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2015 TBILISI DISASTER RECOVERY AND VULNERABILITY REDUCTION PLAN

2015

Tbilisi, Georgia

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EXECUTIVE SUMMARY

This report is commissioned by the United Nations Development Programme in Georgia, and carried out by the author, with the main beneficiary being the Government of Georgia and the Municipality of Tbilisi, with the aim of developing a recovery framework and vulnerability reduction plan in view of the recent disaster that was initiated with heavy rains causing the landslide that initiated mudflow / flash flood event that was responsible for the damage of urbanised areas in the capital.

As various countries continue to direct significant efforts to meet development goals, including women empowerment, poverty reduction and climate change adaptation, and embark on a path towards sustainable development, it becomes crucial to comprehend the multi-faceted manner in which disaster risk interacts with the development and climate change processes including the complex phenomena of weak risk governance, environmental degradation, rapid urbanization and poverty which is leading to an increase in the frequency and intensity of disaster risk thereby hindering the chances of sustainable development. Recovery, in the above context, provides an opportunity to build back better, without reintroducing disaster risk due to the reconstruction process, thereby reducing the vulnerability of the development gains to future disasters.

The current report is informed by the post disaster needs assessment report which was carried out jointly by the World Bank and the UNDP Georgia Country Office. The report provides recommendations for enhancing sectoral recovery from a disaster risk management perspective in the housing, transport and water management sectors. In addition, the report also provides recommendations for improving disaster risk management practices at the local, Tbilisi City, level. In developing the above recommendations, the report makes linkages, where applicable, to the important cross-cutting themes of gender, poverty reduction and climate change adaptation.

Throughout the recommendations, it is assumed that Tbilisi Municipality is the lead stakeholder with the responsibility for coordinating the cooperation of the various stakeholders and monitoring the progress in the implementation of the recovery framework.

1. INTRODUCTION

1.1 Background

As various countries continue to direct significant efforts to meet development goals, and embark on a path towards sustainable development, including women empowerment, poverty reduction and climate change adaptation, it becomes crucial to comprehend the multi-faceted manner in which disaster risk interacts with development and climate change processes including the complex phenomena of weak risk governance, environmental degradation, rapid urbanization and poverty, which is leading to an increase in the frequency and intensity of disaster risk thereby hindering sustainable development. Recovery, in the above context, provides an opportunity to build back better, without reintroducing disaster risk, thereby reducing the vulnerability of the development gains to future disasters.

To this end, this report was commissioned to develop a recovery and vulnerability reduction plan for the Tbilisi 2015 disaster. The current report is informed by the post disaster needs assessment report which was carried out jointly by the World Bank and the UNDP Georgia Country Office [1]. The Disaster Risk Management (DRM) terminology used in this report is explained in the Glossary in Annex 1.

1.2 Objectives

The principal objective of this study is to develop a recovery framework based on the findings and recommendations of the Tbilisi flash disaster needs assessment report [1]. To achieve the above objective, the following tasks will be carried out [2]:

a. Develop draft matrix to guide a Recovery Framework (RF) planning process;

b. Suggest prioritization criteria for the selection of the sectors for RF planning;

c. Facilitate a workshop on recovery planning to agree and define with the stakeholders central recovery vision, objectives, present the RF matrix, provide technical guidance to the sectorial teams in developing sectorial RF;

d. Prepare the final draft of the RF based on the compiled data from the workshop for circulation with the stakeholders;

e. Finalization of the report through integration of provided comments.

While carrying out the above tasks, reference will be made to the Sustainable Development Goals [3], as deemed necessary, in an effort to strengthen linkages with sustainable development.

1.3 Scope and Layout

1.3.1 Scope of Hazards

This report focuses on developing a recovery framework based on the findings and recommendations of the Tbilisi Disaster Needs Assessment report [1], which was triggered by a combination of heavy rain, landslide, mudflow and eventual flash flood. However, where applicable, account will be made of other hazards affecting Tbilisi including earthquakes.

1.3.2 Scope of Risks

The Hyogo Framework for Action (HFA) [4] and the Sendai Framework for Disaster Risk Reduction (SFDRR) [5] refer to both intensive and extensive risks. Definitions of these terms are shown in the

Glossary in Annex 1, based on the United Nations International Strategy for Disaster Reduction (UNISDR) terminology [6]:

1.3.3 Layout

The remainder of this report is divided into three main sections. Section 2 provides a brief overview of the methodology adopted in this study. In Section 3, sectorial losses and recovery activities are reviewed from a DRM perspective. Finally, Section 4 proposes cross-sectoral DRM recovery activities.

1.4 Limitations

It should be recognized that this study is being carried out based on the best available data and information on disaster risk management. Notwithstanding the above, the following limitations should be recognized:

1. There is no national strategy for disaster risk management, which recognizes the importance of recovery process pillared on the build back better principle. Indeed this is reflected in the national HFA progress reports submitted by Georgia in successive reporting periods of 2009-2011, 2011-2013 and 2013-2015.
2. The mandates for flooding risk management, including the recovery stage, is scattered between different institutions at the national and local level.
3. The shift from a culture of disaster management to one of disaster risk management is yet to take place at the national and local levels. Equally importantly it is yet to take place in the main institutions mandates with disaster risk management.

The above limitations are discussed and addressed in more detail in future sections.

2. METHODOLOGY, VISION AND MISSION

2.1 Introduction

The methodology adopted in this study is as follows:

- **Step 1:** Review the findings and recommendations of the Tbilisi Disaster Needs Assessment Report [1], for the housing, transportation, water management sector as well as the cross-cutting DRM topic.
- **Step 2:** Facilitate the workshop on recovery planning to agree and define with the stakeholders central recovery vision, objectives, present the RF matrix, and provide technical guidance to the sectorial teams in developing sectorial recovery.
- **Step 3:** Based on above discussions, review and refine prioritization criteria to the government for selection of the activities within sectors for recovery planning and vulnerability reduction. Develop the recovery framework matrix.
- **Step 4:** Prepare the final draft based on the compiled data from the workshop for circulation with the stakeholders. Incorporate stakeholders' feedback into a final report.

However, it should be recognised that a significant proportion of the workshop was dedicated to a discussion on the roles and mandates of the various agencies in DRM in general and in flood risk management in particular, with interesting and useful contributions from the Emergency Management Agency (EMA), the State Security and Crisis Management Council (SSCMC), Seismic Monitoring Centre (Ilia State University), National Environmental Agency (NEA) of the Ministry of Environment and Natural Resources Protection (MENRP) and various other relevant institutions and line ministries. This discussion helped identify challenges in DRM and flood management, and as such identify the proposed activities under the DRR topic.

2.2 Reference Documents and Guidelines

The development of the recovery planning and vulnerability reduction activities elaborated in the remainder of this report was informed by various reference documents, including some on recovery planning in neighbouring countries in Central Asia, made available by the UNDP Country and Regional offices. In particular, reference documents [7], [8], [9], [10], [11], [12], [13], [14] and [15] informed the development of the framework.

2.3 Vision Statement of the Recovery Framework

The vision guiding the recovery framework accounts for the following considerations:

1. Have a timeframe for completion, where in this regard activities are divided into two categories, namely: short to medium term ranging from 1 - 12 months and medium to long term ranging from 12 to 36 months.
2. Be harmonized with broader investment and growth. In this regard there is a need to ensure that incentives for Foreign Direct Investment (FDI) will not lead to an increase in accumulated risk. On the other hand, there is a need to ensure that resilience building measures are properly planned and designed to continue to attract FDI without placing un-necessary barriers against rapid realisation of investments. The role of the Ministry of Economy and Sustainable Development is crucial in designing a system for expediting construction permits that is both safe and efficient [16].
3. Be harmonized with broader development goals and poverty reduction strategies. In this regard it is necessary to ensure linkages with the teams and agencies who prepared the 2014 Georgian Millennium Development Goals (MDG) report [17]. Furthermore, linkages should also be strengthened with the Socio-economic Development Strategy of Georgia [18] which defined three main principles for socio

economic development of the country, namely: 1) fast and efficient economic growth driven by development of real (production) sector of the economy, 2) implementation of economic policies that facilitate inclusive economic growth, and 3) rational use of natural resources, ensuring environmental safety and sustainability and avoiding natural disasters during the process of economic development.

4. Be based on the country's and city's existing sector development plans. As such, there is a need to strengthen linkages with the development strategy and vision for the City of Tbilisi as elaborated in the Tbilisi MDG Report [19].
5. Be co-led by the agency responsible for disaster risk management and the Municipality of Tbilisi to both ensure ownership and build capacities.

This helps identify the main stakeholders in the recovery process including the Ministry of Regional Development and Infrastructure, Ministry of Economy and Sustainable Development, Ministry of Finance, EMA, SSCMC, NEA of the MENRP and Tbilisi City Hall.

Finally, further details on the methodology adopted for the development of the recovery framework (the objectives, guiding principles and selection criteria) are provided in Annex 2.

3. DISASTER RECOVERY PHASES AND IMPLEMENTATION TIMEFRAME

3.1 Introduction

This section presents the recovery interventions by sector and the timeframe within which it will be implemented. The sub sections review the collated disaster losses from a DRR perspective and provide sectorial DRR activities to be taken into consideration. Throughout the recommendations, in this Chapter and the next, it is assumed that Tbilisi Municipality is the lead stakeholder with the responsibility for coordinating the cooperation of the various stakeholders and monitoring the progress in the implementation of the recovery framework.

3.2 Housing

3.2.1 Impact of the June 2015 Tbilisi Disaster- Synopsis

Impact of the 2015 Tbilisi Disaster is summarised in Annex 3 [1], where notwithstanding the importance of the loss figures stated in the Annex 3, the following should be noted from a DRM perspective:

- There is a need to dis-aggregate the data with respect to socio-economic and gender backgrounds to assess the interaction between disaster risk, women empowerment and poverty reduction attempts, which the latter at the national level has already been reduced from 21% in 2010 to 14.8% in 2012 % [17] and the reduction of unemployment said to be at 15% nationally in 2012 [17] and 31% at Tbilisi level in 2005 [19]. This is particularly important as estimates of extreme poverty are said to vary between 10% to 45%, depending on the threshold, including 77,000 children under 1.25$ per day and 200,000 under $2.00 $USD per day [14]. Food prices, at the global level, has varied recently at both the international and regional levels, depending on wars, drought and water and energy insecurities, which in turn can increase the threshold of extreme poverty further [20].
- There is a need to dis-aggregate the disaster loss data according to gender and age to understand the impact of the disaster on the vulnerability of different groups. This is very important as the website for the online disaster database[1] and the natural hazards and risks atlas of Georgia [12] - which is the product of a cooperation effort between CENN and NEA, EMA and Seismic Monitoring Centre (Ilia State university) - quotes data on

1 Disaster database available on the CENN website tab: http://drm.cenn.org/index.php/en/community-profile

losses[2], albeit not disaggregated along socio economic and gender conditions[3]. This is a main gap in disaster risk management and loss collation practices as indicated by the recent Georgia HFA report [13]. Other statistics on the website of the Georgia Statistics Office (www.geostat.ge), obtained from NEA, also do not include dis-aggregated disaster loss data.

