REQUEST FOR PROJECT/PROGRAMME FUNDING FROM ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN G6-602
Washington, DC. 20433
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Fax: +1 (202) 522-3240/5
Email: secretariat@adaptation-fund.org

ADAPTATION FUND

DATE OF RECEIPT:
ADAPTATION FUND PROJECT ID:
(For Adaptation Fund Board Secretariat Use Only)

PROJECT/PROGRAMME PROPOSAL

PART I: PROJECT/PROGRAMME INFORMATION

PROJECT/PROGRAMME CATEGORY:	**REGULAR**
COUNTRY/IES:	**GEORGIA**
TITLE OF PROJECT/PROGRAMME:	**DEVELOPING CLIMATE RESILIENT FLOOD AND FLASH FLOOD MANAGEMENT PRACTICES TO PROTECT VULNERABLE COMMUNITIES OF GEORGIA** (PIMS 4583, ATLAS IDS – GEO10, PROPOSAL ID: 00060698; PROJECT ID: 00076540)
TYPE OF IMPLEMENTING ENTITY:	**MULTILATERAL IMPLEMENTING ENTITY (MIE)**
IMPLEMENTING ENTITY:	**UNDP**
EXECUTING ENTITY/IES:	**MINISTRY OF ENVIRONMENT THROUGH THE NATIONAL ENVIRONMENT AGENCY**
AMOUNT OF FINANCING REQUESTED:	**USD 5,316,500**

PROJECT / PROGRAMME BACKGROUND AND CONTEXT:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

1. Georgia now ranks as a lower middle-income country, but many Georgians remain affected by high levels of poverty and unemployment, despite the comprehensive reforms. Poverty is particularly entrenched in rural areas, where incidence of extreme poverty is almost twice that in urban areas. Moreover, while rural areas account for only about 9% of GDP, about half of the total population and work force are situated there. The economy has contracted since mid-2008 and is only recently showing some signs of recovery. At the same time, unemployment rates went up to 16.5% and FDI and remittances, a crucial source of income for many households, dropped dramatically. Unemployment is higher now than in 2004 and poverty remains a pressing concern. The World Bank 2008 data show 23.6% of the population living below the poverty line, and 9.3% - in extreme poverty.[1] The global economic crisis further exacerbated social and economic impacts. As such, growth projections have been revised downward to -4.0% in 2009.

2. Georgia is a transcontinental country, along the dividing lines of Asia and Europe and in the southern Caucasus, situated between the Black Sea to the west and the Caucasus mountains to the north. Georgia is a small country, with an area of 69,700 km^2 and a population of 4.4 million. 80% of the territory of Georgia is mountainous, with highest and lowest elevations of 5,201 metres (Mount Shkhara) and below the mean sea level (Black Sea, Kolkheti lowlands). 54% of its territory is located at an altitude of 1,000 m

[1] Georgia Poverty Assessment, World Bank, April 2009.

above sea level. A complex mountainous topography makes the country more prone to the hydro-geomorphological processes and climatic hazards. As such, Georgia is vulnerable to natural hazards including floods, flash floods, earthquakes, droughts, landslides, avalanches, and mud flows. Catastrophic events that have annual probability of occurrence of 50% threaten an economic loss for Georgia that exceeds 20% of the country's GDP[2]. Floods, including flash floods are the catastrophic events of such category of high probability.

3. For example, the February 1987 flood in the Tbilisi region alone affected 36,000 others and caused an economic loss of US$546 million. The same year, River Rioni in western Georgia exceeded its earlier historical maximum water discharge when peak flows reached as high as 4,850m^3/s. The size of the inundated area on the Kolkheti Lowland reached 200 km^2. The losses were severe; 150 people died. Material damages reached nearly US$700 million. The flood destroyed *inter alia* 3,150 houses and 2,150 objects of local infrastructure, 16 km railway lines, 1.300 km roads and 1.100 km power transfer lines.

4. In 1997, the flood events in the Tbilisi-Gori-Kvemo-Kartli region incurred a reported economic loss of US$29.5 million. In June 2005, the flood in the Mtskheta-Mtianeti region caused an economic loss of over US$2 million (ISDR, "Central Asia and Caucasus, Disaster Risk Initiative – Risk Assessment for Central Asia and Caucasus", 2007). During 1995-2009 the total cost of damage from floods and flash floods amounted to over US$1 billion. Annual risk of economic losses caused by potential hydro meteorological disasters reaches US$4 billion.

