PEER REVIEW
GEORGIA
2015

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Programme for peer reviews in the framework of EU cooperation on civil protection and disaster risk management 2015-2016

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Introduction

Peer review is a governance tool where the disaster risk management system of one country (''reviewed country'') is examined by experts (''peers'') from other countries. The EU programme for peer reviews in civil protection and disaster risk management was set up following two successful pilot peer reviews in the UK (2012) and Finland (2013), undertaken jointly with the Organisation for Economic Cooperation and Development (OECD) and the UN International Strategy for Disaster Risk Reduction (UNISDR).

The EU peer review programme aims to facilitate the exchange of good practices and identify recommendations for improving the disaster management policy and operations of the reviewed countries. The programme encourages mutual learning and understanding and facilitates a policy dialogue both internally and between countries as well as among experts.

In February 2015 the Minister of Environment and National Resources Protection of Georgia (MENRP) expressed an interest in undergoing a thematic peer review on **risk assessment and early warning**. Georgia had participated in the second pilot peer review in Finland and regarded peer reviews addressing both Sendai Framework priorities and EU Civil Protection Mechanism policies as an excellent technical assistance tool. Georgia felt that the resulting policy recommendations could be greatly beneficial for the country, providing it with the opportunity to enhance national policies and practices. Furthermore, it hoped to both contribute to and benefit from mutual learning. With the Georgia-EU Association Agreement having been signed in 2014, the peer review would also contribute to deepening political and economic ties between Georgia and the EU in the framework of the Eastern Partnership.

The peer review mission was conducted over five days from 23 to 27 November 2015. Four peers from the EU Member States Austria, Croatia, Italy and Poland participated in the review, supported by the European Commission and a project team. More than 50 stakeholders from many different organisations, including central, regional and local governmental authorities and agencies, non-governmental organisations (NGOs) and academia were interviewed. The interviews took place at:

- the Ministry of Environment and Natural Resources Protection of Georgia (MENRP);
- the Emergency Management Agency (EMA);
- the National Environmental Agency (NEA);
- the office of the United Nations Development Programme (UNDP);
- the 112 emergency room for Tbilisi;
- the mayor's office of the municipality of Kvareli.

A field trip was conducted to see the early warning systems on the Duruji River in Kvareli.

By bringing together stakeholders with a variety of backgrounds, expertise and responsibilities, the peer review sessions helped achieve one of the key objectives of the peer review process in Georgia: to facilitate the sharing of risk assessment knowledge and foster cooperation between risk assessment stakeholders.

The peer review report complements the 2014 UNDP Disaster Risk Reduction Capacity Assessment Report for Georgia, which takes into account risk assessment. The peer review mission aimed at finding additional good practices and areas for improvement on the basis of the EU peer review framework.

This report represents an analysis of the situation in Georgia in November 2015. More recent developments are not taken into account, although some of them are mentioned in footnotes. Furthermore, the peers did not have direct access to the National Threats Assessment Document, which is classified. The discussion of that document in this report is based on information gathered from interviews with stakeholders.

Although seismic hazard is one of the main natural hazards in Georgia, this report is mainly focused on hydro-meteorological and geological hazards. Time did not allow for meetings with the Seismic Monitoring Centre or other institutes covering this hazard, but it was covered in many of the documents the peers received during the preparation of the review.

Scope of the review

The peer review of Georgia was focused on the theme of risk assessment and additionally on that of early warning. It was based upon the thematic framework for risk assessment, with the additional objective on early warning taken from the general peer review framework. These combined themes correspond to priority 2 of the Hyogo Framework for Action 2005-2015.

The definition of 'risk' in Georgia according to the Law on Public Safety is in line with international definitions and European guidelines (Commission Staff Working Paper — Risk Assessment and Mapping Guidelines for Disaster Management[1]), which define risk as '*a combination of the consequences of an event and the associated probability of its occurrence. Consequences can be impacts on the life, health, and property of people, as well as the environment*'. A risk is sometimes called an 'emergency risk' in Georgian legislation.

Georgia sometimes uses the term 'risk assessments' to refer to what the EU, ISO and UNISDR would consider 'hazard assessments'.[2] Georgia does not consider the National Threat Assessment document to be a risk assessment, although it could qualify as such according to international standards.

An 'emergency' is understood as '*a crisis situation in certain territories or organisations that is characterised by the disturbance of normal living conditions of the population, caused by disaster, large industrial accidents, fire, natural disasters, epidemics, epizooty, epiphytoty or by use of the implements of war, and that poses and/or may pose a threat to the life and health of the population, and causes or may cause victims, human injuries, and/or significant material damage*. The definition is quite similar to the definition of 'disaster' in the *Decision on a Union Civil Protection Mechanism.*[3]

[1] https://ec.europa.eu/echo/files/about/COMM_PDF_SEC_2010_1626_F_staff_working_document_en.pdf
[2] https://www.unisdr.org/we/inform/terminology
[3] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32013D1313

Definitions used in this report are based upon EU legislation and guidelines; when these are not available, UNISDR definitions are used. A list of definitions can be found in the annex of the Guidelines. When quoting directly from Georgian legislation or other documents where different terminology is used, the Georgian terminology is used.

This report identifies good practices and areas for improvement and proposes a series of recommendations across the different objectives. It is up to the Georgian Government and stakeholders to consider how these could best contribute to achieving their objective of a resilient society and sustain a national policy dialogue.

Key findings and recommendations

The Georgian risk assessment system has a strong basis in legislation and covers a large number of stakeholders, who contribute to risk assessments and take part in risk management planning.

Good practices:

- There is a strong willingness on the part of the Georgian authorities to improve their civil protection system.
- Georgia has a strong legislative basis for risk assessments, providing definitions and assigning responsibilities to lead ministries. This is a good basis for coordination.
- There are many excellent risk assessment experts of different ages working in many different levels and fields.
- The Risk Atlas and its web portal are a good example of available knowledge and how it can be shared.
- The information bulletin issued by the NEA's Department of Geology is a useful instrument. Having the description of the hazards and the prioritised mitigation measures in one document is useful for the government and other stakeholders at national and local level.
- Georgian society has a lot of ICT experts and knowledge to develop and operate own (monitoring, analysis) systems.
- Creating Georgian networks (as used for the early warning system), connecting existing knowledge, development and ideas is an excellent approach.

Key recommendations on risk assessment and early warning:

- Strengthen the overall coordination in the risk assessment process to ensure that the different hazard, risk and threat assessments are coherent and develop clear guidelines for the role of the different coordinators (the EMA, the State Security and Crisis Management Council (SSCMC) and the NEA). Set out clearly how local risk assessments can support national ones and vice versa and ensure data exchange between them. Make the cross-sectoral interconnections clear between the 17 'risk' functions in the National Civil Safety Plan.

- Step up the implementation of the new legislation, for example by raising awareness of it through workshops for experts from all ministries mentioned in the legislation.
- Develop a more systematic cooperation with different stakeholders such as the private sector and academia. Strengthen the collaboration and data exchange with neighbouring countries on risk assessments.
- Give priority to drawing up the decree on how to conduct risk assessments. Link the methodologies used by the EMA and SSCMC. Also develop sectoral risk assessments and laws that comply with EU policies like the EU Flood and Seveso Directives.
- Establish a risk register. Systematically record and share disaster loss data to support the risk assessments. Enhance data exchange and sharing between organisations to avoid duplication. Use existing international guidance to develop a policy on data collection and sharing. Develop GIS maps for all major natural and technological hazards. Draw up guidelines setting GIS standards. Establish a national GIS/geo-information structure/network. Use selected higher performing ICT systems as standards.
- Take further advantage of EU and UN programmes to improve expertise.
- Develop a policy for allocating financial resources for risk assessments, both on the sectoral level and related to the national disaster risk reduction (DRR) strategy. Clarify how funds are allocated for research and development.
- Develop a procedure and methodology (possibly in a legal framework) that establishes a clear link between the results of risk assessment and risk management. Improve the connection of land-use planning to risk assessment and risk management. Define how risk assessments are to be linked to climate-change adaptation strategies.
- Set clear procedures for cost-benefit analysis on spatial measures derived from all-hazard national and local DRR strategies.
- Develop legislation on critical infrastructure protection that will set clear responsibilities for the stability of society as regards critical infrastructure.
- Give more visibility to the results of the risk assessments and to the potential risk scenarios identified. Take risk communication into account in each of the national action plans for the 17 functions. Explore the use of internet and social media for risk communication.
- Further improve the risk education strategy by using the excellent basis of the current risk education programme.
- Draw up a public consultation policy for assessments and plans for all the different types of hazards at all levels.
- Improve the ground stations network of the early warning system and develop and update the data and GIS maps for the whole territory as a necessary basis for good hazard monitoring. Use a single web platform to share real-time and static data.
- Establish a Georgian 'torrent and avalanche control' agency or department (possibly within the NEA).

- Develop a national regulation on alerting to create standards and set standard technical requirements for early warning and alerting systems.
- Use additional communication instruments to disseminate warnings to the public (for example, SMS systems and social media).
- Draw up, adopt and disseminate guidelines on how to prepare and review emergency plans at local level. Empower municipalities by facilitating the sharing of good experiences on preparedness between municipalities.

1. Risk assessment

Objectives 1 and 4: A coherent system of national, regional, local, cross-border and sectoral risk assessments is developed and used to provide a good understanding of the risks in the reviewed country on all governmental levels and in the private sector. All administrative, technical and financial capabilities to carry out and update risk assessments are available.