- There is a need to double efforts to assess the profile of the damaged housing establishments, and not only destroyed housing. This is particularly true since recent global studies show that such losses (i.e. damaged rather than fully destroyed), represent a significant and largely unreported facet of disaster impacts. Across the 12 countries considered in a recent global study, 34% of the economic cost of disasters in the housing sector was associated with such low-intensity loss reports, as well as 57% of the damage to schools, 65% of the damage to hospitals and 89% of the damage to roads [20]. In this context, damaged housing as opposed to destroyed housing should be seen as an indicator of extensive risk losses corresponding to more frequent and relatively less severe events that often go unreported. The HFA framework [4] for disaster risk reduction, and subsequent GAR reports [20], [22] and [23], highlighted the importance of losses arising from extensive risk. Furthermore, the Sendai framework for Disaster Risk Reduction (SFDRR) [5] reiterated and underlined the importance of extensive risk, highlighting it as an area where insufficient progress was achieved during the implementation of the HFA. In a country with a complex geography and geology such as Georgia, this issue becomes more important as recent studies show that in the recent past the drought cycle of Georgia has changed from 15-20 years to 6 years [14]. The changing severity and frequency of intensive and extensive risks can also be seen from the fact that in the periods 1995-2006, and 2007 to 2009, the recurrence of strong winds varied between 1 to 4, and 6-12, times per year respectively [14].

3.2.2 Sectorial DRM Considerations for Recovery of the Housing Sector

Notwithstanding the importance of the recommendations discussed in the Tbilisi Disaster Needs Assessment Report [1], there is a need to develop a resilience building program for the housing sector in general, consisting of the following steps:

- **Activity 1:** Prioritisation of risk in the housing sector (corresponding to various types of natural hazards) based on a qualitative assessment of housing vulnerability, accounting for the economic, social, physical, natural and institutional factors contributing to vulnerability. In doing so, the variation in vulnerability along socio-economic and gender lines must be accounted for.
- **Activity 2:** Identification of rehabilitation options for high risk housing and assessment of feasibility of rehabilitation (feasibility assessment in terms of financial, market and technical aspects). In this sense, the mandates for DRM within Georgia, and the City of Tbilisi, should be reviewed to ensure they specifically call for a housing strategy to reduce disaster risk.
- **Activity 3:** Identification of financial needs and gaps for the rehabilitation of the housing sector. In this regard, it should be recognized that the success of any DRM strategy for reducing risks in households is dependent on the following elements:
    - **Ownership:** households and families must be convinced on the importance of such initiatives. This can only be secured if both intensive and extensive risks are accounted for in the rehabilitation schemes. In other words, families suffering from certain extensive risks on a yearly basis (e.g. storms or floods) cannot be convinced to ***only*** invest in a hazard that may or may not come within the next 50 years. Furthermore ownership can only be guaranteed by strengthening risk reduction efforts to poverty reduction efforts as families who are facing challenges in securing their daily needs (food, health, education, etc) cannot be convinced in investing in DRR while ignoring their daily needs. This is also true for women led households in poor urban areas.

2 For example, Section 1.1 introduction, p.11 quoting NEA states that between 1995 and 2011 the total amount of damage, as a result of geological and hydro–meteorological natural hazards, amounted to 2,338.5 million GEL.

3 In this study the term socio economic is meant to include categories of sex, age, ability, income, education level attained, poverty and ethnicity, and as such it encompasses gender considerations

- **Financial Needs:** Linking DRR initiatives to poverty reduction and accounting for both intensive and extensive risks requires major investments. The financial needs for such investments should be first assessed in order to be able to identify the financial gaps at the national, local or sectoral levels. In this regard, it should be recognized that disaster risk reduction is capital intensive but cost effective especially when targeting the lowest quintile in terms of income and vulnerable households [23].
- **Sources of Finance:** governments have different options for providing incentives to the private sector (including households) for investing in DRR and for identifying sources from the public sector for such an investment. Such investments should be linked to climate change and sustainable development initiatives in order to avoid duplication, ensure that the efforts of the latter are truly sustainable by accounting for DRR and tap into available funds for CCA and sustainable development [3].

- **Activity 4:** Develop a multi-year implementation plan for the housing sector, together with identification of sources of funding and incentives for the private sector to invest in resilience building measures. Implementation of DRR plans require capacity building, institutional building, legislative reforms, investments and in some cases technology transfer and vocational training. As such this can only be achieved through a long term planning process based on a multi-year implementation plan. The advantages of adopting such a process are several including the ability to account for the fact that certain buildings will automatically be decommissioned and that the annual budget decreases (as a percentage to the national or sectoral budgets). Indeed this is recognized by the EU and the OECD who now asks countries joining the EU to develop multi-year plans for implementing DRR strategies within some sectors including the education sector.
- **Activity 5:** The above should be linked to current attempts to reduce poverty and improve living conditions of the population as part of the attempts to achieve the MDGs and the envisaged SDGs.

3.3 Transport Sector

3.3.1 Impact of the June 2015 Tbilisi Disaster - Synopsis

The impact of the 2015 Tbilisi disasters on the transport sector is summarised in Annex 4 [1], where monetary values are assigned to both damages and losses. Notwithstanding the importance of the explanations provided in Annex 4, the following should be noted from a DRM disaster loss collation and analysis perspective:

- There is a need to dis-aggregate the loss data with the livelihoods of different groups within the city, including women led households in poor urban areas, in order to assess the interaction between disaster risk and poverty reduction attempts, where poverty has already decreased from 21% in 2010 to 14.8% in 2012 [17] and the reduction of unemployment said to be at 15% nationally in 2012 [17] and 31% at Tbilisi level in 2005 [19].
- There is a need to dis-aggregate the loss data according to gender and age considerations to understand the impact of the disaster on the vulnerability of different groups.
- There is a need to double efforts to strengthen linkages and efforts to understand the interaction of losses to livelihoods with families living in destroyed or damaged housing due to the current or earlier disasters, and not only destroyed housing, including for women led households in poor urban areas.
- There is a need to review the mandates for disaster loss collation to ensure that it reflects carrying out the above activities. This requires the collaboration of several ministries and agencies including the EMA responsible for DRM work in the country, NEA who provides information on hazards, the Ministry of Agriculture who is able to assess the effect of road damages on the agriculture sector (where 52% of people are employed, 83% of whom are self-employed [13]), and the Ministry of Regional Development and Infrastructure responsible for the development and maintenance of roads who is able to provide monetary values for road damages and for transport network recovery according to build–back-better principles. It should be recognized that estimated the impact of road damages on the agriculture sector is particularly important in view of the number of self employed in the sector coupled with the fact that

the most vulnerable to poverty are rural families in remote areas, and families in poor urban areas, headed by women. In this regard, by addressing this issue, it becomes possible to address women empowerment, food security, rural development, poverty reduction and disaster risk reduction efforts simultaneously. However, this can only be achieved by the concerted efforts of all relevant stakeholders.

- It should be recognized that the disaster losses as reported by the annual reports of the Georgia Statistics office do not include any data on damages to roads and the transportation network [21].
- The atlas of natural hazards and risks of Georgia available online [12] provides disaster losses due to floods, however these are not dis-aggregated per sector.
- In Tbilisi 86 m of roads were considered to be exposed to high flood hazards [12]. However, as stated in the previous section, roads exposed to medium or even low flood hazards may have a large vulnerability to this hazard and as such cannot be ruled out from the flood risk assessment.
- In Tbilisi, the atlas of natural hazards and risks found that 0 km of roads are exposed to mudflow hazard and 177m of roads are exposed to landslide hazards [12]. However the Atlas did not consider the possibility of a combined event as indeed happened during the rain-landslide-mudflow-flood event of June 2015, where the mudflow was considered to play a significant part in the ensuing damages.
- It should be recognized that in the 1968 Kura flooding in Tbilisi which occurred on April 18-19 with a peak discharge of 2,450 m^3/s is said to have been caused by intensive snow melt combined with heavy rain [12]. This is particularly important since flood hazard and risk maps should therefore be reviewed in view of climate change and its effect on the intensity of the rain and snow and its seasonality which directly impacts on the timing of snow melting.

3.3.2 Sectorial DRM Considerations for Recovery of the Transportation Sector

Notwithstanding the importance of the recommendations discussed in the Tbilisi Disaster Needs Assessment Report [1], there is a need to develop a resilience building program for the transportation sector in general, both at the city and national level, consisting of the following steps:

- **Activity 1:** Prioritisation of risk in the transportation sector (against various types of natural hazards) based on a qualitative assessment of the vulnerability of the transportation sector assets, that includes at least the following steps:
  - a hazard assessment of the transportation sector assets corresponding to various hazards and combination of hazards, leading to hazards intensity area maps.
  - An exposure assessment of the transportation sector assets, related economic sectors supply chains and corresponding livelihoods.
  - A vulnerability assessment of the transportation sector assets, related economic sectors supply chains and corresponding livelihoods.
  - In carrying out the above sub-activities, due consideration should be given to gender considerations in its broadest sense (i.e. the variation in exposure and vulnerability of the livelihood of households with sex, ability, age group and social and economic backgrounds).
  - In carrying out the above, there is a need to ensure that the necessary efforts are being directed at strengthening existing and building new linkages with the ***national strategy for socio-economic development*** [18], the ***Policy of Regional Development*** (which promotes a decentralised governance system) being developed by the Ministry of Regional Development and Infrastructure and the ***National Spatial Development Plan*** and the ***Spatial Planning and Construction Code*** currently under development by the Ministry of Economy and Sustainable Development [16].