5. While Georgia emerges as the most vulnerable in the broader region of Eastern Europe and Central Asia for the period of 1980–2000, measured by the mortality rate among those exposed to floods, since 2004 considerable improvements in institutional landscape to manage flood risks and support timely recovery have occurred. However, much remains to be done and levels of vulnerability and exposure are still high.

Table 1: Floods for the period of 1990-2010 sorted by numbers of total affected people and economic damage costs[3]

Date Of flood occurrence	Number of affected people	Damage (000 US$)
15-April-1995	300	NE*
1-July-1995	-	2,200
1-January-1997	-	19,500
26-April-1997	300	10,000
23-May-1997	200	NE
14-July-2004	-	2,156
23 April, 2005	2,500	NE
15-April-2006	600	NE

***NE = NOT ESTIMATED**

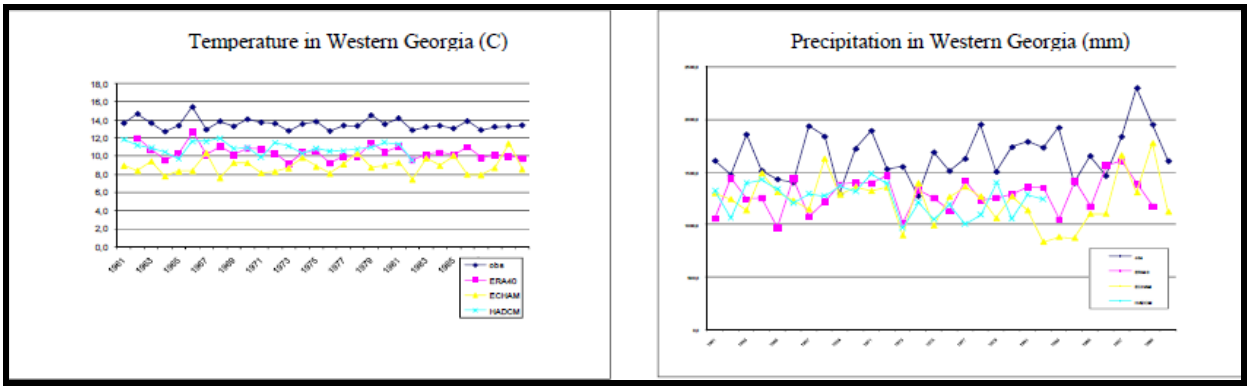
6. The urgent need for increasing flood security is also illustrated by the fact that the majority of the members of Georgian society that are vulnerable to floods are women, children and the poor. Internally Displaced People (IDPs), a large portion of who inhabit western regions of the country are among the most socially disadvantaged groups in the country. Table 1 illustrates that the number of affected people in the past decade is on the increase. This is expected to continue to exacerbate in the face of climate change.

[2] World Bank (2009) "Adapting to Climate Change in Europe and Central Asia"
[3] Source: EM-DAT, The international Disaster Database, The Centre for Research on the Epidemiology of Disasters – CRED http://www.emdat.be/result-country-profile

Historical long time series data analysis in the framework of the Second National Communication established that temperature and precipitation rates are increasing in Western Georgia, with marginal increases of 0.2-0.4 and 8-13% for each of the respective parameters. In this regard, Rioni river basin has been identified by the SNC as the most vulnerable basin susceptible to various extreme climatic events, significantly enhanced by global warming. As a result of the increased frequency and intensity of these phenomena (floods, landslides and mud torrents), land erosion has intensified and greatly damaged agriculture, forests, roads and communications. For example, more than 10,000 ha of agricultural lands fell out of use in the past decade as a result of direct impact of hydro-meteorological disasters. For the country where an average land plot size per person is a mere 0.14ha this is a significant loss. Analysis of observation data on floods for the period of 1967–1989 has demonstrated that in the second half of the analysed baseline period the recurrence of floods increased by more than two-fold, and the maximum discharge has increased by 9%.