1.1 Framework, coordination and stakeholder involvement

There are two main legal acts regulating emergency management issues in Georgia:

- the 2015 Law on State Security Policy Planning and Coordination;[4]
- the 2014 Law on Public Safety.[5]

As both of them are very new, not all requirements resulting from those acts have been implemented yet. For example, the procedures for reviewing risk assessments and a list of responsibilities are yet to be set out in implementing legislation.

The Law on Public Safety sets up the unified emergency management system. The unified system is responsible for emergency prevention, preparedness, response and recovery. The Law imposes obligations for emergency risk assessment and emergency risk management plans on all authorities that are part of the unified emergency management system. Under the law, not only central and local authorities are responsible for ensuring public safety, but the general public and NGOs also play a role. The Law aims to protect the life, health and property of people and clearly states that all economically justified measures should be taken to reduce emergency risks.

The Law includes the following definition of risk assessment: *'a process of determining the nature and scale of an expected emergency, and the indices of negative consequences and impact on the life, health, and property of humans facing the threat, as well as on the environment, by analysing potential threats and assessing existing vulnerabilities'.* The EMA is responsible for preparing methodological recommendations for risk assessment covering potential threats and emergency risks. There is no particular timeframe for the risk assessment process or guidance on how often it should be revised.

The role of risk assessments in overall disaster risk management is not clearly defined within the legal framework. This is largely because the legislation does not describe how the risk assessments should be used in different sectors, at different levels and for different activities (for example, land-use planning). Risk assessments focus on particular risks and no overarching multi-hazard risk assessment is in place for Georgia, although there are several national-level activities which have elements of such a process.

[4] https://matsne.gov.ge/ru/document/download/2764463/1/en/pdf
[5] https://matsne.gov.ge/en/document/view/2363013

The NEA, subordinated to the Ministry of Environment, plays a significant role in hazard identification. The agency is responsible for natural hazard monitoring (e.g. floods and landslides). It prepares annual reports ('information bulletins') for other authorities at central, regional and local levels. To prepare these bulletins, the NEA sends groups to conduct field studies in all regions.

The bulletins include recommendations for public authorities on how to prepare for different kinds of emergencies and what should be done to avoid them. Therefore, the document is used by local and regional governments as a basis for both emergency and risk management planning.

Moreover, the NEA prepares relevant hazard maps including in the GIS format. Almost 50 % of Georgian territory is covered by hazard and risk maps. A substantial part of these maps has been prepared as part of bilateral or international cooperation projects. For example, landslide risk maps have been prepared on the basis of historical data from over 60 years and more than 2 000 digitalised geological reports. As a result, the Georgian territory has been divided into geological hazard zones with different risk levels ranging from no risk to high risk.

The NEA's hazard analyses are forwarded to the EMA, which carries out what are called 'vulnerability analyses'. The EMA estimates how many people could be affected and the potential damage to infrastructure. The combined hazard and vulnerability analysis is referred to as a risk assessment.

Risk assessments are carried out at ministerial level. Based on the Law on Public Safety, the National Civil Safety Plan sets out 17 functions or risks and related risk management activities. For each function there is a lead ministry in charge of drafting a risk assessment (see figure 1).

The 17 'risk' functions in the National Civil Safety Plan

Function 1 — Management of emergency situations (lead: EMA)
Function 2 — Communication activities (Ministry of Economy and Sustainable Development)
Function 3 — Population evacuation activities, management of unexpected flow of refugees (EMA, Ministry of Internally Displaced Persons from the Occupied Territories, Accommodation and Refugees of Georgia)
Function 4 — Response activities (EMA)
Function 5 — Transportation (Land Transport Agency of Ministry of Economy and Sustainable Development)
Function 6 — Medical support (Ministry of Labour, Health and Social Welfare)
Function 7 — Support of hosting country, diplomatic protocol and international humanitarian aid (Ministry of Foreign Affairs)
Function 8 — Forest fire and fire prevention measures (Ministry of Environment Protection)
Function 9 — Energy supply (Ministry of Energy)
Function 10 — Animals and plant protection (Ministry of Agriculture)
Function 11 — Chemical and radiological safety (Ministry of Environment Protection)
Function 12 — Technical-material support (State Financial Resources of Ministry of Internal Affairs)
Function 13 — The evacuation of mobile assets of cultural heritage (Ministry of Culture and Monument Protection)
Function 14 — Public order and material values protection (Security Police Department — Ministry of Internal Affairs)

Function 15 — Transportation of infrastructure belonging to the Ministry of Regional Development and Infrastructure (the Roads and Infrastructure Department of the Ministry of Regional Development and Infrastructure)
Function 16 — Food and drink (Ministry of Agriculture)
Function 17 — Recovery works at emergency locations (EMA)

Figure 1 — The 17 functions in the National Civil Safety Plan

The lead ministry works in coordination with all the other ministries/agencies listed in the Law, which contribute to the risk assessment through inter-ministerial working groups. EMA has an overall coordination role during emergencies (function 1).The National Civil Safety Plan covers a large number of public bodies (ministries, agencies, councils, centres, units, etc.) and also NGOs. The Georgia Red Cross Society is the only NGO with an auxiliary role to the government; it has a role in three functions (4, 6 and 16).

The Georgian Red Cross executes the role of coordinator assigned to it under the National Civil Safety Plan. Its aim is to strengthen the coordination of non-state actors involved in the disaster management sector in Georgia.
As there are a large number of other official documents (laws, sub-laws, plans, decrees and resolutions) which describe activities and competences in an emergency situation, the exact role and competency of each body is difficult to determine, particularly as this also depends on the scale of the threat, the affected area (local, regional or national level) and the nature of the activity (strategic, tactical or operational). Although the 17 functions assign coordination roles, during the mission it was not quite clear how the interdependencies between the different functions are taken into account in the different sectoral risk assessments. Nevertheless, the National Civil Safety Plan is designed to ensure that this cross-sectoral coordination and cooperation between entities takes place.

In addition to the hazard and risk assessment processes, there is also a national threat assessment, which was first drawn up in 2005 and updated in 2015. Under the Law on National Security Policy Planning and Coordination, the SSCMC is responsible for preparing the National Threat Assessment. One of the council's tasks is to '*coordinate development and implementation of necessary measures to identify, avoid, prevent and predict internal and external threats and risks that are against the fundamental state interests of Georgia*'.

The threat assessment should identify military, foreign policy, domestic policy, transnational, social and economic, natural and technological threats and challenges that pose significant danger to the national security of the country. It is approved by the national government. The threat assessment has elements of a risk assessment: for example, both the probability and consequences of potential scenarios are estimated. The threat assessment is updated every five years and is classified (in contrast to the hazard assessments of the NEA, which are public).

Drawing up the document involved many different stakeholders in different working groups. As an example, two of those working groups focused on nuclear hazards and chemical hazard respectively. Each of them had about 15 members from different institutions. The nuclear hazards working group consisted of representatives from the State Security Council, the Interior and Foreign Affairs ministries and the Customs

Office while the chemical hazards groups gathered people from the Environment, Interior Affairs, Health and Agriculture ministries. All stakeholders were asked to use the same basic methodology for drawing up possible threat scenarios. The nuclear hazards working group identified three scenarios:

- shipment of nuclear material;
- storage of nuclear waste;
- the Armenian nuclear power plant.

The chemical hazards working group identified several scenarios related to chemical plants in Georgia which might pose a threat to the population, environment and economy. They worked on the basis of a list of companies dealing with hazardous substances that was provided to them by the Ministry of Environment. In future, private stakeholders might also be involved in the working groups directly.

Although different ministries must contribute to the risk assessments, the cross-sectoral dimension of risks is not fully integrated into the risk assessments. There is very limited awareness of the overall risk assessment process among many stakeholders, who are often focused on response and not prevention.

Neighbouring countries are not consulted during the risk assessment process and their risk assessments are not taken into account. This is a gap as Georgia has three cross-border river basin districts, shared with Azerbaijan, Armenia and Turkey.

Good practice:

- Georgia has a strong legislative basis for risk assessments, which provides definitions, sets out a division of tasks by 'functions' and assigns responsibility to lead ministries.
- Inter-ministerial working groups contribute to the threat assessment
- Local and regional authorities are supported in risk assessment and risk management by EMA local branches, the fire brigades and the Georgia Red Cross Society. An example of this is the evacuation plan for Kvareli.

Recommendations:

- Strengthen the overall coordination in the risk assessment process to ensure the different hazard, risk and threat assessments are consistent with one another.
- Develop clear guidelines for the role of the different coordinators (EMA, SSCMC, and NEA) in the risk assessment process in order to ensure a systematic approach.[6]
- Facilitate a cross-sectoral approach. An important role in this could be played by the national DRR platform. Furthermore the relations between the 17 functions could be made clearer. For each entity a sort of profile could be drafted with the description of roles, responsibilities, data available, etc. This would avoid overlaps and the duplication of responsibilities and tasks. Also, more systematic cooperation could be set up with the private sector and academia.

[6] The EMA is expected to submit the procedure for developing risk management plans (including risk assessment) to the Council of Ministers for approval before the summer of 2016.

- Step up the implementation of the new legislation, for example by raising awareness of it through workshops for experts from all ministries mentioned in the legislation.
- Clearly set out the geographical area, hazard type, causes and consequences, administrative level (from local to national) and the body responsible for implementation for all risk assessments.
- Ensure consistency in the level of risks, e.g. apply the same threshold for a 'national level' risk/threat across all agencies and ministries.
- Set out clearly how local risk assessments can support national ones and vice versa and ensure data exchange between them. Strengthen collaboration and data exchange with neighbouring countries on risk assessments: for example, for flood risk in international basins Georgia could follow the EU Flood Directive provisions for trans-boundary catchments.[7]

1.2 Risk assessment methodology

No agreed single methodology exists for hazard mapping and risk assessments in Georgia: different methodologies are used to develop different aspects of risk assessment. Currently, the NEA is drawing up a document setting out common rules and formats for hazard assessments (a sort of guidelines for hazard assessment) and the EMA is drawing up a decree on how to conduct risk assessments.