- **Activity 2:** Identification of relocation options for high risk transportation assets and rehabilitation options for medium and low risk assets.
- **Activity 3:** Assessment of the feasibility of the various rehabilitation options (feasibility assessment in terms of financial, market and technical aspects). In this regard, it should be recognized that the assessment of benefits arising from various rehabilitation options should account for the following:
    - Direct and indirect damages to economic sectors and livelihoods that will be avoided.
    - Human fatalities that will be avoided.
    - Human injuries that will be avoided.
    - Reduction in inequality (and corresponding improvement in the Inequality adjusted Human Development Index IHDI, as developed by the UNDP). This is particularly relevant as international statistics from various disaster loss databases show that exposure, vulnerability and disaster losses are disproportionately concentrated among the poorest within societies [20] and [22], including women led households in poor urban areas and remote rural areas.
    - Maintaining existing and attracting new Foreign Direct Investments (FDI) as a result of showing that the country provides a safe environment for investments both domestic and foreign. This is particular true as recent disasters have shown that once capital leaves in the wake of a disaster it rarely returns and cities and countries rarely regain their national, regional or international role in the globalised supply chain economics, as indeed evidenced by the Kobe earthquake in 1995 [23].
- **Activity 4:** Identification of financial needs and gaps for the rehabilitation of the transportation stock.
- **Activity 5:** Develop a multi-year implementation plan for the transportation sector, together with identification of sources of funding and incentives for the private sector to invest in resilience building measures. In this regard, it should be recognized, as per the Global Sustainable Development Report [24], that if and when public debt is used as a source of funding development, then this development must be sustainable to ensure that future generations who will repay the debt will be benefiting from the development services once their sustainability is ensured.
- **Activity 6:** The above should be linked to current attempts to reduce poverty and improve living conditions of the population as part of the attempts to achieve the MDGs and the envisaged SDGs as elaborated in the 2020 socio-economic development strategy for Georgia [18].
- **Activity 7:** Finally all the above should form part of a sectorial effort to build resilience in the transportation sector as a Critical National Infrastructure sector, with criticality scales for different assets within the sector. This criticality scale must account for the impact of losses on livelihoods especially in view of the fact that the transportation sector can have a direct impact on agriculture, which employs 53% of the population 83% of which are self employed.

3.4 Water Management Sector

3.4.1 Impact of the June 2015 Tbilisi Disaster– Synopsis

The impact of the 2015 Tbilisi Flash Flooding Disaster on the water management sector is summarised in Annex 5 [1]. Notwithstanding the importance of the figures and explanations within the original post disaster needs assessment report [1], the following should be noted from a DRM perspective:

- There is a need to review disaster loss collation and analysis mandates in the water management sector to ensure 1) linkages with sustainable development are being captured, 2) linkages with poverty reduction and gender equality are being captured, 3) effectiveness of water management plans are captured.
- There is a need to dis-aggregate the damages in terms of houses and/or sectors that may have been affected by deterioration in the quality of the services (e.g. due to wastewater leaking into water sources) in addition

to any households and business that suffered interruption of services if any. Any such households and business should be disaggregated according to the broad gender considerations referred to in earlier sections.

- The National Office of Statistics in Georgia does not include loss data related to the water and waste water networks.
- The atlas of natural hazards and risks of Georgia [12] did review the exposure of lifelines to hazards. In this regard, the lifelines which were considered included oil and gas pipelines. However, the vulnerability assessment considered the combined electricity and water network to arrive at a lifeline vulnerability index. However the sewage network was not considered due to the lack of access to digital data.

3.4.2 Sectorial DRM Considerations for Recovery of the Water Management Sector

Notwithstanding the importance of the recommendations discussed in the Tbilisi Disaster Needs Assessment Report [1], there is a need to develop a resilience building program for the water management sector in general, both at the city and national level, consisting of the following steps:

- A resilience building program for the water network following similar lines as described for the transportation network and relying on the concepts of resistance, reliability, redundancy and response and recovery. As discussed earlier, this will be achieved by:
  - **Step 1:** hazard, vulnerability and risk assessment, leading to risk prioritisation.
  - **Step 2:** identification of options for strengthening the network, while accounting for both weather related and geophysical hazards.
  - **Step 3:** assessment of feasibility of the various strengthening schemes, where as mentioned earlier the use of cost benefit analysis may be used to rationalise the process provided it accounts for both direct and indirect losses and recognizes the value of saving human lives and reducing injuries.
  - **Step 4:** identification of needs and gaps for building resilience within the water sector.
  - **Step 5:** Development of an implementation plan, based on a multiyear program and including an identification of sources of funding. Again, public debt may be used as one source provided the ensuing developments are sustainable to ensure fairness to future generations who may have to repay this debt [24].
  - **Step 6:** Link to poverty reduction, gender equality and climate change aspects including any available models and simulations on the expected changes in intensity and frequency of storms and associated rainfall volume and period.
- The resilience building program or the water management sector must develop its own criticality scale to assess the criticality of various network sections and assets on water drainage and usage purposes. Such a scale must account for the following considerations:
  - The criticality rate must be used for rating the critical infrastructure identified earlier according to its value of "criticality" and the impact of its loss. This categorisation is usually done using a "Criticality Scale" to be developed by each country, which assigns categories for different degrees of severity of impact.
  - For example, a criticality scale of 1 to 5 may be adopted where Category 5 (CAT 5) indicates infrastructure which would have the most severe impact when it is disrupted; CAT 0 indicates infrastructure whose loss would be minimal when considered in the national / city-based context.
  - Not everything within a national / city-based critical infrastructure sector (such as the water management sector) is "critical". Within the water management sector there are certain "critical"

elements of infrastructure, the loss or compromise of which would have a major detrimental impact on the availability or integrity of essential services, leading to severe economic or social consequences or to loss of life. These "critical" assets make up Georgia's (or Tbilisi's) Critical National Water Management Infrastructure (CNWMI) and are referred to individually as "infrastructure assets". Infrastructure assets may be physical (e.g. sites, installations, pieces of equipment) or logical (e.g. information networks, systems).

- The Criticality Scale must account for five impact dimensions:
  - Impact on delivery or interruption of services;
  - Economic impact, including efforts for sustainable development
  - Livelihood impact
  - Impact on life
  - Impact on the environment
- The criticality designation would then reflect the highest criticality category reached in either of the impact dimensions
- It should be recognized that adopting such an approach would ensure integrated efforts between disaster risk reduction, poverty reduction, gender equality, environmental protection, sustainable development and climate change. This would be a novel addition to traditional efforts for criticality assessment that do not account for impacts on livelihoods, sustainable development or indeed the environment.

4. ENHANCING DRM INSTITUTIONAL AND LEGISLATIVE ARRANGEMENTS AS A CROSS-CUTTING ISSUE WITHIN RECOVERY PLANNING AND VULNERABILITY REDUCTION

4.1 Introduction

Among the outcomes learnt, from a review of the Yokohama Strategy for a Safer World that had been adopted in 1994 was that, a country that have integrated disaster risk reduction in its legislative and institutional frameworks have a greater ability to cope with the risk of disasters [4]. The problems brought on by the Flash Flooding Disasters[4], warrant proper coordination of community development plans and policies, with an integrated approach to flood damage mitigation and coordination of activities and programmes to protect the community concerned.

Currently in Georgia, as in many countries worldwide, there are different laws directly or indirectly related to DRM. These have been reviewed recently by the DRR capacity assessment study [14]. More importantly, the laws with direct relevance to flood management are summarised and discussed in Annex 6 where it can be seen that there are different components from each law that need to be extracted to fulfil certain duties. Clear cut responsibilities between the parties involved in flood risk management may be difficult to perceive as there may be an overlap of provisions. However, it should be recognized that because flood risk management duties are scattered in separate legislation, it is not possible to definitively include or exclude any rights or duties. There may be provisions from different laws that complement each other, but when a crisis happens, and there is a need for a prompt recovery to be initiated there may not be sufficient time or linkages to ensure this complementarity.

As mentioned earlier, countries that were successful in managing risks and apply disaster risk reduction measures are those countries that have made the effort, amongst others, to develop a legislative framework with disaster risk management as a national priority [20].

4.2 Recommendations for Revision of flood risk Management within Georgia (Short Term)

The scattered mandates for flood risk management and water management among the different laws in Georgia, outlined above, have also been recognized by various studies and papers (e.g. [25], [26] and [27]), where the relevant laws are said to vary from 15 to 17. However; the government of Georgia, partly as a result of joining the EU Association Agreement is reviewing its water management and flood risk management laws. In particular the European Floods Directive 2007, and corresponding updates, requires member countries to have policies, plans and programs that manage and coordinate flood risks.

Notwithstanding the importance of the above, there is a need to choose between two options for flood risk management, one which keeps the flood risk management responsibilities in different legislation and a second which unifies all legislation in a single document. It should be recognised that a single unified legislation will have the following advantages:

- The revised laws can more clearly and distinctly state the responsibility of the different operating authorities, and the different sources of flooding.
- The revised law will more easily avoid making flood risk management powers permissible but rather **impose a duty** on authorities to carry out their flood risk management duties.

4 The Flash Flooding Disaster was initiated with heavy rains causing the landslide that initiated mudflow / flash flood event that was mostly responsible for damaging the urbanised area in the capital . Hence the term Flash Flood Disaster (or FFD) will be used in this document to mean the multi hazard even as explained in this footnote.

- A single unifying legislation would be able to fulfil and address the sources of flooding, defining the duties of each operating authority, and facilitating flood risk management.
- A single unifying legislation may enable the local government to better coordinate and lead flood management effort. However, in this regard, even if flood management roles remain in different legislations, there is a need to review and strengthen the role of local governments in flood risk management.
- Finally in the recovery process after the disaster, legislation relating to welfare, housing, education and provision of other public amenities need to be available complementing the recovery and rehabilitation process. Accordingly, a flexible legal structure is needed in a modern community to keep up with the socio-economic and technological advancements.

4.3 Institutional Strengthening related to Flood Risk Management (Short Term)

Institutional challenges related to flood risk management include seven aspects of governance that may be analysed to provide a simple and brief gap analysis. Table 1 below provides an overview of the classification of the institutional challenges, the definitions of each and their potential impact on flood risk management. These must be addressed as part of the assessment on flood risk management practices, once the relevant legislations have been reviewed and finalised and the duties and responsibilities delineated within the different agencies or single agency.