7. Landslide hazard is serious in Georgia[4] and 10,000 potential landslide centres have been identified, of which 3,000 are active[5]. During March to April 1989, landslides killed 98 people, affected 2,500 others and incurred a reported economic loss of US$423 million. Of the three main hydrometerological hazards, on average, landslides account for 56% of damages and 47% of deaths annually (for the period 1995 to 2009). Since 1980, the number of landslides has increased by 43%, reaching a total of 117 at present. This especially steep rise in the number of landslides was provoked by the abundant snowfall in the winter in past decades. The increase in heavy precipitation for the last two decades in Kvemo Svaneti (W. Georgia) has also caused an almost two-fold growth in the frequency of mud streams. Intensity and duration of precipitation events combined with early and more accelerated snow melt, as a result of temperature alleviations, are likely to increase due to climate change. This will result in an increased frequency of major floods in many parts of the country, especially in the Rioni basin, the Western region of the country. This anticipated change is clearly expressed in the historical trend as well as long term projections illustrated by the SNC model outputs below.

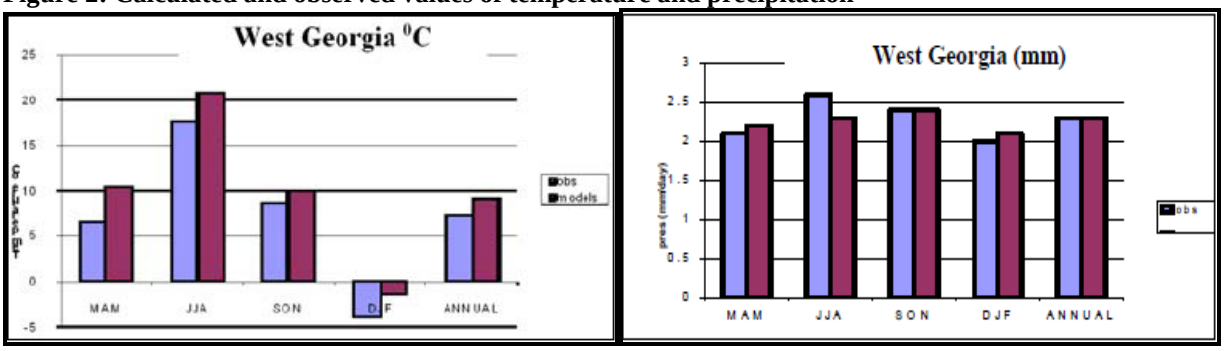
Figure 1: temperature and precipitation baseline data calculated by PRECIS model for Western Georgia



[4] 56% of Georgia is moderately to highly susceptible to landslides (George Gaprindashvili (2011). Landslide hazard assessment in Georgia, Report on the 1st project of AES Geohazards Stream Landslide)

[5] Pusch C. (2004). Preventable Losses, Saving Lives and Property through Hazard Risk Assessment, A Comprehensive Risk Management Framework for Central Europe and Central Asia, Disaster Risk Management Working paper series 9, The World Bank

Figure 2: Calculated and observed values of temperature and precipitation



8. According to the Second National Communication, precipitation patterns have changed in Georgia; rainfall becoming more and more intense and prolonged, concentrated in the short period of time. The SNC long term climate change scenarios indicate more extremes and anomalies, such as prolonged rainfall events, concentrated in a short period of time; These high intensity precipitation events have the potential to generate more runoff during these short periods, thereby increasing the potential for flash flooding (due to high peak river flows). Increased inter-seasonal variability of precipitation will have a 5-10% increase in river run-off during the spring season in the River Rioni and its tributary Tskhenistskali and thus a strong negative effect on the flood frequency and the occurrence of landslides, flash-floods and mudflows. In addition, seasonal runoff is also expected to increase due to early snowmelt. The early snowmelt is a likely consequence of the high temperatures predicted in the SNC (2-3°C by century's end), which would produce more intensive thawing processes. SNC concludes that the combined effect of intensive rainfall and early snow melt will exacerbate flood and flash flood occurrences during the transition seasons. The WEAP model employed by the SNC on Rioni River basin showed runoff increase by 11%, which is consistent with other projections on spring floods. According to the predicted changes in the Rioni River's upper reaches, runoff is predicted to increase 26% by 2050 which will be followed by a 10% decrease by 2010 (but still higher than current observations)[6]. Therefore, the current trends and future projections are strongly pointing to the Rioni River Basin of Western Georgia for immediate adaptation action to minimize the intensified flood and flash flood related risks.

Rioni River Basin – General description

9. Rioni River basin is the second largest in Georgia and the largest in Western Georgia. The 13,400km^2 river basin (20% of the land area of Georgia and 40% of Western Geirgia), originates from two sources on the southern slopes of the Main Caucasian range and runs into the Black Sea near the city of Poti. In the upper basin the river flows in narrow deep gorge with a width of 50-70 m. Here its length is 115 km with a 7.2 degree inclination. After passing through Kutaisi it flows through the wide area of Kolkheti lowland (plain), to the Port of Poti where it enters the Black Sea. The project area will cover the Rioni basin with the exception of the Rioni delta (see Annex 1).