According to the Law on Public Safety, the EMA has to '*prepare methodological recommendations for analysing potential threats and emergency risks*', involving all relevant authorities in the development process. Once this decree is approved, the methodology described in it will be mandatory and all the ministries will have to follow it when carrying out risk assessments. It is unclear whether EMA will use the same risk categories already used by the Security Council for the National Threat Assessment.

Different agencies cover different steps in the risk assessment process. Risk identification and risk mapping in Georgia is done by many different agencies, ministries and international organisations. The NEA, subordinated to the Ministry of Environment, has a significant role in natural hazard identification. The agency prepares an annual report with hazard and risk maps (see also chapter 1.1). Moreover, other authorities prepare hazard analyses in the area of their responsibility e.g.:

- Ministry of Environment — radiation and chemical substances and forest fires;
- Ministry of Education and Science — hazard assessment on seismic risk;
- Ministry of Health — hazard analysis on pandemics;
- Ministry of Regional Development – information on transportation issues.

In addition to the NEA and other hazard maps, an electronic national hazard and risk atlas compiled in 2012 is an important reference for all ministries and national

[7] One point of reference could be the Sava River Commission http://www.savacommission.org/.

agencies.[8] However, there is a gap with regard to companies and heritage sites engaged in activities or storing waste from past activities that can be a threat to health and human lives, property and the environment. Georgia has no risk register in these areas.

A methodology exists for preparing the threat assessment, parts of which are public. The assessment methodology uses a risk matrix approach based on the combination of a probability and consequence of a certain risk or threat. The probability assessment is based on a statistical method. The consequence or impact of a risk is calculated taking into account:

- the economic effect as a share of GDP;
- the number of dead or injured;
- the impact on social infrastructure;
- the political impact, both domestic and foreign.

Each of these aspects is measured on a scale of five (1 — negligible, 2 — minor, 3 — moderate, 4 — severe and 5 — critical).

SSCMC does not develop a risk assessment by itself, but receives risk assessment documents from all ministries, universities, private companies etc. and brings them together in the National Threat Assessment document. For each hazard there is an inter-ministerial working group that works on the document. The threat assessment has a classified and a non-classified part (the description of natural hazards is not classified).

On risk evaluation, a hierarchy of different types of risks is one of the outputs of the threat assessment. Priority risks are assigned the maximum level (red). Once the National Threat Assessment is approved, ministries, agencies and other institutions start to prepare strategies and action plans for each risk. The national action plan for each risk has to be approved by the government.

Good practice:

- Basing the risk assessments on the 17 functions in the National Civil Safety Plan.
- The risk atlas is an important document that gives a good overview of the different hazards that affect the country and their level of impact.
- The information bulletin issued by the NEA's Department of Geology is a useful instrument for decision-making, land-use planning and emergency planning both at a national and at a local level. Having the description of the hazards and the prioritised mitigation measures in one document is useful for the government and other stakeholders.
- The use of a risk matrix and the prioritisation of different risks in the National Threat Assessment are in line with the 'EU Risk Assessment and Mapping Guidelines for Disaster Management'.[9]

[8] Atlas of Natural Hazards and Disaster Risks of Georgia (2012), "Institution building for natural disaster risk reduction in Georgia" project; Faculty of Geo Information Science and Earth Observation, the University of Twente; Caucasus Environmental NGO Network (CENN); NEA; EMA and Ilia University.

[9] https://ec.europa.eu/echo/files/about/COMM_PDF_SEC_2010_1626_F_staff_working_document_en.pdf.

Recommendations:

- Give priority to drawing up the decree on how to conduct risk assessments in order to lay down homogeneous and consistent standards and procedures at national level. There should be a unified system of procedures, not a unified method per se. In other words, there should be room for different, 'fit for purpose' approaches. All future national/international risk assessment projects will have to follow the approved procedures. When doing this, it could be useful to refer to EU risk assessment and mapping guidelines.
- Link the methodologies used by the EMA and the SSCMC and draw up standardised criteria that different levels of government can use to identify and develop scenarios for different kinds of hazards.
- Develop sectoral risk assessments and laws that comply with EU policies like the EU Flood and Seveso Directives.
- Improve flood risk identification and mapping using the EU Floods Directive as a model.[10]
- Establish a risk register that includes the type and description of risks, legal framework, standards, measures and procedures for risk-reduction activities and for assessing residual risk, covering also industrial facilities and heritage hazardous waste sites.
- Systematically record and share disaster loss data to support the risk assessments, in particular risk identification and the development of scenarios.
- If appropriate, draw up clear criteria to determine whether the level of a particular type of risk is acceptable or not.

1.3 Information and communication

The information on the risk assessments in Georgia is communicated in several different ways. Geographic information systems (GIS) are used in many ministries (e.g. NEA), NGOs and projects (e.g. on the Rioni River), but there is no common standard data model. The NEA prepares maps in GIS format supported by other specific programs and software. Data are accessible for internal units of the NEA. There are plans to create a shared GIS or geo-information data pool, which would make it possible to share data with other authorities and with the general population (with different levels of access).[11]

The NEA information bulletin is published on the agency's website and disseminated to ministries and governors of the regions. Usually it is not sent directly to municipalities (unless they specifically ask for it), but they receive it through the governors.

[10] In the spring of 2016 Georgia will start a cooperation project with Austria over flood risk assessment in Tbilisi.
[11] Since the peer review mission, Georgia has been in contact with the UN Office for Outer Space Affairs (UNOOSA) to get support to build geospatial infrastructure.

Land-use and/or urban planning in Georgia is available only for a few municipalities through analogue plans or documents. There is no management system for land-use planning. Natural hazard datasets are not integrated into land-use plans because the existing data are not on an accurate enough scale, but the NEA and other experts are sometimes involved.

The administrative capacity to communicate internally the results of risk assessments, scenarios and lessons learnt is sometimes lacking. However, Georgia is currently working on development of a national emergency management information system (NEMIS, see also paragraph 1.5).

Good practice:

- The risk atlas web portal. This could be the right starting point for implementing a web portal on integrated risk assessments.

Recommendations:

- Enhance data exchange and sharing between organisations to avoid duplication, increase cooperation and coordination of efforts in collecting data and make them available to benefit everybody. This will save resources and at the same time preserve data and information ownership.
- Facilitate the sharing of data, maps and information on hazards among the different ministries and agencies and promote their dissemination throughout the country, in particular at a local level. For example, it is important to disseminate data and info contained in the info bulletin both at a national level and also at a local level. At a national level this is essential for decision-making and cost-analysis calculations. Local authorities are in charge of land-use planning, so it is really important for them to take into account all this information.
- Develop GIS maps for all major natural and technological hazards (like the landslide and avalanche maps produced by the NEA) to replace paper maps.
- Draw up guidelines setting GIS standards (same legends, colour palette, data that should be uploaded, high level of resolution etc.). In this way maps will be comparable, consistent and easily readable.
- Establish a national GIS/geo-information[12] structure/network with a single GIS coordination office for all GIS activities in Georgia.
- Use all existing natural hazards datasets for land-use and urban planning activities.
- Draw up info bulletins (containing a description of the phenomena, GIS maps, thresholds, mitigation measures, etc.) also for other hazards, in particular floods.

[12] Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE). http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32007L0002

1.4 Expertise

The NEA and other agencies have competent assessment experts with good field expertise, but they often lack equipment and financial resources to conduct their tasks. Experts responsible for the National Threat Assessment have been trained by experts from the UK and Austria. Since the first National Threat Assessment in 2005, a lot of experience has been gained. However, there is no clear and accepted protocol for the use of expert opinions in the risk assessment process.

According to the Law on Public Safety, '*within the scope of the emergency risk reduction strategy, a national public consultative body — the Expert Advisory Council — is established under the Agency (EMA)*'. The Council consists of approximately 120 members, mostly scientists/experts from different organisations, academic institutions, official authorities and NGOs. The main task of the Council is to draw up analyses and recommendations for preventive measures which should be implemented by public authorities to mitigate emergencies.

Good practice:

- The exchange of experience and knowledge between officers from governmental institutions and experts from international organisations and local university researchers is a very good practice.
- The Expert Advisory Council is a good way to enhance cooperation between scientists, NGOs and government.
- The implementation of 'home-made' (i.e. by Georgian universities, scientists and companies) software, prototypes and models to be used for risk assessment and early warning systems is a very good practice that should be encouraged.

Recommendations:

- Use experts and researchers from universities and better integrate universities and research centres into the risk assessment process and overall risk management. This could be established by decree/law.
- Clarify how funds are allocated for research and development. This would create better conditions for developing home-made software and methods, making the Georgian system more sustainable. It would also encourage and systematise the exchange of experience between university researchers. It should be a very effective way to orientate applied research and should lead to really effective and useful platforms and models.
- Take advantage of EU programmes such as the Civil Protection Exchange of Experts Programme,[13] other programmes under the Union Civil Protection Mechanism and European neighbourhood instruments such as twinning and TAIEX[14] to enhance Georgia's risk management capabilities.
- Design courses to train experts in Georgian and international risk assessment methodologies.

[13] http://www.exchangeofexperts.eu/EN/Home/home_node.html
[14] http://ec.europa.eu/enlargement/tenders/taiex/index_en.htm

1.5 Risk assessment infrastructure

Different institutions in charge of risk assessments use different kinds of ICT infrastructures. No common IT platform for risk assessments has been developed or selected at a national level. Information and data (including historical data) are available in Georgia, but they do not cover all different types of hazards with the same level of completeness. Moreover, they are collected by different agencies/institutions/ministries in different ways, using different standards, and are not collected and stored in a common database. However, an Electronic Regional Risk Atlas (ERRA) portal (a viewer of static layers) is going to have additional installation points in a few months.