Table 1 *Institutional Gaps and Effects related to flood risk management*

Institutional Gap Type	Definition	Potential Effect on Flood Disaster Risk Management
People Gap	Disconnects in the mission and function of organization(s) that arise when key positions remain unoccupied or employed by staff with mismatching capabilities.	Inconsistent and non-uniform workload on staff; little to no innovation, old flood risk management practices repeat; ad-hoc approach towards entry level hiring takes over systematic approach.
Process Gap	Inefficiencies in the functioning and decision-making of the organization that arise from the way staff engage with the hierarchy largely in a top-down manner at peer level and with stakeholders.	Centralization of powers; uncertainty of time and priority; new flood risk management ideas do not propagate; staff disengage from primary activity; accountability and disaster risk governance is weak; poor transparency of the decision making processes and functions related to flood risk management; lack of established processes results in elite capture of processes.
Technology Gap	Existing processes, practices, methods, and tools do not integrate technological systems and tools.	Delays in performance which is critical to reducing vulnerabilities for organizations engaged in flood risk management, overburdened field officers; solutions employed do not raise scalability, visibility and efficiency
Resources and Funding Gap	Funding shortages reduce performance of institution.	Lowered quality of output due to inadequate funds. Lowered motivation of engineers and geologists due to inadequate facilities; poor quality solutions lead to poor maintenance and increase in vulnerability to flood risk.
Support System Gap	Inadequate setup to help the department in supplementary (non-core) functions, long-term strategic projects and capacity building.	Quality of technical solutions suffers due to inadequate research, little to no training to build capacity of existing staff, culture of seeking conducting research & development does not exist
Ecosystem Gap	Lack of vision and lack of ownership of overall goals of organization by staff and stakeholders.	Community is either neutral or negative to perceived performance of Department; ***Department's role reduced from protecting the community from floods to protecting the structures from floods and protecting miscreants in the community***
Coordination Gap	Methods to engage with partner organizations are either weak or missing.	Lack of effective long-term solutions; institutional development will be incomplete without partnerships and collaboration with all relevant stakeholders.

4.4 Review of Mandates related to the Recovery Stage within the DRM Cycle (Short to Medium Term)

In additional to the legislative and institutional review on flood risk management, the following additional reviews of mandates related to the recovery stage within the DRM cycle are required to improve flood risk management practices:

- Review mandates for the development and implementation of national, local and sectoral recovery plans. In this context, it is important to recognize that post-disaster recovery is not clearly defined and addressed in current legislation [13]. Even though, at the institutional level, the Natural Disaster Prevention and Rapid Response Unit established in 2014 under the Ministry of Regional Development and Infrastructure MRDI is mandated to integrate disaster prevention, early warning, response and **post-disaster recovery** in infrastructure planning and development [14]. However, as mentioned earlier this is not sufficiently translated into clear roles and responsibilities within legislation. Furthermore, this does not address the multi-disciplinary and multi stakeholder nature of the recovery process from planning through to implementation. Finally, Georgia's statement under the HFA Strategic Goal Area 3 related to response and recovery does not explicitly refer to recovery planning [13].
- Review mandates on data collation and data sharing of information (disaster losses, hazard and vulnerability maps, etc) related to DRM in general and during the recovery stage in particular. In this regard, it should be recognised that Georgia's national progress report on the implementation of the HFA for the reporting period 2013-2015 acknowledged the lack of gender dis-aggregated data on vulnerabilities and losses [13]. However, the report did not highlight this as an area where future effort should be directed under its proposed recommendations corresponding to HFA Priority for Action 2 [13].
- Review mandates for auditing the successful implementation of recovery plans. This should allow an analysis of the effectiveness of the reconstruction process in terms of building back better and allow decision makers to draw evidence-based conclusions (i.e. determine whether the reconstruction process lead to a reduction in the recurrence of losses due to similar hazards with similar or more severe intensities). This is particularly important since several ministries have contingency plans and associated budgets, which include provisions for recovery; however, in many cases, the legislation leaves room for interpretation on what is considered to be recovery [13]. Furthermore, many recovery activities are not based on 'building back better' in view of the lack of a unified post disaster needs assessment practice [13]. Indeed flaws in the reconstruction processes can be seen in the recent post-storm renovation of house roofs in the Kakheti region where a joint needs assessment was carried out [28] and [13]. Another example is the weak integration of recovery planning into the regional development plan for Kakheti region (financed by the World Bank), which did not sufficiently engage regional and municipal authorities [13] and [14]. Furthermore, one of the worst cited cases of ineffective rehabilitation or recovery policy is the situation of the people affected by environmental/ technological accidents (potential IDPs or eco-migrants). Currently the Ministry of IDPs from Occupied Territories of Georgia, Refugees and Accommodation (MRA) has registered 37,000 families who have been affected by the aforementioned mentioned types of disasters (150,000 people) [13].

4.5 Strengthening of Institutional Setup of DRM systems at the Local Tbilisi Level and Establishment of a Tbilisi DRM Platform for Mainstreaming DRM (Medium to Long Term)

DRM efforts at the Tbilisi level, including a DRM platform at the local Tbilisi level, are related to DRM efforts at the national level for several reasons including the fact that certain tasks may need to be carried out nationally while other tasks require cooperation with non-local actors and stakeholders. For these reasons, the national institutions with mandates on DRM, as identified in [13] and [14] were reviewed and discussed in Annex 7, to inform the discussion and recommendations for strengthening the local level

DRM Systems. Notwithstanding the important institutional capacities present in the above institutions, at the national level, there is a need to carry out the following activities in order to improve the institutional setup for the DRM relevant institutions at the local level:

- Clarify which agency is responsible for overlooking all matters related to DRM, including a review of the overlaps between the EMA, SSCMC and NCMC at the national level and a review between the above national institutions and the City Hall Tbilisi level institutions.
- Propose institutional strengthening for EMA all stages of the DRM cycle, particularly those related to assisting and cooperating with local authorities to carry out their DRM duties.
- Propose institutional strengthening for City Hall of Tbilisi in all stages of the DRM cycle.
- Propose institutional strengthening for NEA in all stages of the DRM cycle relevant to its competencies, particularly those related to assisting and cooperating with local authorities to carry out their DRM duties.
- Setup a Tbilisi DRM cross-sectoral platform with a specific agenda and specific activities that form a priority for various institutions and institutional strategies in order to ensure ownership from various institutions. Examples include linkages to poverty reduction strategies, agricultural food security strategies, women empowerment strategies and climate change adaptation strategies amongst others. On the other hand setting up a platform or a think tank with no practical or tangible agenda of activities is more often than not non-sustainable as it fails to ensure ownership of the various institutions [15].

4.6 Develop resilience building programs for critical national infrastructure (Medium to Long Term)

Develop resilience building programs for critical national infrastructure against a variety of hazards including flooding and FFD. Such programs will build resilience (within the sectors under considerations including the water management and the transportation sector) based on the provision of the five main components of resilience, namely: redundancy, reliability, resistance, response and ***recovery***. Furthermore, the development of sectorial resilience programs will ensure that recovery efforts directly link into sectorial resilience building efforts.

4.7 Disaster loss collation and analysis capacities (Medium to Long Term)

In view of the lack of dis-aggregated data on disaster losses along socio economic and gender considerations, it becomes difficult to integrate DRM practices into poverty reduction, climate change adaptation, sustainable development and women empowerment in general. This lack of dis-aggregated data referred to earlier in the report has been recognized by various reviews on DRM practices in the country [13] and [14]. Furthermore, the lack of dis-aggregated loss data also manifests itself in the absence of online available data on damages at various sectorial levels (e.g. the water and waste water networks, flood drainage systems) and well as the lack of dis-aggregated data on housing (where the atlas of natural hazards and risks of Georgia [12] divided buildings into residential, non-residential and other). There is a need to address this situation by carrying out the following activities:

- Review current practices in disaster loss collation to ensure that all sectors are included in the disaster loss collation exercise. The review should also include mandates for disaster loss collation and analysis, dis-aggregated according to fatalities, injuries, economic losses, environmental losses and loss of livelihoods all dis-aggregated according gender and socio economic considerations. In this context it should be recognized that this is part of the proposed mandatory indicators at the global level for the SFDRR [5].
- Review current databases for disaster losses to identify the most suitable location for a central disaster loss data depository and develop new or strengthen existing disaster loss generation and sharing mechanisms at the local level. In this regard, different agencies and relevant institutions are expected to collate their sectorial data and provide monetary values for damages and for building back better.

- Develop new forms for disaster loss collation capable of capturing the variation of disaster losses with gender and socio-economic considerations in order to improve linkages with poverty reduction, women empowerment, climate change and socio-economic development strategies.
- Carry out sample analysis of extensive and intensive losses, as elaborated in various international guidelines [20] and [22]. This will allow for an understanding of disaster risk losses in Tbilisi (and Georgia) in terms of fatalities, economic losses and effect on livelihoods for both extensive and intensive risk.

4.8 Early Warning Systems (Short to Medium and Medium to Long Term)

Early warning is referred to in different strategies and programs including the United Georgia without Poverty Strategy (2010), the Basic Data and Directions Programme, the National Environment Action Programme of Georgia (2012), amongst others. Furthermore, various institutions are mandated with different early warning tasks.

In view of the lack of an effective and functioning early warning system in the country, it is legitimate to question the ability and effectiveness of translating DRM strategies into reality and in fulfilling the DRM mandates of various institutions, as indeed flagged by the recent progress report on the implementation of the HFA [13]. Notwithstanding the above, there is a need to carry out activities to assess the presence of the following inter-related four elements necessary for an effective people-centred early warning system [29]:

- **Risk Knowledge**: Assessments of risk require systematic collection and analysis of data and should consider the dynamic nature of hazards and vulnerabilities that arise from disaster risk drivers such as poverty, urbanization, rural land-use change, environmental degradation and climate change. Risk assessments and maps help prioritise early warning system needs and guide preparations for disaster prevention and responses. Risk assessments must account for the multi-hazard disastrous events as indeed occurred during the heavy rain-landslide-mudflow-flooding disaster in June 2015 in Tbilisi.
- **Monitoring and Warning Service**: There must be a sound scientific basis for predicting hazards and a reliable forecasting and warning system that operates 24 hours a day. Warning services for different hazards should be coordinated where possible ***to gain the benefit of shared institutional, procedural and communication networks***.
- **Dissemination and Communication**: Warnings must reach those at risk. Clear messages containing simple, useful information are critical to enable proper responses that will help safeguard lives and livelihoods. Regional, national and community level communication systems must be pre-identified and appropriate authoritative voices established. The use of multiple communication channels is necessary to ensure as many people as possible are warned, to avoid failure of any one channel, and to reinforce the warning message. This is particularly important for a country like Georgia with more than 80% of its territories being mountainous, and where some remote regions have a very high exposure category [12].
- **Response Capability**: It is essential that communities understand their risks; respect the warning service and know how to react. Education and preparedness programmes play a key role. It is also essential that disaster management plans are in place, well practiced and tested.