10. Approximately 986,800 people live in the Rioni basin, distributed over 4 regions – Racha-Lechkhumi and Lower Svaneti, Imereti, Samregrelo-Zemo Svaneti, and Guria – in the following municipalities: i) Oni, Ambrolauri, Tsageri, Lentekhi located within Racha-Lechkhumi and Lower Svaneti region; ii) Tkibuli, Tskaltubo Samtredia, Terjola, Zestaponi, Sachkhere, Kharagauli, Bagdati, Vani, Chiatura and Khoni and the city of Kutaisi, in Imereti regional; iii) Abasha, Senaki, Martvili, about one third of the Khobi municipality, and the city of Poti located within Samegrelo-Zemo Svaneti region; iv) a very small

[6]This forecast was made without consideration of glacial melting. The inclusion of this variable may bring some future correction in model outputs. This factor exhibits the main element of uncertainty in current projections. However, strong deviations are unlikely as the scenarios are reinforcing current trends and are also consistent with global projections.

area of Chokhatari (Khokhnari community) and very small part of the Lanchkhuti municipalities located in Guria region and, part of the Java district located in break-away region of South Othetia. Approximately 71% of the population of the basin live in the Imreti region which is in the upper to middle part of the basin.

11. Agriculture is the main economic activity in the basin and accounts for 71% of employment. Livestock raising, hayfields and horticulture, potatoes, cereal, and wine production are important in upper basin region of Racha-Lechkumi Region. Corn, vegetables, fruit, nuts, honey production, orchards are important in the middle basin region of Imreti and cattle-raising and poultry production is done in the lower catchment region of Guria. Other economic activities include power generation, important in Racha and Imreti regions where there are hydropower dams, mining of zinc, arsenic, lead, gold, construction materials (such as gypsium, clays, limestones and peddles) and minerals (such as barites, pyrites, phosphorous, calcites, and quartzite). Trade and services are most developed in the upper basin municipalities of Ambrolauri and Tsageri where seasonal tourism related to spa resorts and historical monuments and churches is important, and in the city of Kutaisi (Georgia's second largest city) in Imerti region in the middle basin where tourism and local trade contribute significantly to the local economy. Unemployment rates range from 20% in Racha Region to greater than 75% in Imreti Region[7]. The poverty rate for the basin is approximately 40%.

12. The climate of the Rioni Basin differs in upper, middle and lower reaches. In upper reaches, the climate is moderate to humid subtropical. In high mountains, humid mountainous climate with snowy winter is common, while in the low mountains and foothills moderately cold winter and temperate hot summer dominates. In the upper basin the average annual precipitation is 2500mm. In the middle reaches the climate is also humid with moderately cold winters and hot relatively dry summers and average total annual precipitation is 1,586mm while in the downstream reaches the climate is mild humid sub-tropical, with moderately cold winters and relatively dry hot summers. Here the average total annual precipitation is 1,190 mm.

13. River Rioni and its tributaries in upstream basin flow mainly in mountainous areas and are mainly snow-melt fed. The right bank tributaries (the Lukhumi, the Tskhenistskali and the Tekhura) have their sources on the southern slope of Great Caucasus Range, while left tributaries (the Kvirila, the Dzirula and the Khanistskali) have their sources at Imereti Upland and the northern slope of the Meskheti Range. Soil profiles along these rivers are characterized by rocky and stony compounds and in mountain zones are covered by a thin layer of gravel sand and clay, while in plane zones they are gravel-sandy or gravel-clay.

14. In the Rioni river basin floods occur in the spring to summer period and are caused by rainfall, as well as snow and glacier melting. In the upper basin, the flood season begins in early April and peaks in mid-June, while in the middle reaches it begins in early March and peaks at the end of May and in the lower reaches it begins in February and peaks by early May. Floods continue to occur until the end of August and by the end of September, they intensify due to heavy rains, Even during the drier months (December-February) flash floods occur frequently due to high intensity rainfall and affects steep areas significantly. During the spring flooding (April-June) and abundant precipitation, the water level increases up to 3m (the water level in the Tskhenistskali River sometimes reaches 8m). In the upper basin, the main hydrometeorological hazards are from precipitation triggered landslides, and mudflows, in the middle and lower basin hazards are mainly from river flooding and flash flooding.