Georgia has taken first steps to address this situation. The UNDP has collaborated with EMA in setting up a database system to collect data during and post disasters. At the moment Georgia is working on a project on historical data (a disaster loss database). It will still have to be decided who is responsible for collecting and updating data, which kind of ICT infrastructure will be used to share data and, more generally, on the data sharing policy.

EMA is currently developing a national emergency management information system (NEMIS), in cooperation with the DRR Centre of the Association for Rural Development for Future Georgia (RDFG). NEMIS is an information management software platform that provides:

- situational awareness for program activities, logistics and development;
- gap analysis to generate real-time reporting and seamless information sharing.

NEMIS is fully customisable and provides evidence-driven insights to support informed decision-making about planning and effective use of resources.[15]

Good practice:

- Having good local ICT experts trained within the country is an added value for Georgia. This could put Georgia in a position to be able to develop and maintain its own systems, web portals, etc.

Recommendations:

- Use existing international guidance[16] to develop a policy and possibly a law on data collection and sharing.
- to gain a clear idea of the availability of data throughout the country and to avoid overlaps, investigate:
    - what data are collected by each entity and how;
    - who is updating the databases;
    - what ongoing procedures and ICT systems are used.

[15] Georgia is currently also working on customizing for its own use international software for simulation of chemical incidents.

[16] Guidance for recording and sharing disaster damage and loss data (JRC, 2015); Guidelines for reporting under the Flood Directive 2007/60/CE (DG Environment). http://www.desinventar.net/index_www.html; http://www.preventionweb.net/english/hyogo/gar/2015/en/home/index.html

- Use selected higher performing ICT systems as standards: in this way future programmes and projects will use the same ICT systems.[17]
- Ensure interoperability between ICT and GIS systems used to develop analyses and to view scenarios. Data at an appropriate scale (definition) should be taken into account in order to develop useful scenarios both for risk assessments and sectoral analyses.

1.6 Financing of risk assessment

To develop and improve its capabilities despite limited resources, Georgia is largely dependent on projects and programmes financed by international organisations like the EU, UNDP, the World Bank and USAID. These initiatives are temporary by default and very often cannot be sustained in the implementation period or maintained and monitored in the longer run. The financial capacity available in Georgia to carry out and update work on risk assessments is limited and probably insufficient for a large-scale overhaul.

Recommendation:

- Develop a policy for allocating financial resources for risk assessments, both on sectoral level and related to the national DRR strategy. As 'understanding risk' is a main priority in the Sendai Framework it seems logical to allocate specific budget in the national DRR strategy for improving Georgia's risk assessment capability (as part of the risk management capability).

[17] INSPIRE Directive: http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32007L0002.

2. Interface with risk management processes

Objective: following the development of the national risk assessment and maps, the involved authorities should seek to interface in an appropriate way with the ensuing processes of risk management

Risk assessment is carried out within the broader context of disaster risk management. Risk assessment and mapping are the central components of a more general process which:

- identifies the capacities and resources available to reduce the identified levels of risk and the possible effects of a disaster (capacity analysis);
- considers the planning of:
  - appropriate risk mitigation measures (capability planning);
  - the monitoring and review of hazards, risks and vulnerabilities;
  - consultation and communication of findings and results.[18]

One of the main results of this process is a national (and also local) strategy and action plans for disaster risk reduction (DRR).

In Georgia there is no legal definition of risk management but the Law on Public Safety defines an emergency risk management plan as: *'a preliminary planning document developed by the Unified System bodies that specifies the goals for detecting, assessing, and reducing emergency risks, specific objectives, the management measures necessary for reaching these objectives and the management actions required to reduce potential damage and loss to minimum level, as well as to prevent origination of new risks'*.

All public administration authorities are included in the unified system laid down in the Law on Public Safety. The unified system includes three levels of operation:

- political (central authorities);
- operational (regions) and
- tactical (municipalities).

The primary responsibility for response lies at the local level. If the situation cannot be dealt with locally, the next level up is engaged. The political level is activated when a political decision is needed (e.g. help from international organisations, use of the armed forces). The political level might also be involved in the event of a cross-border emergency.

According to the Law on Public Safety:

- the EMA should participate in preparing the risk management plan and supervise its implementation;
- central level authorities included in the unified system should develop and implement emergency prevention measures and the risk management plan;
- the governments of the autonomous republics of Abkhazia and Adjara as well as the governors should plan and implement public safety preventive measures as well as develop and approve risk management plans;

[18] EU risk assessment and mapping guidelines.

- in coordination with the agency, municipality authorities should plan and implement public safety preventive measures and develop and approve risk management plans.

Based on the above-mentioned provisions, all administrative levels should take part in the risk management planning process. One body, the EMA, is indicated as a supervisory body. The EMA should monitor if measures implemented by other institutions are reducing risks.

Apart from the EMA, the SSCMC (State Security and Crisis Management Council) also has responsibility for some aspects of disaster management. In the event of an emergency in which local or regional level authorities are overwhelmed, either the EMA or the State Security Council will respond to the emergency, depending on its scale.

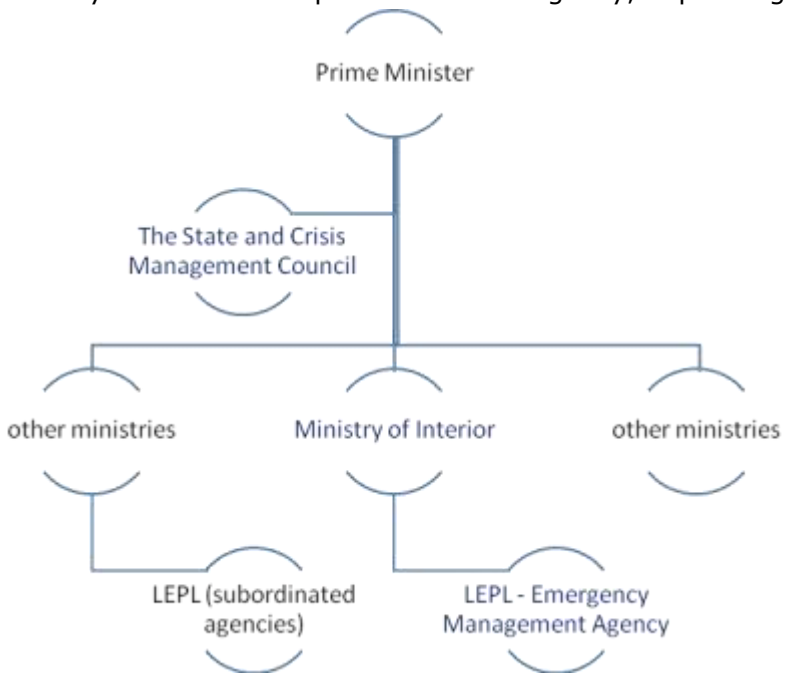

Figure 2: Diagram showing the crisis management system at government level

According to the Law on National Security Policy Planning and Coordination, the SSCMC is an advisory body subordinated to the Prime Minister. It is responsible for preparing decisions of the Prime Minister on domestic and foreign policy, defence, stability and legal order that are related to national security. SSCMC's emergency management-related tasks include:

- managing all types of crisis situations at the political level, which might threaten the state interests;
- developing proposals necessary to prevent and eliminate the outcomes of political, military, social, economic and ecological events and other threats;
- coordinating and developing measures necessary to identify, avoid, prevent and predict internal and external threats and risks that are against the fundamental state interests of Georgia.

By contrast, the EMA operates under the supervision of the Ministry of Interior Affairs. It coordinates the activities of the entities included in the unified system during prevention, preparedness, response and recovery. The agency's tasks include:

- drafting the National Civil Safety Plan and updating it every two years;
- participating in the preparation of any other emergency management plan and risk management plan and supervising its implementation;
- preparing methodological recommendations for analysing potential threats and emergency risks;
- developing procedures for collecting, processing and transmitting emergency-related information.

The EMA operates at national, autonomous (i.e. the Autonomous Republic of Adjara), regional and local levels. Often representatives of the agency are deputy chairs of crisis management councils operating at local and regional levels. EMA local branches support local administrations in developing action plans (emergency plans) and therefore also in determining the level of risks throughout the country.

Another example of a stakeholder involved in emergency management is the Georgian Red Cross. Its work focuses on:

- preparedness of communities for possible disasters, increasing potential to mitigate risks;
- increasing public awareness.

The Georgian Red Cross operates mostly at local level (e.g. during emergency training sessions).

As discussed in chapter 1, the National Civil Safety Plan is a basis document for other plans. Both emergency management plans and emergency risk management plans at all administration levels should derive from the national plan. For example, the local emergency plan for Kvareli had been prepared in accordance with the national plan and its 17 functions. The emergency plan for Kvareli covers both natural and man-made hazards (e.g. floods, mudflows etc.). The plan also includes:

- detailed evacuation activities (contact numbers of transportation companies which would be responsible for providing vehicles for evacuation; contact numbers of other private entities responsible for providing special technical devices in emergencies);
- the procedure for engaging additional aid from higher levels of administration.

The national DRR strategy and capability planning in Georgia is based on the National Threat Assessment document. Once this document is approved, the ministries and agencies responsible for the 17 national functions start to prepare strategies and action plans. After that, each ministry has to plan its own activity and allocate the necessary financial resources. The whole set of national action plans for each function will have to be approved by the council of ministers.