4.9 Knowledge transfer and capacity building related to disaster risk management (Medium to Long Term)

Knowledge transfer and capacity building related to disaster risk management is critical for the success of risk management efforts. However, it should be recognized that capacity building efforts must be sustainable and be relevant to the country and city context under consideration. As such, they are most effective when they are tied to developing national, sectoral and local strategies and then implementing

them. Such capacity building programs must form part of a national / local capacity building strategy required in order to implement national and local strategies and policies. Notwithstanding the above, it is recommended to carry out the following capacity building activities.

- Review mandates to identify any gaps in the development and implementation of national, sectoral and local capacity building strategies for flood and disaster risk management in general. In this context review the efforts for the development of the National Plan of Action for Capacity Development in Disaster Risk Reduction, as referred to in the DRR capacity assessment carried out by CADRI [14]. The remainder of these activities will highlight some of the capacity needs for effective flood risk management which were perhaps not sufficiently elaborated in the above DRR capacity assessment study [14].
- **SFDRR Priority for Action (PoA) 1**: Strengthen capacity for assessing extensive and intensive risk and collating and analysing extensive and intensive disaster risk losses, including emerging health risks due to climate change. In this regard it should be recognised that the SFDRR stresses the importance of assessing the social, economic and institutional factors that contribute to vulnerability and risk in addition to the more traditional physical and natural factors. As such, there is a need to enhance capacities in carrying out and linking qualitative and quantitative risk assessments. Furthermore, the SFDRR stresses the importance of analysing and linking extensive and intensive risk assessments. Hence, there is also a need to train EMA and Tbilisi city hall in the collation of various line ministries to determine monetary values for sectorial losses. Finally, there is a need to build capacity for all in the development and analysis of disaster loss data dis-aggregated along gender and socio-economic considerations.
- **SFDRR PoA 2**: Enhance capacities for improving risk governance arrangements at the national, local and sectoral institutions including mainstreaming DRM in mandates, policies and strategies. Furthermore there is a need to strengthen capacities for identifying costs, timeframes, sources of funding (in the public and private sectors) and progress indicators for DRM policies. In addition there is a need to enhance capacities for improving accountability for disaster risk creation and transfer. Finally, there is a need to enhance capacities for developing operational mechanisms for a local, city-based cross-sectoral platform capable of truly linking DRM, development, women empowerment and climate change challenges and activities.
- **SFDRR PoA 3**: Strengthen capacities for developing long term resilience building programs at the sectoral level and creating linkages with reconstruction process based on building back better principles. Strengthen capacities for carrying out cost benefit analysis to be used in flood and disaster risk management decision making processes for all relevant stakeholders.
- **SFDRR PoA 4**: strengthen capacities for coordination and follow up of the response and recovery process to ensure it is based on build back better principles.

ANNEX I

RECOVERY FRAMEWORK MATRIX

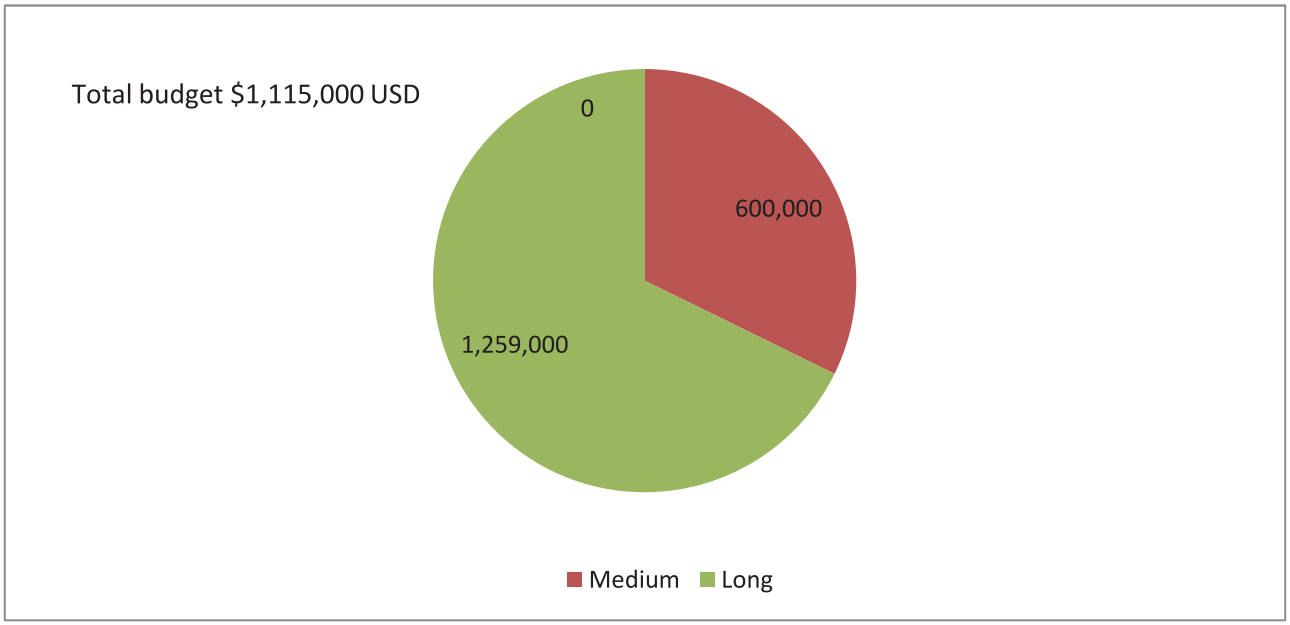
SHORT TO MEDIUM TIMEFRAME									
Sector	Objectives	Intervention	Activities	Gov lead	Imp. agency	Partners	Budget	Budget available	Timing
WATER MANAGEMENT SECTOR	Implementation of Flood hazard risk reduction measures	Strengthening capacity for disaster risk assessment in water management sector at local level	1.Identification of responsible staff for disaster risk reduction in water management sector at Tbilisi city hall services to conduct risk assessment and identification of reduction measures; 2. Hire consultant to develop methodology and guidelines for risk assessment in water management sector;	Tbilisi City Hall	Tbilisi CityHall	NEA, GEOSTAT, NAPR, GWP	$25000		2016
		Risk prioritisation and ensuing reduction	2. Detailed multi-hazard assessment of the water management sector	Tbilisi City Hall/GWP	NEA, Ilia State University, Institute of Geophysics, MRDI, GWP	NEA, Institute of Geophysics, MRDI, GWP, UNDP	$50000	16600	2016
		DRR mainstreaming into integrated water management policies and strategies	1. review mandates on land use planning and water management 2. review and refine mandates for mainstreaming DRR into land use planning and water management 3. identify challenges in capacities, funding and implementation	Tbilisi City Hal	Tbilisi City Hall - relevant services responsible for water management sector		$50000		2016
TOTAL SECTOR							$125000		
TRANSPORT SECTOR	Reducing disaster risks in transport sector	Strengthening disaster risk reduction capacities in transportation sector	1.Identification of responsible staff for disaster risk reduction in transport sector at Tbilisi city hall services to conduct risk assessment and identification of reduction measures; 2. Hire consultant to develop methodology and guidelines for risk assessment in transport sector;	Tbilisi City hall	Tbilisi CityHall		$50000		2016
		Risk prioritisation and ensuing reduction	Detailed multi-hazard assessment of the housing sector	Tbilisi City hall	Tbilisi City hall - responsible for transport sector, NEA, Ilia State University, Institute of Geophysics	UNDP	$70000		2016
		Mainstreaming DRR into transport sector	1. Review mandates on the development of transport strategies 2. review mandates on mainstreaming DRR into the transport sector 3. Identify challenges in capacities, resources and implementation	Tbilisi City hall	Tbilisi City Hall		$5,000		2016
	Resilient Development of Transport sector	Improved planning for resilience building of transport sector	1. Review legislation on resilience building for the transport sector; 2. Propose ammendments to legislation	Tbilisi City hall	Tbilisi City Hall		$10000		2016
TOTAL SECTOR							$135000		
HOUSING SECTOR	Reduce multi-hazard risks to families and minimize effects on livelihoods and poverty	Technical Assistance to strengthen capacities for risk assessment in housing sector at Tbilisi municipality level	1.Identify responsible staff for disaster risk reduction in housing sector at Tbilisi municipality to conduct risk assessment and identification of reduction measures; 2. Hire consultant to develop a methodology and guidelines for risk assessment in housing sector;	Tbilisi city hall	Tbilisi City hall		$25000		2016
		Risk prioritisation and ensuing reduction	Detailed multi-hazard assessment of the housing sector	Tbilis city hall	NEA, Ilia State University/ Seismic Monitoring Center, Institute of Geophysics, GEOSTAT, NAPR	NEA, Ilia State University/Seismic Monitoring Center, Institute of Geophysics, GEOSTAT, NAPR, Forensics Beurau	$150000	16600	2016
	Risk-sensitive development plannning in housing sector	DRR technical assistance on legislative and institutional systems related to DRR	1. Review mandates on the development of housing strategies 2. Review mandates on mainstreaming DRR into housing strategies 3. Identify challenges in capacities, funding and implementation	bilisi City Hall	Tbilisi City Hall	Ministry of Economy and Sustainable Development	$5,000		2016
TOTAL SECTOR							$180000		