[7] Only 57% of the population of Imreti Region is employable due to the aging nature of the population. Only 10% of the employable population is engaged in formal employment although a large percentage describes their status as 'self-employed', mainly in agriculture.

15. Between 1842 and 2008, 111 incidents of flooding have been recorded in the Rioni basin with losses ranging from 200,000 to 60 Million USD and inundated area ranging from 4 to 200 km^2. The number of events per year has increased in the last decade, with 7 events occurring in 2005, 6 of which were categorised as strong. The largest number of flood events has been recorded in 6 municipalities in the last 10 years. These are Oni, Tsageri, Lentekhi, Ambrolauri, Tskaltubo, and Samtredia municipalities. The project will target these municipalities for direct climate resilient adaptation measures. The 6 municipalities and their specific vulnerabilities are discussed under Component 2.

Underlying causes of vulnerability in the Rioni River Basin:

16. The underlying causes of vulnerability to climate change in the Rioni basin can be categorised into 1) physical factors –direct manifestations of climate change, 2) factors caused by anthropogenic intervention – those related to the harmful ways in which humans have and continue to interact with the environment which has exacerbated vulnerability and 3) Institutional factors – related to the legislative/regulatory barriers placed by government and other institutions, as well as limited capacity (human and resources) to manage climate change vulnerability.

Physical factors

17. Based on the analysis of observed climate data and long term projections, Western Georgia and Rioni River basin is a priority region with urgent adaptation needs. There is a need for robust flood and flash-flood management practices that take into account long-term climate change impacts on the local hydrological regime. Due to the complex mountainous topography with the inclination of slopes that in many parts exceed 10-12 degrees, erosion, landslides and mudflows occur frequently following periods of intensive rainfall periods. Particularly in highland areas, melting of snow in conjunction with intensive rainfall causes more flood and flash flood events, often accompanied by mudflows and landslides. After a heavy snowfall in winter, a sudden rise in temperature and rainfall in the winter/spring period causes a hastening of confluence of the rain, melting snow, and consequently a flood. From the hydrological point of view, on the other hand, factors that have a decisive influence on the occurrence of flash floods - apart from the intensity and duration of the rainfall - are the topography, soil conditions, and coverage of the terrain. Disadvantageous topographical conditions such as high-exposure (steeply sloping) highland terrains, narrow valleys or ravines hasten the runoff and increase the likelihood of flash flood occurrence.

18. In the Lower Svaneti, located within the upper course of the River Tskhenistskali basin, an increase in annual precipitation by 10% and annual mean temperature by 0.6^oC has been observed in last decade compared with data for the 1955-1970 period. This process is reflected in glacier retreat, and changes in river runoff. According to topographic surveys carried out in 1953-1958, twenty small glaciers were detected in the basin of the R. Tskhenistskali, with a total area of 12.5km^2. Among them, the most significant is the Koruldashi Glacier that is currently retreating, at an average rate of 3.4m annually (based on direct observations undertaken during 1965-1990). Due to the absence of measurements since 1990, results of a cooperative survey of the Caucasus glaciers, performed by researchers from the Reading and the Moscow State Universities, have been used to assess the conditions of the glaciers of the River Tskhenistskali basin. According to the findings of the study, based on the analyses of satellite imagery of 1985-2000, it was determined that during the period in question, the mean rate of glacier retreat was equal to 8m/y, and that the area covered by glaciers decreased by 6-9%. The assessment showed that for the past half-a-century, the total area of glaciers in Kvemo Svaneti might have decreased by 25%, and their total volume reduced from 1.2km^3 to 0.8km^3. This corresponds to a stock of water equal to 700 million m^3. If these rates of glacier retreat continue, the projected increases in temperature by 2050 is likely to result in the total disappearance of glaciers in Kvemo Svaneti that will have a significant impact on the river regime of the Tskhenistskali basin (Second National Communication of Georgia, 2010).

19. With the melting of glaciers, there is a trend to increased sediment loads carried in the river. The silting of the river bed by glacial sediment reduces the river flow discharge capacity especially, during floods and, as well as the river bed gradient along the affected length all the way to the coast. In the Rioni Delta there is a trend towards an enhanced accumulation of sediments carried by glacier-fed rivers, caused by intensive enrichment of river sediment with moraine materials originated in the process of glacier retreat. A significant part (20-30%) of the lower portion of this segment is occupied by the Kolkheti National Park and other protected areas, which under the joint action of eustasy from the Black Sea and river bed silting processes, have been flooded several times and suffered serious damages. The impact of sedimentation on the river bed in this segment is very high. While the Rioni Delta is not part of the study area of this project, any measures to decrease sediment transport from melting glaciers in the upper catchment, will provide benefits to the coastline and high risk areas along the way. In addition, addressing these processes will also enhance river discharge capacity and minimize risks of river bank overtopping during flood events.