The process and methodology for developing action plans and using capability analysis and capability planning are not regulated in the Law on Public Safety; instead it is up to the ministries responsible for each of the functions. However, this is monitored and coordinated by the SSCMC. In 2014 UNDP performed a capacity assessment for the

national DRR system in Georgia. On the basis of the UNDP report, the SSCMC developed an action plan for capacity development to improve the DRR system.

A national DRR strategy is still under development. Georgia has the ambition to base this new strategy on the principles of the recent Sendai Framework. It is not clear how the recommendations from the threat assessment are included in the DRR action plans. Nor is it not clear if there will be a method in place to ensure that the recommendations are implemented.

Link with spatial planning

Land-use plans are drawn up at local level. If needed, the Ministry of Economy helps municipalities to draw up the plans. A procedure on how to draw up land-use plans has been laid down in law, but the drawing up of the plans itself is not a legal requirement. From practical experience in the municipality of Kvareli it seems to be difficult to take risks into account in land-use planning. For example, a school was rebuilt in an area prone to mudflows. The lack of a legal requirement to draw up a spatial plan means that in practice many municipalities do not have such plans. Although the NEA provides very detailed maps and advice on hazardous areas and potential mitigation measures, there is no institutional framework to ensure that prevention strategies are implemented and monitored.

Link with critical infrastructure protection (CIP)

There is no specific law on critical infrastructure related to Council Directive 2008/114/EC of 8 December 2008. However, the Law on Public Safety does include the concept of 'objects falling into a category of public safety'. The Law (specifically Article 49(2)) states that there is a list of facilities falling under public safety: '*special economic facilities, facilities necessary for preserving the population's life and living conditions, facilities of vital importance, and potentially hazardous facilities*'. This definition does include aspects of critical infrastructure, but is not directly in accordance with the EU Directive and practice in Member States. Moreover, the legal obligations for such facilities are mostly directed at fire safety and internal prevention and preparedness and not at societal impact or a systems-integrated approach.

It is a legal requirement to perform regular inspections of such facilities to check the performance of fire safety requirements, emergency prevention and response requirements. Task forces are ready to go on the spot if needed (in emergencies or if a problem occurs). The Technical and Construction Agency (within the Ministry of Economy) is working on the collection of data and on improving the legislation on critical infrastructures.

Good practice:

- Risk management is based on the National Civil Safety Plan and the activities are organised on the basis of the 17 functions laid down in the plan. This is a good starting point for developing fruitful cooperation between different institutions involved in the process. For each function, risk and phase of risk management the coordination is clear.

Recommendations:

- Develop a procedure and methodology (possibly in a legal framework) that establishes a clear link between the results of risk assessment and obligations in related fields such as:
    - land-use planning;
    - building design criteria;
    - decentralised risk prevention policy;
    - policy on chemical process and facility safety measures;
    - critical infrastructure protection;
    - monitoring and enforcement.
- Improve the connection of land-use planning to risk assessment and risk management. Results of the NEA's hazard assessments (provided in its info bulletins) should be taken into account in land-use planning. They should also be monitored and enforced, taking into account the principles for 'Building Back Better' (Sendai Framework).
- Set clear procedures for cost-benefit analysis on spatial measures derived from all-hazard national and local DDR strategies. For example, once the National Threat Assessment document has identified the major threats for Georgia, we recommend a clear procedure/directive that states that funds and available financial resources should be invested in reducing those threats. This would make the political decision-making easier.
- Develop an integral strategy for critical infrastructure protection that complies with the EU directive on CIP and the current practice in EU Member States, including a clear connection with risk assessment.
- Determine how risk assessments are to be linked to climate-change adaptation strategies taking into account good practices developed in the EU and by international organisations.
- Take into account climate change when carrying out hazard/risk mapping and drafting risk management plans for flood risk, in line with the EU Floods Directive, and use guidelines and good practices provided under the IPA FLOODS Programme.

3. Transparency and accountability

Objective: the development and outcome of (national) risk assessments is transparent and accountable for the stakeholders and general public (with exception of sensitive information)

The processes of stakeholder participation and of publication and risk communication differ for each of the (sub-) assessments done in Georgia. The annual info bulletins prepared by the NEA are public and can be consulted online. The Atlas of Natural Hazards and Disaster Risks of Georgia is also available on the web and can easily be consulted and downloaded by all stakeholders and the general population. However, the Atlas has not been updated since the first assessment in 2012. Moreover, the maps in the risk atlas do not have a sufficient resolution to be used for local risk management. The population can use them to get a general picture of the situation in their local area, but they not detailed enough for the public to understand a specific need for action.

Georgia's National Threat Assessment document is in large part classified, because of the inclusion of military, terrorist and other security threats. The Georgian Government has clearly decided which information included in the national assessments is sensitive and must not be published. The part concerning natural hazards and man-made disasters is unclassified. Emergency plans (and the risk classifications they contain) are not published, but are not classified information either. In certain areas or municipalities (for example in Kvareli), specific information about particular risks is actively disseminated to the population.

None of the aforementioned risk assessments and plans is open for public consultation before their adoption. However, the most relevant bodies are usually involved in drafting the assessments. The formal decision processes for adopting the documents are transparent and accountable in accordance with legislation. Furthermore there is the Expert Advisory Council provided for in the Law on Public Safety, which makes recommendations on preventive measures to be implemented by public authorities in order to mitigate emergencies.

Risk communication to the public is a sectoral responsibility. A main line of communication activities — based on the Sendai recommendations — is risk education, coordinated by the Ministry of Education.

In 2016, according to the standards set out by the national curriculum, public safety is taught in the 4th, 8th and 12th grade at school. According to the principle of continuous learning it is planned to start teaching a new course on 'Society and me' in 3rd and 4th grade and a revised course on 'My Georgia' in 5th and 6th grade will be taught from 2017. Both of these subjects are for primary school and represent the integration of public security issues as part of social sciences teaching in education. Also, 'public education' will start being taught as a separate subject in 3rd, 7th, 8th and 9th grade. This subject also includes public security, sustainable development and future prospects. This course includes detailed teaching of DRR issues, which are

integrated into the subject of geography. These subjects will help implement the concept of a 'safe school space'.

The Ministry of Education has a 'memorandum of understanding' with public organisations and NGOs which enrich the theoretical material with practical context and aid implementation. The main aim of the partnership is to raise awareness and strengthen it with practical skills. The partners are Unicef, Save the Children, local Georgian stakeholders, the Centre against Disasters, Oxfam and ASB (Germany). The donor for the project is the European Commission.

The Georgia Red Cross Society has recently begun actively working on non-formal education, in coordination with the Ministry of Education and Science and with local educational resource centres. Georgian Red Cross representatives are training teachers in family emergency planning i.e. what individual households can do to minimise the negative effects of disasters. Those teachers are in turn teaching children how to prepare their own family emergency plan together with their families, neighbours and relatives. After that, a competition is organised at school, municipality and regional levels to identify the best and the most innovative family emergency plans. The winning students are invited to participate in summer camps, where they have a chance to strengthen their skills and knowledge in areas such as first aid, psychosocial support and disaster management.

Good practice:

- The local practice in Kvareli shows a good example of communication to the inhabitants on specific risks they face.
- The integration of safety and risk reduction in education on all levels is a sound basis for risk awareness and preparedness of the whole population, starting with children.

Recommendation:

- Give more visibility to the results of the risk assessments and to the potential risk scenarios identified. These should be published and disseminated throughout the country. The NEA's info bulletins, other sectoral risk information and the 'natural and technological hazards' section of the National Threat Assessment provide a good basis for more systematic risk communication campaigns that would include both information on the hazards people are facing and what they can do themselves (to prevent, prepare, respond and recover).
- Draw up a public consultation policy for assessments and plans covering all the different types of hazards at all levels. These assessments and plans could take account of the procedures developed by the EU for floods and water management.
- Take risk communication into account in each of the national action plans for the 17 functions. Translate these sectoral strategies to the local level, so that integrated, hands-on communication strategies are in place in municipalities. Despite its limited resources, the local level is best placed to combine national knowledge, local emergency plans, local training and exercises and local risk education in schools into an approach that best fits the local characteristics and

needs. The NEA and EMA seem well equipped to assist municipalities in this, especially those municipalities with either a high risk and/or a weak record on risk communication. Furthermore, good use can be made of international examples of very concrete information campaigns and leaflets for specific hazards.

- Further improve risk education on the excellent basis of the current programme by drawing on international examples like civil protection children's games and building a strong connection between children's education at school and municipal training and exercises for children and adults.
- Explore the use of internet and social media for risk communication. Several countries have examples of websites, platforms and apps for communicating risks to the whole population and educating them on what they can do themselves.

4. Early warning

Objective: Early warning systems are in place for all major hazards, with outreach to communities

4.1 Hazard monitoring and detection

A central focus of civil and disaster protection is the rapid warning and alerting of the population in the event of disasters or crises. In mountainous Georgia, natural hazards are a safety risk in many regions: floods, mudflows, avalanches, slope movements and rock falls threaten people, their living environments, their settlements and economic areas, transport routes, supply lines and infrastructure. With growing prosperity, the need for safety and protection of the population increases. There is a long history of hazard monitoring in Georgia, which provides a basis for early warning and alerting activities. However, monitoring decreased in the years after independence in 1991. Only in recent years has the infrastructure for hazard monitoring and recording meteorological and hydrological data started to improve again. Recently Georgia has been working on implementation of several early warning systems (EWSs). The peer review mission visited the Kvareli EWS for mudflows.[19]

In Georgia several national agencies are in charge of monitoring different kinds of natural hazards. In particular, the NEA is responsible for hydro-meteorological, geological and environmental pollution, whereas the Seismic Monitoring Centre of the Ilia University and the Institute of Geophysics are responsible both for seismic hazards and for all secondary natural hazards assessment caused by earthquakes.[20] Forest fire hazard falls within the responsibility of the National Forestry Agency (see figure 3).

