information on biodiversity loss and climate change impact on Georgia's ecosystems; erosion and land degradation issues and their connection to climate change.
2. The Convention on Biological Diversity defines biodiversity and ecosystem services as key factors of climate change adaptation and disasters risk reduction (ecosystem approach working group meeting, Montreal 21.10.2015). These issues shall be scrutinized in Georgia and the results reflected in all the report to be submitted to the Convention.
3. The necessity of introducing ecosystem approaches in combating land erosion and degradation is the key message of Johannesburg working group meeting and Twelfth Session of the Conference of the Parties (COP12) in Ankara. Erosion and natural disaster risks linked with climate change shall be evaluated and included in appropriate reports. This will facilitate the protection of population from natural disasters and adaptation to climate change.
4. It is necessary to study the impact of erosion process in Georgia and assess the adverse impact on social and economic state of the population due to the loss of ecosystem services, especially against the background of climate change.
5. It is necessary to asses, and reflect in respective reports, biodiversity reduction, and the risks of the loss of production, functions and ecosystem services due to climate change and their results
6. Assessment of adaptation and mitigation capacities of forests as main carbo stores accumulated in terrestrial ecosystems. (Decision 1, Article 70, adopted by 16th Conference of the Parties.) Forest ecosystem services and production shall be assessed taking into account the tasks of overcoming poverty and sustainable development (CoP.16 Decision 1, Appendix 1, Article 2 (c-e).[56]
7. Land-use, Land-use change and forestry (LULUCF) process shall include the discussion over the issues of: reduction of forest areas, reforestation, forest protection, agro-forestry, forest management, sustainable use of forests, carbon emissions, etc. and their inclusion in biennial update reports (BUR)
8. Development of comprehensive reports and detailed maps of climate change impact on biological diversity and land erosion for decision-making bodies. These document will contribute to making right decisions, and improving the quality of public awareness.
9. The quality of climate change adaptation and mitigation plans in the regions need to be improved. State adaptation plan shall be developed to increase the efficiency of different actions. Availability of government priorities and donors' assistance will allow, on its part, to focus on the topics that are most relevant in terms of climate change adaptation and mitigation.
10. Based on the urgency of the issue, steps taken towards adaptation to climate are crucial. The need for adaptation is indicated in all sectoral studies and strategies. Hence, the development of adaptation plans is absolutely critical for country progress and minimization of the damage. One may say with confidence that adaptation is a priority, and the issue is particularly relevant at the regional level, where the adaptation is perceived as the private initiative of a project.
11. We need to increase the level of knowledge and opportunities of the officials to improve the quality of the planned activities. This primarily refers to the increase in local governance capability in planning annual

[56] Global forest covers around 30 per cent of the Earth's land surface Forests provide valuable ecosystem services and goods, serve as a habitat for a wide range of flora and fauna and hold 80% of standing stock of global carbon. Forest areas for recent 8000 years makes 45% of its initial territory. Most of it was extirpated during last century.

activities and budget support. The process of training and education of appropriate specialists should be continued.

12. The process of preparing adaptation plans and strategies shall be accelerated, which needs collection of baseline information. Along with the collection of background information it is necessary to prepare detailed models and the forecasts with high degree of reliability to be used in updating and upgrading the plans.
13. Introduction of new technologies, creation of local adaptation mechanisms and activities for their implementation are absolutely necessary;
14. Availability of sectoral adaptation plans is extremely important, especially in such sectors as agriculture, forestry, energy, health, and biodiversity conservation.