Anthropogenic Factors

20. In addition to physical factors, anthropogenic factors exacerbate the exposure of populations in Rioni basin to natural hazards, and will increase exposure under climate change. These factors, if not addressed, could limit the ability to adapt to climate change. They include:

- Increased economic activities in floodplains which further increase the hazard exposure and risk of flooding. Unsuitable landuse practices such as expansion of settlements and farming plots, encroaching the floodplain areas and even river banks has placed increasing numbers of people at risk, but has also reduced the natural storage capacity of the floodplain thus exacerbating flooding in other locations as well.

- Unsuitable agricultural practices in mountainous regions inherited from agro-technical measures widely used during Soviet times which have destroyed traditional types of sustainable agriculture such as slope terracing. These unsuitable agricultural practices cause erosion by destruction of natural swards.

- Forest cover is crucial in high mountainous regions and in conditions of complex and dissected relief. Georgian regulation state that forest logging is prohibited on slopes greater than 35 degrees[8], to conserve soil protection functions of forests. Data from the forestry department of the Ministry of Energy and Natural Resources[9] shows that 310,000m^3 to 370,000 m^3 of timber and firewood was officially harvested between 1995-2000. The same source states that 700,000 m^3 of illegal felling occurred during the same period. Approximately 300-400m^3 of timber per ha was harvested. This is excessive given that 7-8 m^3 harvesting is sustainable for Georgia. This rate of harvesting has lead to increased occurrences of floods, flash floods, erosion, landslides and mudflows.

- Riverbed mining. Improper mining for aggregates in improper locations is a problem which can affect river geomorphology and can lead to lateral and vertical migration of the riverbed, as well

[8] This is about to change to 30 degrees. While the issue is under consideration by relevant authorities, the exact time for its enforcement is not known yet

[9] As per the legal act enforced in March 2011, the authority of the Ministry of Environment Protection and Natural Resources and the Ministry of Economy and Sustainable development of Georgia, linked to the policy implementation, collaboration of corresponding normative acts and approval of sub-normative acts about natural resource management and usage was transferred to the Ministry of Energy and Natural Resources. The Natural Resources Agency, as Legal Entity of public Law was created under the Ministry of Energy and Natural resources. Consequently, Ministry of Environment Protection and Natural Resources changed into Ministry of Environment Protection.

as changes in the flow regime as the river attempts to return to hydro-geomorphological equilibrium. These changes can lead to destructive forces acting on river banks and properties in the path of the changing river. There is evidence of heavy duty mining of the river bed material in the Rioni basin, and evidence of channel lateral migration. Some of these activities are undertaken without proper planning and preliminary assessment of impact within a robust permitting regulatory framework.