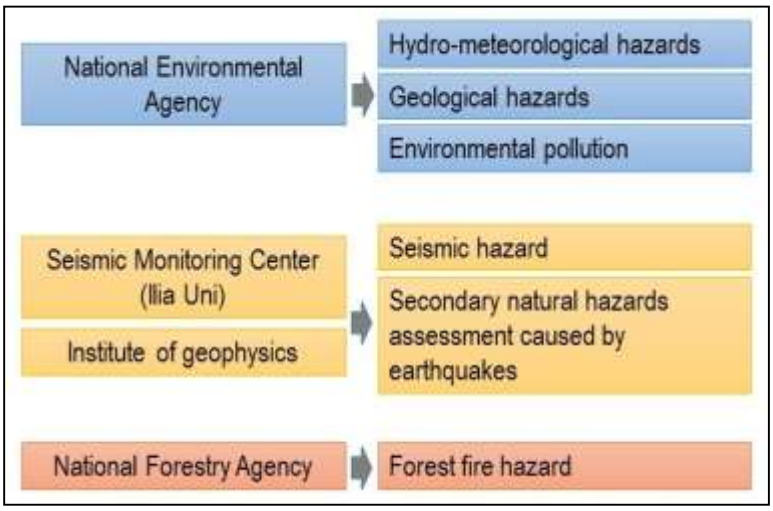

Figure 3 — agencies responsible for hazard monitoring

[19] Since then a new EWS has been developed for Mt. Kazbegi/the Tergi Valley, based on the recommendations of an EU civil protection mission.
[20] However, the role of the Seismic Monitoring Centre is not laid down by law.

The NEA's Department of Geology is well structured and the experts in the department have an excellent knowledge of the national territory and of the areas most affected by landslides and avalanches. Once a year, an info bulletin on landslides is issued by the NEA. This bulletin is a high quality document. It contains data from monitoring activities, historical data, estimation of millimetres of rainfall that can trigger specific landslides and flash floods (rainfall thresholds) etc. Moreover, each settlement and municipality is divided into four categories, from no, low, medium to high level of hazard. The bulletin also contains GIS maps indicating the location and classification of different landslides. For each landslide the bulletin provides comprehensive tables with info on the area affected, the type of phenomena, damage registered and mitigation measures (both structural and non-structural) that should be put in place as a priority. The Department of Geology also monitors whether the measures have been carried out.

Georgia is a member of the World Meteorological Organisation (WMO). The NEA's Hydro-Meteorological Department works 24/7 and in close contact with all the other departments of the agency, providing weather forecasts and issuing warnings for severe weather conditions.

The Hydro-Met Department receives data from the ground stations all over the country, although not all of them are automatic stations. The Hydro-Met Department owns a lot of historical meteorological and hydrologic data deriving from the good observation network Georgia had before becoming independent. Unfortunately, in the years since independence the observation network has been deteriorating and the amount of data has been decreasing. Nowadays, only one radar remains. It belongs to a private company (Delta) and is mainly used for hail estimation. The Hydro-Met Department is working on an agreement to receive these data in its monitoring room. In the near future a meteorological radar will be provided by the USA and installed in western Georgia.

The NEA's Department of Hydrology works in close contact with the Hydro-Met Department. Data on river discharge and water quality are published each month on the NEA website. Both departments are working on implementation of the EU Floods Directive (2007/60/CE), but this is still at an initial phase.

Overall it seems that the NEA is more advanced when it comes to geology than hydrology. Landslide hazards are very well detected and identified all over the Georgian territory. Knowledge of other hazards such as floods is not as advanced.

Good practice:

- The NEA's Hydro-Met Department is in close contact with all the other departments of the agency and with the EMA. This links technical expertise on hazards to emergency management and is an important basis for the dissemination of warnings.
- The Hydro-Met Department takes into account the rainfall thresholds identified by the Department of Geology in its info bulletin and uses these data to send ad hoc alerts and warnings.

Recommendation:

- Improve the ground stations network to ensure that it covers the whole of Georgia, and expand the existing hazard monitoring network. For reliable warning systems it is absolutely necessary to have a dense field measurement and observation network. To achieve this, the allocation of state-level financial resources will be important, both for implementing and maintaining the network.
- Develop and update the data and GIS maps for the whole territory as a necessary basis for good hazard monitoring.[21]
- Define and use, where possible, warning level thresholds for amounts of rainfall in combination with river levels/discharges and predicted snow melting in order to warn the population and activate the civil protection system as quickly as possible.
- Improve the monitoring system in specific areas by having constant live images from webcams and local meteorological readings.
- Use a single web platform to share real-time and static data for all different types of hazards between all agencies and ministries (and stakeholders) involved in risk management (prevention, preparedness, response and recovery phases). We also recommend choosing and using one official software application all over the country, using the best working tools from experiences in previous projects around the country.
- Establish a Georgian 'torrent and avalanche control' agency or department (possibly within the NEA) that will be responsible for:
    - drawing up hazard zone plans;
    - planning and implementation of technical and forest-biological control measures;
    - caring for torrent and avalanche catchment areas;
    - managing possible subsidies and representing the public interest in protection against mountainous natural hazards.

4.2 Alerting

The NEA's Hydro-Met Department is operative 24/7, 365 days a year. The NEA can issue warnings by email to relevant state agencies (EMA first of all), departments, local authorities and other stakeholders it identifies. For example, if present rainfall thresholds in particular areas affected by landslides are expected to be exceeded, a message is sent to the local authorities and stakeholders involved. The message includes a description of the phenomena, including the estimated time and location, but not an impact estimation. The NEA also publishes information on its website. All Georgian municipalities have the NEA's telephone numbers.

[21] This can be done in cooperation with ARISTOTLE (http://aristotle.ingv.it/), a network of research institutes that will deliver multi-hazard early warnings for the European Response Coordination Centre and thus improve early warning capacity in Europe and globally.

In the event of an imminent hazard or threat, taskforces of NEA experts can be sent into the field to assist local authorities. They inform local institutions on developments in the phenomena (landslides, flash floods…), the area that might be affected and identify the structures to be evacuated if there are further developments.

The NEA is in close contact with the 112 Centre: the two are connected by a hotline. The 112 Centre receives weather warnings from NEA and, if necessary and available, notification messages during a (weather) event. District-wide or municipal alerts are triggered by the district emergency management centres. NEA and the 112 Centre have exchanged their contact numbers and can reach each other at all times. However, the 112 Centre does not inform NEA about calls (assistance requests) it receives related to specific (weather) events, nor does it send any liaison officer to the emergency room of EMA or participate in coordinating the emergency phase. Despite the exchange of contact numbers, in practice there is a one-way information flow from the NEA (warning and notification messages) to the 112 Centre, but no two-way flow, even though 112 owns much information that would be useful for the management of an ongoing emergency.

At this stage, there is no SMS service for the population: people are informed through the web, TV and radio. TV and radio receive info from local authorities, the NEA and the EMA. However, several local EWSs have been set up in different areas of Georgia with the support of international organisations and projects. Currently UNDP is supporting the setup of a flood forecasting EWS in western Georgia. It is also providing hydraulic modelling and offering training to NEA officers.

Kvareli municipality experiences mud and debris flows. In 2013 the NEA, the EMA and the municipality executed an EWS project. At the same time UNDP had a similar project on another part of the same river. Both systems use different software, but uniform datasets have been defined. The NEA processes the data from both systems.

Whenever a threshold for the river level is exceeded, the NEA informs the mayor, who then decides whether or not to activate sirens, after asking the local police to check the ongoing situation on the spot. The siren has only one kind of signal, which means the start of population evacuation. There do not seem to be different scales or grades of alert (first warning, second warning) or a standardisation of alerts across Georgia. The siren signal in Kvareli can be heard from every neighbourhood of the town (experiments have been done to check this) and the inhabitants have received a training programme explaining to them what the signal is and what to do in the event of an emergency.

The alerting systems (sirens) are powered via the public electricity network and have no autonomous battery power, so if there is a power failure the population cannot be alerted by sirens. Also the functioning of the sirens is not checked regularly. Moreover, the siren is set up on a building located in a flood-prone area and has not been installed on the most suitable point of the roof. Although tests have shown that the signals can be heard across town, it seems that the installation of the sirens was not preceded by an electro-acoustic study that takes into account all elements of sound propagation, density of population and barriers and geographical inputs. While the sirens are

installed in places with easy access for installation and maintenance, they might not be the most effective for alerts (Figure 4).

Figure 4 — siren in Kvareli

Good practice:

- There is a solid institutional structure (the NEA's Hydro-Met Department) in charge of forecasting and monitoring 24/7, 365 days a year.
- It seems that the EWSs (mostly funded by international projects and programmes) have been set up in coordination and close cooperation with end users.
- In some cases (e.g. Kvareli), local EWSs have been set up and are well-known by the inhabitants thanks to information folders, panels on the street and training/exercises for emergency services and inhabitants.

Recommendation:

- Integrate or connect all different monitoring and alerting systems into a single national alert and warning network or centre[22] to serve as a 'one-stop-shop' to alert emergency relief services (fire units, ambulances, police) and inform/alert the public and political decision-makers. Having a central alert and warning centre does not, of course, mean that the experts are not connected and involved in running and being responsible for 'their' early warning systems. The experts in the different hazard fields continue to be responsible for analysing all incoming data and defining and setting thresholds for automatic or semi-automatic systems.