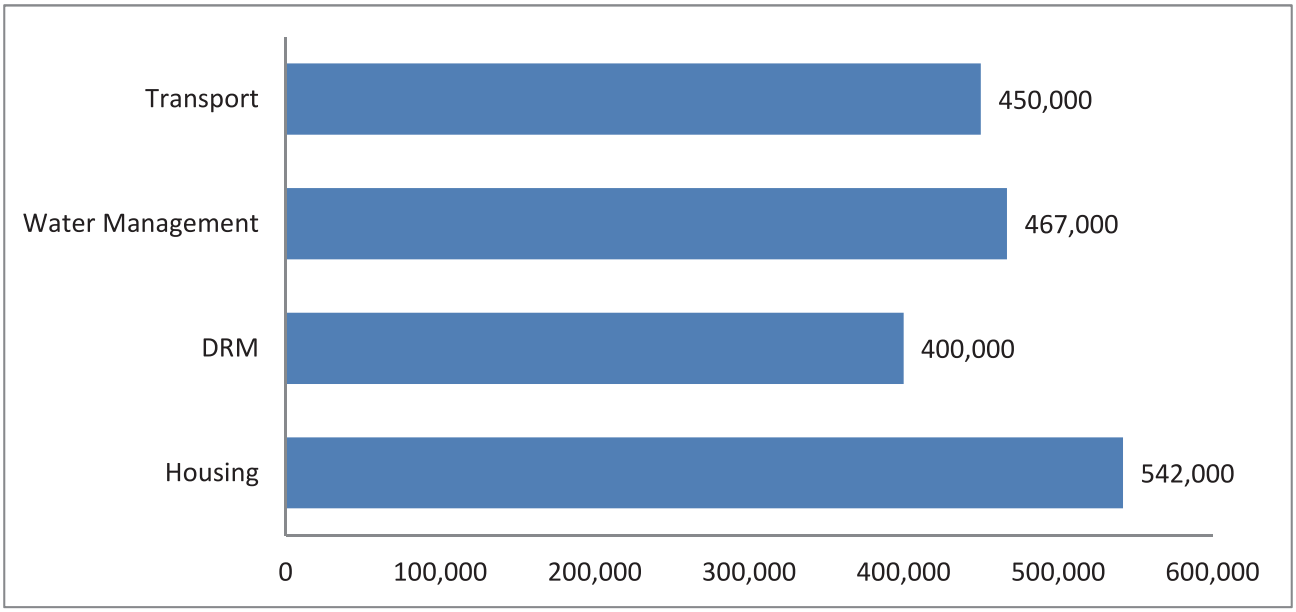
SHORT TO MEDIUM TIMEFRAME									
Sector	Objectives	Intervention	Activities	Gov lead	Imp. agency	Partners	Budget	Budget available	Timing
DRM SECTOR	Strengthen risk governance on local level	Improve DRR cross sectorial coordination efforts on local level	1. Review mandates for DRR cross sectoral coordination for recovery on local level 2. review mandates on data sharing of information (losses, maps, etc) related to DRR in general and during the recovery stage 3. Review mandates for the development of national, local and sectoral recovery plans	Tbilisi City hall	Tbilisi City hall		$10,000		2016
		Disaster loss collation and analysis	1. Review legislation on a.) data sharing, b.) disaster loss collation, and c.) estimation of economic losses 2. Propose modification to legislation along above three axes 3. Develop mechanisms for regular updating of hazards and vulnerabilities	SSCMC	SSCMC, NEA, EMA	EMA, NEA, GEOSTAT,	$10000		2016
		Improve govrenance for disaster recovery	1. Review legislation on recovery 2. Propose strengthening of legislation to ensure recovery is based on build back better prnciples	?? National stakeholders should identify			$10,000		2016
	Improve Multi-hazard Early warning systems	Improve Institutional and legal set up for MHEWS	1. review legislation on existing early warning systems 2. review current initiatives on early warning systems 3. Assess early warning systems in terms of the four main necessary components: a.risk knowledge, b. monitoring and warning, c. dissemination and communication, and d. response capacity 5. Develop recommendations for National Protocol for MHWES 4. strenghten the four components of the system where necessary	SSCMC, NEA, EMA	SSCMC, NEA, EMA	UNDP	$40000		2015
		Improve capacities for risk knowledge	1. Assess and identify needs for capacities in mutli-hazard mapping of Tbilisi;	NEA, Ilia University, Institute of Geophysics, EMA	NEA, Ilia University, Institute of Geophysics, EMA	International partners	$30000		2016
		Improve capacities for monitoring and warning	1. Identify technical needs for MHEWS monitoring and warning;	NEA, Ilia University,	Ministry of Finance		$30000		2016
		Improve capacities for dissemination and communication	1. Identify clear mandates and responsibilities during early warning; 2. Development of user-friendly communication channels onlocal and community levels	EMA, NEA, Tbilisi city hall			$30000		2016
TOTAL SECTOR							**$160000**		
TOTAL Short to Medium Term							**$600,000**		

MEDIUM TO LONG TERM TIMEFRAME									
Sector	Objectives	Intervention	Activities	Gov lead	Imp. agency	Partners	Budget	Budget available	Timing
WATER MANAGEMENT SECTOR	Implementation of Flood hazard risk reduction measures	Strengthening capacity for disaster risk assessment in water management sector at local level	1. Conduct trainings for relevant staff from the city hall for collecting, analysing, and updating the required data; 2. Training for relevant staff in risk assessment (including floodplain zoning) and prioritization of risk reduction measures	Tbilisi City Hall	Tbilisi CityHall	NEA, GEOSTAT, NAPR, GWP	$15000		
		Disaster loss colaltion and analysis	Hire consultants to support and provide guidance to relevant staff from the City hall in the following: 1. Review available historical loss databases (public agencies and newspapers) 2. Collate all data in one database, review and refine data- (assess advantages of using DisInventar, among others) 3. Carry out intensive / extensive disaster risk loss analysis 4. Develop new forms for disaster loss collation 5. Provide online version of data base so relevant institutions can a.) input their sectoral losses, and b.) have access to data	Tbilisi City Hall	Tbilisi City Hall	NEA, EMA, Ministry of Justice (National Agency of Public Registry-NAPR), National Statistics Office	$50000		
		Risk prioritisation and ensuing reduction	1. Develop Criticality scale criteria 2. Detailed multi-hazard assessment of the water management sector 3. Vulnerability assesment of the water management sector 4. Risk assessment of water management sector 5. Prioritisation of risk in water management sector 6. Identification of risk reduction measures in water management sector; 7. Estimate cost for implementing risk reduction measures 8. identify sources of funding 9. based on above determine reasonable implementation period (in years) and develop a multi year implementation plan	Tbilisi City Hall/ GWP	NEA, Ilia State University, Institute of Geophysics, MRDI, GWP	NEA, Institute of Geophysics, MRDI, GWP, UNDP	$270000		
	Resilient development of water management sector	DRR mainstreaming into integrated water management policies and strategies	1. Link water management development planning to flood risk reduction measures 2.Based on ISO standards, or other international standards, develop and adopt a set of indicator for monitoring progress of resilience building program, 3 link to regional development efforts	Tbilisi City Hall	Tbilisi City Hall - service responsible for water management sector		$7000		
TOTAL SECTOR							**$342000**		

MEDIUM TO LONG TERM TIMEFRAME									
Sector	Objectives	Intervention	Activities	Gov lead	Imp. agency	Partners	Budget	Budget available	Timing
TRANSPORT SECTOR	Reducing disaster risks in transport sector	Strengthening disaster risk reduction capacities in transportation sector	1. Conduct trainings for relevant staff from the city hall for collecting, analysing, and updating the required data; 2. Training for relevant staff in risk assessment (including floodplain zoning) and prioritization of risk reduction measures	Tbilisi City Hall	Tbilisi CityHall	NEA, GEOSTAT, NAPR	$15000		2016-2017
		Disaster loss colaltion and analysis	Hire consultants to support and provide guidance to relevant staff from the City hall in the following: 1. Review available historical loss databases (public agencies and newspapers) 2. Collate all data in one database, review and refine data- (assess advantages of using DisInventar, among others) 3. Carry out intensive / extensive disaster risk loss analysis 4. Develop new forms for disaster loss collation	Tbilisi City hall	Tbilisi City hall - responsible for transport sector		$10000		2016-2017
		Risk prioritisation and ensuing reduction	1. Develop Criticality scale criteria 2. Detailed multi-hazard assessment of the transport sector 3. Vulnerability assesment of the transport sector 4. Risk assessment of transport sector 5. Prioritisation of risk in transport sector 6. Identification of risk reduction measures in transport sector; 7. Estimate cost for implementing risk reduction measures 8. identify sources of funding 9. based on above determine reasonable implementation period (in years) and develop a multi year implementation plan	Tbilisi City hall	Tbilisi City hall - responsible for transport sector, NEA, Ilia State University, Institute of Geophysics		$260000		2016-2018
	Resilient Development of Transport sector	Improved planning for resilience building of transport sector	1. Adopt legislation chages on resilience building of transport sector; 2. Link transport development planning to multi-hazard risk reduction measures 3. Based on ISO standards, or other international standards, develop and adopt a set of indicator for monitoring progress of resilience building program, 4. link to regional development efforts	Tbilisi City Hall	Tbilisi City Hall		$10000		2018
		Development of recovery plans for transport sector	1. identify challenges in capacities, resources and implementation and build capacities on recovery planning 2. Develop pre-disaster recovery plan for transport sector	Tbilisi City Hall	Tbilisi city hall		$20000		2016-2017
TOTAL SECTOR							**$315000**		