- Risk from dams. There are four major dams on the Rioni River – Rioni Hydroelectric Station I, Gumati Hydroelectric Station I, Gumati Hydroelectric Station II and Vartiskhe Hydroelectric Station. There are three other HPP dams located on tributaries of the Rioni. They are Lajanuri HPP dam, Shaori HPP Dam and Tkibuli HPP dam. These dams pose a flood risk in a number of ways. Firstly, they suffer from high rates of sedimentation (e.g. Gumati reservoir has reduced from 18 Million cubic meters to 1 Million cubic meters in storage capacity, a 95% reduction, since its construction. Vartsikhe is said to have experienced a similar rate of sedimentation). The impact of this reduced storage capacity will put communities at risk as the dams provide very much reduced attenuation to large floods. In addition, the sediment prism associated with this high rate of sedimentation, has resulted in a severe decrease in the river bed slope from 1.5% to 0.9%, which has caused a decrease in flood conveyance capacity in the upstream reaches and the reduced channel depths has led to more frequent and severe river bank overtopping and flooding of property and infrastructure. The reduction in reservoir storage capacity will continue if poor land use practices that increase erosion and sedimentation continue, and will be further exacerbated by climate change as landslides and other mass sediment transport processes associated with the region increase and intensify. Georgia does currently have the Soviet era dam safety standards. However, the dam safety regulations that would impose compulsory inspections and maintenance on owners are missing. This poses a second threat to the downstream population as the toppling or breaching of dams would lead to the sudden and catastrophic release of flood waters. This risk is increased with climate change, as the increase in flood peak flows and sedimentation, both the risk of overtopping and hence toppling of the dams. There are three further dams planned for Rioni basin – Tvishi, Namakhvani and Zhoneti HPPs to be built between Lajanuri and Gumati HPPs – for which pre-feasibility studies are well advanced. Based on estimates, it is anticipated that Tvishi would have lost 92% of its storage capacity in 5 years, Namakhvani, 80% in 25 years, but Zhoneti would experience no loss of storage in the first 10 years, due to the retention of sediments by the two upstream reservoirs. In addition to increased flood risk in the upstream reaches of all reservoirs, the effects of all of these reservoirs on the lower Rioni basin will include increased entrenchment of the river channel in the downstream reaches (due to the lack of sediments in the flow), and reduced sedimentation rates at the river mouth resulting in changes in the morphology of the coastline which could lead to erosion and recession of the coastline. Sediment flow rate to the coast has already declined from pre-regulation rates of 7.59 Mt/y to 3.72 Mt/y after the regulation. The sedimentation of reservoirs is an important issue which will increase with climate change and will increase exposure and vulnerability of communities. Resolving dam sedimentation issues will benefit both the affected communities and the HPP owners as it will increase their power production capabilities and efficiency.

Figure 1: Gumati reservoir silting prism tailpiece near Zhoneti village

21. In response to the mounting climate change induced risk, exacerbated by anthropogenic factors in the Rioni basin, Georgia needs to ensure that it implements a flood risk management approach for the basin which includes avoidance, control and preparedness measures. Its land use policy needs to be robust to a range of possible climate change futures, with particular focus on flood plain development controls, incentives and regulations aimed at incorporating holistic risks on development. Support needs to target the most vulnerable groups of society, as well as local and national government institutions to undertake direct adaptation measures; those that minimizes the exposure of people, economic assets and ensures that potential damage to development likely to be affected by flooding is limited to acceptable levels. Georgia also needs to strengthen the early warning system for these events that are likely to exacerbate both in frequency and intensity as a result of climate change. However, towards achieving these normative conditions there are several barriers to be addressed:

22. *Barriers:*

- Land use decisions are over-fragmented across the various institutions at all levels that result in absence of any coherent land use policy. As a result, there are no regulations for internalizing climate change risks into land use policy nor zoning or land use planning limits and controls to manage flood risks more effectively;

- Any regulations imposing restrictions on business and infrastructure development are likely to be viewed by some at the government institutions as potential limitations to economic progress, much needed for country's poverty reduction aims;

- Observation capacities are equally low that hampers more vigorous early warning; alert levels have not been revisited for decades and hazard maps need to be updated with comprehensive forward looking hazard profiling;

- There is limited knowledge and application of the latest methods of flood management, especially bio-engineering methods that are more robust to all possible hazard evolution scenarios that might be realized in Georgia, as a result of climate change;

- Human capacities are limited at national and especially at local levels and lack decision support tools that help a better preparedness to increasing flood risks.

23. The proposed project is designed to address the above barriers and achieve climate resilience of highly exposed localities and populations to the increasing flood hazard risks.

PROJECT / PROGRAMME OBJECTIVES:

List the main objectives of the project.

24. The project **objective** is to improve resilience of highly exposed regions of Georgia to hydro-meteorological threats that are increasing in frequency and intensity as a result of climate change. The project will help the governments and the population of the target region of Rioni Basin to develop adaptive capacity and embark on climate resilient economic development. The project is comprised of three main components:

1. Floodplain development policy introduced to incentivize long term resilience to flood / flash flood risks;
2. Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly exposed communities;
3. Early warning system in place to improve preparedness and adaptive capacity of population.

PROJECT / PROGRAMME COMPONENTS AND FINANCING:

Fill in the table presenting the relationships among project components, activities, expected concrete outputs, and the corresponding budgets. If necessary, please refer to the attached instructions for a detailed description of each term.

For the case of a programme, individual components are likely to refer to specific sub-sets of stakeholders, regions and/or sectors that can be addressed through a set of well defined interventions / projects.