[22] The Commission staff working document 'Towards Better Protecting Citizens against Disaster Risks: Strengthening Early Warning Systems in Europe' (SEC(2007) 1721, 14.12.2007) can be taken into account when doing this.

- Facilitate the exchange of data and information between the EMA Emergency Centre and the 112 Centre by sending a 112 liaison officer to the EMA (112 can provide info on the assistance request, making it easier to understand the ongoing scenario, and the EMA can provide useful data to 112 in order to help people quicker). It could be useful to use a single GIS platform to facilitate this sharing of data.
- Add an estimation of the impact of the forecast phenomena whenever possible in the warning messages in order to better prepare institutions, local authorities and populations.
- Define and use, whenever possible, different levels of warnings linked to a gradual activation of the system at local level in order to make EWSs more efficient.
- Develop a national regulation on alerting to create standards for:
    - the content of early warning messages and forecasts;
    - redundant dissemination of messages and forecasts to ensure reception;
    - the frequency of notification messages containing a description of the ongoing phenomena and the short-term evolution of the situation during adverse events;
    - guidelines that must be followed when installing and maintaining a siren;
    - the use of siren signals in connection with:
        - the type of danger (upcoming or immediate danger);
        - the end of danger;
        - the fire alarm (applies only to firefighters and mostly at the local level);
        - the duration of the warning signal (in seconds);
        - the description of warning signals (howling, continuous, intermittent, etc.);
        - instructions for reacting to the siren (what to do);
    - the design of posters, method of distribution and display of posters in public places;
    - the bodies (centres) responsible for launching population alerts via sirens and text messages that have to be broadcasted via radio or/and TV;
    - the use and roles of radio stations, TV stations and other electronic media and their obligation to broadcast warning information or messages on measures that must be taken after the population has alerted via sirens;
    - regular testing of the system using a defined type of siren signal and scheduled date and time of the test. In this way, the population will be able to distinguish a test from a real emergency (that could cause panic).
- Set standard technical requirements for early warning and alerting systems along the following lines:
    - two different, independent signal distribution networks (e.g. one via TETRA radio);
    - redundant power supply for all components, including the sirens in local communities;

- access to the monitoring systems for all authorities and emergency services with safety tasks, such as fire brigades, assistance and rescue organisations in Georgia;
- checking of the system (via a test alarm) on a weekly or maximum monthly basis.

- Use additional communication instruments to disseminate warnings for the public (for example, SMS systems and social media).

Specifically for the EWS in Kvareli:

- Improve and develop new alerting procedures (NEA-mayor-police-emergency services-population) to save time and to make the system more efficient. Limited warning time is available to evacuate the population and activate the civil protection system.
- Check whether the sirens are installed in accordance with a valid electro-acoustical study that will guarantee the most efficient alerting of the population in a particular area under threat.
- An autonomous power supply and regular tests of the sirens are recommended.

4.3 Emergency planning for early warning

In Georgia, it is the local mayors who are legally responsible for evacuation. Local emergency plans include preparedness for the use of early warning (if an EWS is present in a municipality). For example, in Kvareli, the EWS is integrated into the municipality's emergency response plan, which is linked to the national response plan.

Kvareli's emergency response plan includes all hazards for the region (flash flood/mud flow is the highest risk) and describes all four stages: prevention, preparedness, response and recovery. The plan describes the roles of the entities and also provides maps. In the system there is a warning level, a danger level and a disaster level. However, there is only one kind of siren signal.

The emergency plan for the Kvareli area can be activated by a notification from the NEA on the basis of readings of the EWS data. The NEA informs the mayor whenever a threshold for the river level is exceeded. The mayor then decides whether to activate sirens or not, after asking the local police to check the ongoing situation on the spot.

In the emergency plan there is a specific reference to the use of 112, although the National 112 Centre does not seem to be aware of this. The 112 Centre does not take into account local emergency plans in its own emergency planning. However, existing municipal emergency plans mention no obligations for the 112 Centre, nor is the 112 Centre required by law to provide any information to municipalities. As for the national emergency plan, the only obligation of the 112 Centre is to provide information to the EMA.

The inhabitants of Kvareli received training as part of the implementation programme for the local emergency plan. To inform the inhabitants, maps of the risk zones and evacuation routes have been placed around town. In 2016 another round of training will be organised and information leaflets will be distributed door-to-door. Georgian Red Cross volunteers will be involved in providing information to the local population, as well as in the planned joint simulation exercises. The maps from the emergency plan are shared with the NEA and EMA. The NEA in turn makes recommendations in its yearly bulletin. Recommendations are made not to build in some zones, but these are not mandatory.

Good practice:

- Taskforces of geologists and other experts from the NEA are dispatched to the field to verify maps, exposed elements, evacuation routes and to inform local authorities and people.
- Maps with evacuation routes are well disseminated among the population: at least in Kvareli, these have been placed around the town.
- Exercises/drills are organised to test and improve the action plan and the local response.
- A representative of the EMA (branch office) helps the mayor draw up the emergency plan in a proper way and also helps him to manage the emergency situation during an adverse event.

Recommendation:

- Draw up, adopt and disseminate guidelines on how to prepare and review emergency plans at local level.
- Empower municipalities by helping municipalities to share good experiences on preparedness. Emergency plans should be public and well-known by the population living in the area and by all stakeholders involved. The Kvareli case shows that an implementation programme and risk communication strategy can help very well to get people informed and trained.

Annex I Terminology and abbreviations

The following definitions are working definitions for the purpose of the peer review documents only. They are based largely on EU legislation and guidelines. Where official EU definitions were not available, UNISDR definitions have been used.[23]

Definitions

Contingency planning A management process that analyses specific potential events or emerging situations that might threaten society or the environment and establishes arrangements in advance to enable timely, effective and appropriate responses to such events and situations.

Disaster refers to any situation which has or may have a severe impact on people, the environment, or property, including cultural heritage.

Emergency services refer to a set of specialised agencies that have specific responsibilities and objectives in serving and protecting people and property in emergency situations.

Peer review is a governance tool by which the performance of one country in a specific area (in this case risk management/civil protection) is examined on an equal basis by fellow peers who are experts from other countries.

Preparedness is a state of readiness and capability of human and material means, structures, communities and organisations enabling them to ensure an effective rapid response to a disaster, obtained as a result of action taken in advance.

Prevention is any action aimed at reducing risks or mitigating adverse consequences of a disaster for people, the environment and property, including cultural heritage.

Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential structures and functions.

Response is any action taken at national or sub-national level in the event of an imminent disaster, or during or after a disaster, to address its immediate adverse consequences.

Risk management capability is the ability of a Member State or its regions to reduce, adapt to or mitigate risks (impacts and likelihood of a disaster) identified in its risk assessments to levels that are acceptable in that Member State. Risk management capability is assessed in terms of the technical, financial and administrative capacity to carry out adequate:
(a) risk assessments;
(b) risk management planning for prevention and preparedness;
(c) risk prevention and preparedness measures.

[23] http://www.unisdr.org/we/inform/terminology.

Stakeholders with an interest in disaster risk management include: scientific communities (including engineering, geographical, social, health, economic and environmental sciences), practitioners, businesses, policy-makers, central, regional or local levels of government, and the public at large.

Sub-national level refers to regional, provincial or local government level tasked with disaster risk management.

Abbreviations

Abbreviation	Definition
CENN	Caucasus Environmental NGO Network
CIP	Critical infrastructure protection
DRR	Disaster risk reduction
EMA	Emergency Management Agency (Ministry of Internal Affairs)
ERRA	Electronic Regional Risk Atlas
EWS	Early warning system
GIS	Geographic information systems
LEPL	Legal entity of public law (i.e. a public organisation)
MENRP	Ministry of Environment and Natural Resources Protection of Georgia
MRA	Ministry of IDPs from Occupied Territories, Refugees and Accommodation
MRDI	Ministry of Regional Development and Infrastructure
NEA	National Environmental Agency
NEMIS	National emergency management information system
RDFG	Association for Rural Development for Future Georgia
SSCMC	State Security Crisis Management Council
UNDP	United Nations Development Programme

Annex II overview of stakeholders

Representatives of the following institutions were involved in the peer review:

- Emergency Management Agency (EMA)
- Georgia Red Cross Society, Disaster Management Department
- Ministry of Economy and Sustainable Development, Department for Spatial Planning and Urban Development
- Ministry of Environment and National Resources Protection:
    - Environmental Supervision Department
    - Geology Department
    - Natural and Technological Hazards Management Department
    - Nuclear and Radiological Safety Department
    - Water Management Department
- Ministry of Education
- Ministry of Health:
    - National Centre for Disease Control and Public Health (NCDC)
    - Department of Disaster Coordination
- Ministry of IDPs from Occupied Territories, Refugees and Accommodation, Department of Eco-migrant Issues
- Ministry of Labour, Health and Social Affairs (MOLHSA), Department for Emergency Situations
- Ministry of Regional Development and Infrastructure, Natural Disaster Prevention and Rapid Response Unit
- Municipality of Kvareli
- National 112 Centre, Tbilisi
- National Environmental Agency (NEA):
    - Environmental Pollution Monitoring Department
    - Geology Department
    - Hydro-Meteorological Department
    - Short-Term Prognosis Division
- State Security and Crisis Management Council (SSCMC)
- State Security Service for CBRN, Hazard-fighting Council
- Technical Construction Supervision Agency
- United Nations Development Programme (UNDP)

Annex III List of documentation

The following documentation was used to prepare for the review:

Nr	Type of document	Title	Version
1	Report	HFA Progress Report Georgia	April 2015
2	Report	UNDP Disaster Risk Reduction Capacity Assessment Report Georgia	2014
3	Report	Mt. Kazbegi/Tergi Valley Early Warning System Report	2014
4	Report	Draft country profile — Prevention, Preparedness and Response to Natural and Man-made Disasters in the EaP Countries — PPRD East 2	October 2015
5	Report	Risk Atlas natural hazards Georgia	2014
6	Report	Desk Research Georgia Peer Review	November 2015
7	Report	National Environmental Action Programme of Georgia 2012 –2016	2012

Annex IV Thematic review framework

Peer reviews are conducted using standard frameworks that guide the peers in collecting information, analysing the disaster risk management structure in the country under review and the way policies are implemented The standard frameworks consist of objectives, requirements and indicators relating to different disaster risk management areas. Example questions included in the frameworks can be used to guide the peer review team in the preparatory phase and during the mission. The teams can develop further questions during their review.