MEDIUM TO LONG TERM TIMEFRAME									
Sector	Objectives	Intervention	Activities	Gov lead	Imp. agency	Partners	Budget	Budget available	Timing
HOUSING SECTOR	Reduce multi-hazard risks to families and minimize effects on livelihoods and poverty	Technical Assistance to strengthen capacities for risk assessment in housing sector at Tbilisi municipality level	1. Conduct trainings for relevant staff from the city hall for collecting, analysing, and updating the required data; 2. Training for relevant staff in risk assessment (including floodplain zoning) and prioritization of risk reduction measures	Tbilisi City Hall	Tbilisi city hall		$15000		2017
		Disaster loss collation and analysis	Consultancy services to support in: 1. Reviewing available historical loss databases (public agencies and newspapers) 2. Collating all data in one database, review and refine data- (assess advantages of using DisInventar, among others) 3. Carry out intensive / extensive disaster risk loss analysis 4. Develop new forms for disaster loss collation 5. Provide online version of data base so relevant institutions can a.) input their sectoral losses, and b.) have access to data	Tbilisi City Hall	Tbilisi city hall	EMA, NEA, GEOSTAT,	$25000		2016-2018
		Risk prioritisation and ensuing reduction	1. Develop Criticality scale criteria 2. Detailed multi-hazard assessment of the housing sector 3. Vulnerability assesment of the housing sector 4. Risk assessment of housing sector 5. Prioritisation of risk in housing sector 6. Identification of risk reduction measures in housing sector; 7. Estimate cost for implementing risk reduction measures 9. identify sources of funding 10. based on above determine reasonable implementation period (in years) and develop a multi year implementation plan				$260000		2016-2018
	Risk-sensitive development plannning in housing sector	Design comprehensive permanent housing solutions	Develop an action plan for alternative use of very high/high risk areas;	Tbilisi City Hall	Tbilisi city hall		$7000		2018
			Develop a comprehensive resettlement plan for very high / high risk areas;	Tbilisi City Hall	Tbilisi city hall		$20000		2018
			1. Adopt legislation chages on resilience building of housing sector; 2. Link transport development planning to multi-hazard risk reduction measures 3. Based on ISO standards, or other international standards, develop and adopt a set of indicator for monitoring progress of resilience building program; 4. Link to povery reduction efforts	Tbilisi City Hall	Tbilisi city hall		$15000		2018
		Development of recovery plans for housing sector	1. identify challenges in capacities, resources and implementation and build capacities for recovery 2. Develop a pre-disaster Housing Recovery plan				$20000		2018
TOTAL Sector							**$362000**		
DRM SECTOR	Strengthen risk governance on local level	Improve DRR cross sectorial coordination efforts on local level	1. Develop cross sectoral DRR platform at the Tbilisi Level, with operating procedures, tasks, legislation and training	Tbilisi City Hall	Tbilisi city hall	National DRR stakeholders	$60000		
		Improve govrenance for disaster recovery	1. Adopt legislation changes on recovery 2. Within proposed legislation link to sectoral resilience building programs	Tbilisi City Hall	all relevant line ministries, Tbilisi Cross sectoral DRR platform		$20000		
	Improve Multi-hazard Early warning systems	Improve capacities for risk knowledge	1. Conduct trainings for strengthening knowledge and skills in multi-hazard mapping; 2. Identify resource mobilization strategy for strengthening the capacities; 3. Improve technical capacities and knowledge in mutli-hazard mapping	Tbilisi Cross sectoral DRR platform	NEA, Ilia University	DRR Stakeholders	$30000		
		Improve capacities for monitoring and warning	Set up fully functional multi hazard monitoring/ observation system for Tbilisi	Tbilisi Cross sectoral DRR platform	NEA, Ilia University	DRR Stakeholders	$100000		
		Improve capacities for response and preparedness	1. Increase technical capacities of response agencies 2. Identify funding requirements for regular simulation exercises and drills for critical infrastructure on Tbilisi level	EMA	EMA, 112, Tbilisi Cross sectoral DRR platform		$30000		
TOTAL SECTOR							**$240000**		
TOTAL Medium to Long Term							**659000?**		


Total budget $1,115,000 USD
0
600,000
1,259,000
Medium
Long


Transport
450,000
Water Management
467,000
DRM
400,000
Housing
542,000
0
100,000
200,000
300,000
400,000
500,000
600,000

ANNEX 2

GLOSSARY

Extensive Risk: The widespread risk associated with the exposure of dispersed populations to repeated or persistent hazard conditions of low or moderate intensity, often of a highly localized nature, which can lead to debilitating cumulative disaster impacts. Extensive risk takes a special importance in the development process because it is usually a characteristic of rural areas and urban margins where communities are exposed to, and vulnerable to, recurring highly localised floods, landslides, storms or drought. Extensive risk is often associated with poverty, weak risk governance, unchecked / rapid urbanisation and environment degradation.

Intensive Risk: The risk associated with the exposure of large concentrations of people and economic activities to intense hazard events, which can lead to potentially catastrophic disaster impacts involving high mortality and asset loss. Intensive risk is mainly a characteristic of large cities or densely populated areas that are not only exposed to intense hazards such as strong earthquakes, active volcanoes, heavy floods, tsunamis or major storms but also have high levels of vulnerability to these hazards.

The thresholds that separate extensive and intensive risk are shown in Table 1. Under these criteria, any hazardous event that includes 30 or more people killed ***or*** 600 or more houses destroyed is considered corresponding to an intensive risk.

Table 2 *Extensive versus Intensive Disaster Loss Threshold*

Threshold Type	Threshold Limit
Mortality threshold	30 people killed
Houses Destroyed Threshold	600 houses destroyed

Building code: A set of ordinances or regulations and associated standards intended to control aspects of the design, construction, materials, alteration and occupancy of structures that are necessary to ensure human safety and welfare, including resistance to collapse and damage.

Capacity Development: The process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals, including through improvement of knowledge, skills, systems, and institutions.

Corrective Disaster Risk Management: Management activities that address and seek to correct or reduce disaster risks which are already present.

Disaster Risk Management: The systematic process of using administrative directives, organizations and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster.

Disaster Risk Reduction: The concept and practice of reducing disaster risk through systematic efforts to analyze and manage the casual factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Exposure: People, property, systems, or other elements present in hazard zones that are thereby subject to potential losses.

Prospective Disaster Risk Management: Management activities that address and seek to avoid the development of new or increased disaster risks.

Recovery: The restoration, and improvement where appropriate, of facilities, livelihoods and living conditions of disaster affected communities, including efforts to reduce disaster risk factors.

Resilience: 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 basic structures and functions.

Risk Transfer: The process of formally or informally shifting the financial consequences of particular risks from one party to another whereby a household, community, enterprise or state authority will obtain resources from the other party after a disaster occurs, in exchange for ongoing or compensatory social or financial benefits provided to that other party.

Vulnerability: The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

ANNEX 3

FURTHER METHODOLOGICAL DETAILS OF THE RECOVERY FRAMEWORK

Objectives of the Recovery Framework

The main objectives of the recovery framework are as follows:

- To support the social and economic recovery of all affected communities through programmes to improve water management, repair of housing, restoration of transportation services, as well as improving the cross-cutting DRM performance. In this regard, where applicable, linkages should be made to programs for reducing social vulnerability of households [17] and [19] and programs for mitigating damages arising from the 2002 earthquake in Tbilisi and improving earthquake resilience in general [19]. In doing so, the variation of vulnerability along socio economic lines and gender considerations should be accounted for.
- To enhance national and local government capacities to plan, implement and monitor recovery programmes in a manner that reduces risks to future disasters. In this regard, this should be linked to sectorial resilience building programs at the city level and to the third pillar of the socio-economic development strategy of Georgia [18]. Furthermore, there is a need to strengthen linkages to the ***Policy of Regional Development*** (which promotes a decentralised governance system) being developed by the Ministry of Regional Development and Infrastructure and the ***National Spatial Development Plan*** and the ***Spatial Planning and Construction Code*** currently under development by the Ministry of Economy and Sustainable Development [16].
- To design effective policies, strategies, programmes and monitoring support needed for full recovery. In this context, there is a need to ensure sustainability and ownership of these strategies and programs, as a first step through reviewing and strengthening institutional arrangements for DRM in general and flooding recovery in particular, as will be elaborated further in Section 4 of this report.

Guiding Principles of the Recovery Framework

The main guiding principles of the recovery framework are as follows:

- The reconstruction of lives, livelihoods, housing and infrastructure must be based on the principle of Build Back Better, while accounting for the variation in capacities, needs and vulnerabilities along socio-economic and gender considerations.
- The recovery and reconstruction process must build resilience against all hazards affecting Tbilisi, intensive and extensive, geophysical and hydro-meteorological.
- The vulnerability reduction process must account for the social, economic, institutional, natural and physical factors contributing to vulnerability. In doing so, both extensive and intensive disaster risk must be accounted for especially in view of the fact that extensive risk affects poorer communities in urban areas which in turn increases the economic factors that contribute to disaster vulnerability (corresponding to both intensive and extensive risk). In particular, the variation of extensive risk along socio economic and gender considerations must be accounted for.
- The sectoral recovery topics and activities must form part of sectoral resilience building programs in order to ensure that improvements are sustainable and that the capacities for resilience building are being improved for the line ministries, and corresponding municipality administrative units, under consideration.

Prioritisation Criteria for the Selection of Recovery Activities

All proposed activities satisfying the above guiding principles are considered a priority for implementation. There order of implementation however should take into account the following:

- Institutional arrangements are in place in order to ensure ownership and sustainability of efforts.
- Reduction in the vulnerability of the weakest quintile of households, livelihoods and infrastructure.
- Linkages can be made with sectorial resilience building programs.

ANNEX 4

COSTS AND DAMAGES IN THE HOUSING SECTOR

A Flash flooding Disaster (FFD) usually results in one or more of three impacts: (1) damage of loss of building contents (e.g., bedding, furnishings, tools, electronics), (2) damage to a building itself, or (3) destruction of a building, where if a house is deemed more than 50 percent damaged, it is classified as fully destroyed [10]. The impact of the 2015 Tbilisi Flash Flooding Disaster on the housing sector is summarised in Table 4 [1].

Table 3 *Summary of Cost of Destroyed Houses and Goods within*

Areas	Destroyed Houses and Land Plots (M) GEL	Household Goods (M) GEL	Losses (M) GEL
Svanidze Street **(17 families)**	14.5[1]	0.39	1.82[2]
Tskneti Ravine **(39 families)**		0.60	
Chikovani Street **(10 families)**		0.11	
Akhaldaba **(1 family)**		0.23	
Upper Tskneti		0.27	
Total **(67 families)**	14.5	1.6	1.82
Total **Damages (M) GEL**	16.1		

In total 67 families lost their houses. According to the assessment, properties that include dwellings, land plots and households goods of 67 families were totally destroyed. At the time the report was written, figures for damages to the partially damaged houses were not available, thus the number of total damages to the housing sector may be higher once the assessment is finished [1].

5 This figure only includes destroyed houses from Svanidze Street, Tskneti Ravine, Chikovani Street. Akhaldaba only had one destroyed house and Upper Tskneti did not have any.

6 This number is based off the total sum of goods and the cost of temporary shelter

ANNEX 5

COSTS AND DAMAGES IN THE TRANSPORTATION SECTOR

The most significant impact of flooding on the transport sector usually arises from the removal of road surfaces and ballast (and similar damage to railroads), bridge abutments and spans. This damage comes from the force of the water as well as from erosion by water of foundations, underpinnings and footings. The force of the water usually defines the scale of damage [10]. In this context, damages refer to the physical damages to the transport infrastructure caused by the disaster, while the losses constitute increases in vehicular operating costs which have been incurred by users and sub-sector companies as a result of the unavailability of transport assets that were totally or partially affected and unusable during the period in which they will not be in service [1]. The impact of the 2015 Tbilisi Flash Flooding Disaster on the transportation sector is summarised in Table 5 [1].

Table 4 *Summary of Cost of Damages and Losses of the Transportation Sector*

	Area	Damages (GEL) M	Damages (USD)	Losses (GEL) M	Losses (USD) M
1	Chabua Amirejibi New Road	17	7.6	Loss information has not been disaggregated per area.	
2	Bagebi Tskneti road connection	2	0.9		
3	Tbilisi roads affected by floods	8	3.6		
4	Tskvneti - Akhabada Road	4	1.8		
5	Vere River course works	1	0.44		
6	Vehicles	1.2	0.5		
TOTAL		**33.2**	**14.8**	**6.6**	**2.9**

According to the Tbilisi Disaster Assessment Report [1], throughout the affected areas, the damages to the transport infrastructure assets have been caused mainly by:

- Erosion, wash out and flood debris, caused by fast flowing flood water and debris.
- Landslides - Localized slope failures.