The objectives and to a lesser extent the requirements are the essential policy components under review. Review questions should therefore relate closely to the objectives, particularly those where the preliminary information received was not sufficiently clear or showed gaps. The indicators cover a wide area of policies, tools and methodologies and can be used by peers to help them identify examples of good practice, areas for improvement or possible gaps. The indicators do not represent a 'checklist' against which the country should be formally assessed.

	Requirements		Key indicators
1.1	**Framework:** The risk assessment fits within an overall framework	*1.1.1*	Risk assessments are carried out based on a clear legal and/or procedural framework
		1.1.2	The role of risk assessments in overall disaster risk management is defined at the appropriate national and/or sub-national level.
1.2	**Risk assessment:** Up to date, multi hazard, risk assessments, based on unitary methodology, are available on different levels and in different sectors and are linked to climate change adaptation strategies	*1.2.1*	Multi-hazard risk assessments on different levels and in different sectors are available
		1.2.2	Risk assessments are linked to climate change adaptation strategies
1.3	**Involvement of relevant networks:** National risk assessments should aim at making the relevant actors reach a common understanding of the risk assessment methodology, the risks faced and of their relative priority [same requirements for regional, local and sectoral risk assessments]	*1.3.1*	The risk assessment method is developed in cooperation with the relevant authorities such as scientific communities, including social, health, economic and environmental sciences, practitioners, businesses, people at risk and policy makers
		1.3.2	At the beginning of the national risk assessment process one authority must be designated for the task of coordinating the work
		1.3.3	A stakeholder assessment is made before starting the risk assessment process and kept up to date.
		1.3.4	There is cooperation with the private sector where their risk assessments complement the efforts of public authorities

		1.3.5	an (inter)national Cooperation network for the formation of macro-regional risk analysis is established. Neighbouring countries are involved in the compilation of risk analyses and their risk analyses are taken into account.
1.4	**Risk assessment methodology:** A shared understanding is reached on both the range of risks considered relevant and the levels of severity for which preparedness planning would be judged appropriate	*1.4.1*	The concept of "risk" and the main factors of risk which have to be taken into account in the risk assessment are defined and accepted
		1.4.2	The scope or width of the risk assessment (and the justification for including or excluding specific risks) is defined and accepted
		1.4.3	A categorization of kinds of risks is defined and accepted
		1.4.4	The scoring criteria for the risk assessment are defined and accepted
		1.4.5	The methods used for the risk assessment are defined and accepted
		1.4.6	A protocol for the use of expert opinions is defined and accepted
		1.4.7	The uncertainty of the methods is justified
1.5	**Risk identification:** The national risk assessment is based upon a sound risk identification: the finding, recognizing and describing of risks	*1.5.1*	There is a listing of separate risks and risk scenarios, with their description
		1.5.2	For each risk there is a separate risk map, showing the spatial distribution of the hazard and the vulnerabilities
1.6	**Risk analysis:** For every risk and risk scenario identified in the previous risk identification stage, the risk analysis process carries out a detailed (and if possible quantitative) estimation of the probability of its occurrence and the severity of the potential impacts	*1.6.1*	The risk analysis includes probability and impact estimations, as well as a vulnerability analysis
		1.6.2	The impact analysis includes human impacts, economic and environmental impacts and political and social impacts
		1.6.3	The separate impact scores of each risk are recorded and justified, with clearly identified and substantiated assumptions
		1.6.4	The outcome of the risk analysis can be presented in a risk matrix for impact and probability
1.7	**Risk evaluation:** The results of the risk analysis are compared with risk criteria to determine whether the risk and/or its magnitude is acceptable or tolerable	*1.7.1*	(Political) risk criteria are set to determine whether the risk and/or its magnitude is acceptable or tolerable
		1.7.2	A political decision is made about the acceptability of risks and the prioritization of risk prevention and preparation
1.8	**Coherent system:** the system for risk assessments shows coherence between the different levels of government and between different sectors	*1.8.1*	The risk assessments on other government levels and in different sectors are taken into account in the national risk assessment
		1.8.2	The national government encourages and stimulates risk assessments by other levels of government and in different sectors

2.1	**Capability assessment:** The risk assessment is followed by a capacity analysis and capability planning	*2.1.1*	There is a plan or program to perform a capacity analysis and develop capability planning on the basis of the national risk assessment
2.2	**Recommendations:** The risk assessment results in specific recommendations for related policy fields (if relevant):	*2.2.1*	for land use planning
		2.2.2	for building design criteria
		2.2.3	for community disaster mitigation/risk prevention policy
		2.2.4	for the policy on chemical process and facility safety measures and for design of sustainable industrial processes
		2.2.5	for designing and maintenance of critical infrastructure
		2.2.6	for monitoring and enforcement
		2.2.7	for national and decentralised response planning
2.3	**Implementation:** the implementation of the recommendations is ensured; relevant stakeholders are involved.	*2.3.1*	Agreement is reached about an implementation plan or program
		2.3.2	There is interconnection between the separate plans (national, decentralised, sectoral)
3.1	**Risk communication**: Potential risk scenarios are published to inform the population	*3.1.1*	The risk assessment and the scenarios therein are published openly for the public
		3.1.2	Specific information is provided about the particular risks the population faces (in certain areas)
		3.1.3	The publication of the risk assessment includes an overview of the government's preparatory measures
		3.1.4	The publication of the risk assessment includes advices on how the general public could be better prepared
		3.1.5	The competent public body has decide which information from the national risk assessment is sensitive and will therefore not be published
3.2	**Consultation stakeholders:** Draft risk assessments should be widely consulted with stakeholders and interested parties, including central and regional levels of government and specialized departments (RAMG p.13)	*3.2.1*	The risk assessment is published and announced for consultation
		3.2.2	The stakeholders are informed on the particular risks they face
		3.2.3	Interested parties are consulted on flood risk management plans at the catchment scale
		3.2.4	Flood maps and plans are made publicly available

4.1	**Framework:** The risk assessment fits within an overall framework	*4.1.1*	See requirement 1.1
4.2	**Coordination:** A risk management structure assigns clear responsibilities to all entities involved in the risk assessment so that overlaps or mismatches between responsibility and capability are avoided	*4.2.1*	There are clearly defined responsibilities and roles/functions assigned to the relevant entities participating in the risk assessment
		4.2.2	The responsibilities to assess specific risks are assigned to relevant entities.
		4.2.3	The cross-sectorial dimension of risks has been integrated in the risk assessments
4.3	**Expertise:** The experts carrying out the risk assessment have the competencies and responsibilities and received adequate training to carry out the risk assessment	*4.2.1*	The distribution of responsibilities for the assessment of the risks regularly is reviewed
		4.2.2	The experts responsible for the risk assessment(s) are adequately informed, trained and experienced in the assessment of risks
4.4	**Other stakeholders:** Entities carrying out risk assessments cooperate with a range of stakeholders, including from the private sector, academia and other government entities not directly involved in the assessment process	*4.4.1*	The relevant stakeholders are involved in the risk assessment process
4.5	**Information & communication:** An effective information and communication system for the assessment of risk is available	*4.5.1*	The necessary administrative capacity is available to communicate the results of risk assessments to the public
		4.5.2	The necessary administrative capacity is available at national and/or appropriate sub-national level to communicate internally the results of risk assessments, including scenarios lessons learnt, etc.
		4.5.3	The results of risk assessments are integrated in a risk communication strategy
4.6	**Methodology:** A methodology is developed to carry out risk assessments. Expected impacts of identified risks are assessed according to a methodology developed and risks accordingly prioritised	*4.6.1*	The national or sub-national entity developed a methodology for risk assessment
		4.6.2	The cross-border dimension of risks has been integrated in the risk assessments

		4.6.3	The risk assessment considers infrastructure in the risk assessment
4.7	**Infrastructure:** The infrastructure and appropriate information is available to carry out the risk assessment	*4.7.1*	ICT infrastructure is available to carry out risk assessments
		4.7.2	Appropriate information and data (including historical data) is available to carry out risk assessments
4.8	**Financing:** Financing includes the identification, estimation and reservation of funds required to carry out and update risk assessments	*4.8.1*	The appropriate financial capacity is available to carry out and update work on risk assessments
5.1	Early warning systems are in place for all major hazards, with outreach to communities	*5.1.1*	**Early warning system**: Hazard detection, monitoring and forecasting of risks in the state is ensured (monitoring of storm, earthquake, tsunami, radiation)
		5.1.2	**Dissemination:** An Early Warning Communication System for abrupt effect risks is established (EWS - notification system, SMS, mobile cell note, sirens). The system is planned upon a scale of grades of alert, standardised, comprehensive and recognisable for all. The system is continuously strengthened to the needs of users
		5.1.3	**Emergency planning:** Emergency plans are activated based upon notifications from the early warning system
		5.1.4	**Coordination:** early warning systems are set up in coordination with (international) stakeholders from technical organisations and end users