ANNEX 6

COSTS AND DAMAGES IN THE WATER MANAGEMENT SECTOR

In terms of water supply, the Flash Flood Disaster (FFD) may lead to several adverse effects including to: contaminate water sources and supplies, damage or destruction of water treatment and delivery infrastructure, reduce water quality and introduce contaminants to otherwise safe water supplies and limit access to safe water supplies. In terms of sanitation, flooding may lead to several adverse effects including to: destroy sanitation facilities and waste treatment facilities, limit access to toilets and waste management facilities, increase discharge of raw or partially treated sewage into the environment, increase soil contamination from contaminated sediment and increase health hazards by contributing to poor sanitation [10]. The impact of the 2015 Tbilisi Flash Flooding Disaster on the water management sector is summarised in Table 6 [1].

Table 5 *Summary of Damages to the Water Management Sector*

Items	Damage (M GEL)	M USD
Sewage infrastructure and pipes (around 6000m)	2.2	1.01
Water supply infrastructure and pipes (around 2400m)	0.5	0.23
Total	2.7	1.2

ANNEX 7

DISCUSSION ON FLOOD MANAGEMENT LAWS

The laws which are relevant to flood management are listed and discussed below:

- **Law on Protecting the Population and Territory from Natural and Man-made Emergency Situations (2007)** which creates the main legal basis for disaster management in Georgia distributing the ***roles and responsibilities of various ministries during emergencies*** [14].
- **The Civil Safety Law (2014)** which predominantly addresses civil protection, defining ***functions and competencies of various state entities with preparedness, response, prevention of emergency situations*** and ***early recovery action as a part of the immediate response stage*** [14]. In this regard it should be recognized that the law does not refer to the recovery process in its broader sense of building back better, thereby creating the linkages between response and sustainable development. Furthermore, this law, which replaced the above law on protecting the population and territory, should be reviewed to ensure that all the flood risk management and risk management mandates existing in the earlier law have indeed been transferred to the new law.
- **Environmental Impact Assessment (EIA) Law** was introduced in 1996, abolished in 2003, and reintroduced recently [14]. ***EIA is required for all infrastructure development projects***. However, there are challenges in the enforcement of the EIA and in licensing the companies who are able to carry it out. Furthermore, there are challenges in effectively incorporating DRR considerations into the EIA process. In turn this raises the issue of the need for the development of implementation decrees or acts for the various laws under consideration to ensure their prompt and effective implementation and enforcement.
- **Law on Protected Areas** regulates environmental management, as it ensures the protection and restoration of natural ecosystems and landscapes of Georgia. Article 1 Paragraph "e" defines the goal for the ***protection of territories located in erosion, mudflow, (flash) flooding, avalanche and landslide risk zones***. Article 20 refers to the ***management of disaster risks within the protected areas*** through temporary regulation for disaster and emergency management [14]. However, there is a need to strengthen and formalise linkages with laws regulating the environmental management of urban and/or rural areas adjacent to protected areas and the interaction between the two.
- **The Law on Land Improvement** regulates waters and water bodies used for (agricultural) land-reclamation purposes [14].
- **Law on Wildlife** Article 10, mandates relevant government entities (not specified in the law) with the restoration of the natural habitat of wildlife, deteriorated due to natural disasters, epidemics and other causes [14].
- **The Forest Code** mandates relevant central, regional and local authorities with the restoration of forests from damages due to natural disasters, epidemics and other causes. A separate chapter is dedicated to forest maintenance which is ***targeted to increase land fertility, prevent soil degradation caused by water and wind erosion, swamping, mudflows, snow avalanches and other hazards*** [14].
- **Law on Water** defines the main principles of water policy, such as the protection and rational use of water, with regard to the demands of the present and the future. Chapter II, under the law on water, makes provisions on the ***responsibilities related to water management on national, Autonomous Republic and local governance levels including implementation of works for the recovery of bodies of water damaged by natural disasters***. Article 14 states that water protection actions are planned in accordance with the principles of sustainable development. ***Furthermore, the law requires water protection to be integrated in the following actions: local land-use plans; resettlement and development plans; infrastructural projects; sectorial plans; management plans of protected areas; and natural resource management plans*** [14].
- Law on Conservation of Soils and Reclamation and Improvement of Soil Fertility, the Law on State Control for Environmental Protection, the Law on Licenses and Permits, and the Law on Ecological Inspection provide the legal streamlining of a number of water-related aspects (as i.e. EIA) [14].
- Urban planning and construction activities in Georgia are regulated by the Law on Construction Activities; the Law on the Principles for Spatial Planning and Urban Development, law on architectural works, the Code of Product Safety and Free Movement, and other bylaws and orders.

ANNEX 8

DRM INSTUTIONS AT THE NATIONAL LEVEL – A DISCUSSION

The following institutions have a role to play in disaster risk management:

- The Ministry of Environment and Natural Resources Protection of Georgia (**MENRP**) recently established the **Natural and Technological Hazards Management Service**. This Service is in charge of the coordination and implementation oversight of environmental strategies and policies, planning of disaster risk reduction activities, setup of a database of DRR activities, and capacity development related to the Early Warning System.
- The **Disaster Prevention and Planning Division and the Standing Secretariat** of the **Expert Advisory Council** are both located under the Emergency Management Agency (**EMA**). The Disaster Prevention and Planning Division is mandated to coordinate risk reduction, prevention and preparedness activities across the country within its area of competency. The Expert-Advisory Council is mandated to develop a strategy for the implementation of the National Response Plan that would work along the 5 HFA priority for actions. The Expert-Advisory Council has three divisions in charge of (i) the prevention of the consequences of natural emergencies and the reduction of loss; (ii) the prevention of the consequences of manmade emergencies and the reduction of loss; (iii) the coordination of experts in the field of civil emergency planning within NATO and Partnership for Peace programs. ***However, it should be recognized that the work of this institution should be reviewed in view of the emerging Sendai institution (which rearranged DRM categories as 4 rather than 5)***.
- The **State Security and Crisis Management Council** (**SSCMC**), under the Prime Minister's office, is mandated to elaborate proposals on preventive and response measures against political, social, economic and ecological threats. The **Crisis Operations Centre**, under the **SSCMC**, updates the existing threat assessment that defines natural hazards as one of the risks. The Council will define the required capacities and resources to **develop a risk reduction strategy** and a **four-year strategic plan for implementation**.
- The **National Crisis Management Centre** (**NCMC**) was created within the Office of the Council. Upon occurrence of a crisis (including disasters arising from natural hazards), the National Crisis Management Centre, subordinated directly to the Prime Minister, amongst other tasks, ensures the elaboration of plans for all types of crisis situations threatening national interests; coordinates the **prevention and risk reduction** of crisis situations on governmental level; coordinates the preparation of plans for occurring crisis situations on governmental level; coordinates the activities of state agencies when a crisis situation occurs; and creates and maintains an information database. ***However, depending on the understanding and intended use of the terms prevention and risk reduction, there may be an overlap with the SSCMC and EMA relevant institutions***.
- The **National Environmental Agency** (**NEA**), under the MENRP, is mandated with monitoring ongoing hydro-meteorological, geodynamic and geological events and environmental pollution, issuing license permits for the exploitation of natural resources, and ensuring the sound functioning of monitoring systems. ***However, it should be recognized that as per risk governance best practices, the agency carrying out the monitoring process should not also be the agency auditing the "sound functioning of the monitoring process"***.
- The **Climate Change Division of MENRP** provides assessments of climate change impacts on the sectors of economy and ecosystems and prepares relevant predictions, develops the national plan for adaptation to climate change, coordinates the national communications to the UNFCCC and provides an inventory of greenhouse gas emissions (GHG).
- The **Ministry of Regional Development and Infrastructure** (**MRDI**) is in charge of the regional development policy, the introduction of water supply systems, the development of an integrated state policy on the development and design of networks of secondary and international roads. ***MRDI is in charge of municipal planning, in accordance with the State Strategy on Regional Development***. For this purpose, MRDI plans to establish technical working groups where NEA and EMD specialists will be invited to contribute to this process.

- The **Natural Disaster Prevention and Rapid Response** Unit established in 2014 under **MRDI** is mandated to integrate disaster prevention, early warning, response and ***post-disaster recovery in infrastructure planning and development***. The unit is in charge of developing proposals and projects that consider various disaster prevention issues including: the implementation of natural disaster prevention policies, methodologies and knowledge products related to infrastructure development; awareness raising and information exchange; the effective use of early warning systems for infrastructure; rapid response to disasters affecting infrastructure; ***post-disaster damage assessments of infrastructure***; the systematic review of issues related to disaster prevention and response, in collaboration with all other national and local authorities.
- The **Coastal Protection Service** of Road Department under the **MRDI** regulates engineering protection for seashores and river/reservoir banks against abrasion, floods etc., that is regulated by the Law of Georgia "On Regulation and Engineering Protection of the Seashores, Reservoirs and River Banks" (2000).
- The **Department of Spatial Planning and Construction Policy** of **MoESD** is in charge of the development, implementation, coordination, management and monitoring of spatial, urban planning and construction activities, including technical regulations and building codes.
- The **Department of Migration, Repatriation and Refugee Issues** of the **Ministry of IDPs from Occupied Territories, Refugees and Accommodation (MRA)** is mandated to develop a system for the ***management of migration caused by natural disasters*** ("eco-migration"). The entity provides monitoring of migration processes, prepares predictions, and implements resettlement processes induced by natural disaster risks. It also develops an adaptation-integration programme of eco-migrants in new settlements. ***However recent reports [13] and [14] indicated that the some of the activities did not sufficiently account for DRM and recovery considerations***.
- The **Environmental Information and Education Centre** was established in 2013 under the **Ministry of Environmental and Natural Resources Protection** with the following goals: to organise and administer an environmental information system, in cooperation with all relevant stakeholders, to: collect and share environmental information; collect and share information on ongoing and completed environmental projects; create a database and to ensure its publicity; collect statistical data related to the field of environmental protection; establish and maintain an environmental library; facilitate access to environmental information through the website and other information sources; facilitate education on the environment and sustainable development; promote public awareness within the competence of the Ministry of Environment and Natural Resources Protection.

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