PROJECT COMPONENTS	EXPECTED CONCRETE OUTPUTS	EXPECTED OUTCOMES	AMOUNT (US$)
1. Floodplain development policy introduced to improve long term resilience to flood / flash flood risks	1.1. Hazard and inundation maps produced;(US$455,000) 1.2. Review and change land use regulations (land use planning, including zonings and development controls, e.g. on protection / buffer zones, settlement expansion; economic development categories etc) to internalize climate change risks into floodplain management and spatial planning. (US$76,225) 1.3. New building codes reviewed and streamlined for the housing rehabilitation schemes to flood proof new buildings (e.g. material standards, traditional house raising etc) taking into account alternative climate change scenarios; (US$31,225) 1.4. Targeted training of national and local authorities responsible for climate risk management in advanced methods of forward looking climate risk management planning and flood prevention measures;(US$61,325) 1.5. Community-based flood insurance scheme designed and implemented covering highly exposed villages under 6 municipalities.(US$46,225)	Floodplain development policies in place to minimise exposure of highly vulnerable people of Rioni river basin to climate change induced flood risks.	670,000
2. Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly exposed communities	2.1. Direct measures of long term flood prevention and risk mitigation designed with participation of local governments and population in 6 municipalities (Lentekhi, Oni, Ambrolauri, Tskaltubo, Samtredia, Tsageri);(US$926,665) 2.2. Community-based adaptation measures, such as bank terracing, vegetative buffers, bundles and tree revetments implemented building on an existing municipal employment guarantee scheme;(US$966,669) 2.3. Flood plain seasonal productive systems (e.g. short season annual cropping, cattle rearing plots or seasonal pastures, agro-forestry) benefit 200,000 people and improve resilience to flood threat;(US$976,666) 2.4. Lessons learned and best practices documented and disseminated to raise awareness of effective climate risk management options for further up-scaling; (US$30,000)	Direct investments and local actions in highly exposed and vulnerable communities improve flood management practice on 8,400km^2 and build resilience of 200,000 people	2,900,000

3. Early warning system in place to improve preparedness and adaptive capacity of population	3.1. Long term historical observation data digitised and used in policy formulation and risk management practices;(US$115,000) 3.2. Multi hazard risk assessment for the Rioni river basin (floods, flash floods, associated mudflows and landslides, linked with climatic alterations under alternative scenarios);(US$70,000) 3.3. Series of targeted training delivered for the NEA staff and partner organisations in the advanced methods of climate change risk assessment and forecasting;(US$40,000) 3.4. Essential equipment to increase monitoring and forecasting capabilities in the target basin procured and installed; (US$575,000) 3.5. Systems established at the national and sub-national level led by the NEA for long and short term flood forecasting of hydrological risks; including dissemination and communication of forecasts. (US$200,000)	Institutional Capacity developed for early warning and timely alert communication to vulnerable communities of the Rioni river basin	1,000,000
4. Project/Programme Execution cost			330,000
5. Total Project/Programme Cost			4,900,000
6. Project Cycle Management Fee charged by the Implementing Entity (if applicable)			416,500[10]
Amount of Financing Requested			5,316,500

A detailed breakdown of the budget is presented in Annex 8.

PROJECTED CALENDAR:

Indicate the dates of the following milestones for the proposed project/programme

MILESTONES	EXPECTED DATES
Start of Project/Programme Implementation	Jan, 2012
Mid-term Review (if planned)	Jan, 2014
Project/Programme Closing	Jan, 2016
Terminal Evaluation	Apr, 2016

PART II: PROJECT / PROGRAMME JUSTIFICATION

1. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate

[10] On the request of the Government of Georgia the project will be implemented by UNDP using the MIE modality. UNDP is able to provide the following implementation services through its country office, regional and headquarters networks: project identification, formulation, and appraisal; determination of execution modality and local capacity assessment of the national executing entity; briefing and de-briefing of project staff; oversight and monitoring of AF funds, including participation in project reviews; receipt, allocation and reporting to the AF Board of financial resources; thematic and technical capacity building and backstopping; support with knowledge transfer; policy advisory services; technical and quality assurance; and troubleshooting assistance to the national project staff. Further details on the types of specialized technical support services which may be provided are articulated in the table provided to the AFB Secretariat on 14 May 2010 (as annexed).

resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

25. The project aims to develop resilience of highly vulnerable communities and regions to climate related hazards, such as floods, and flash floods. Activities have been prioritised through consultation with local communities including heads of municipalities, NEA (National Environment Agency at the Ministry of Environment Protection) local staff responsible for management of the hydrometric network and national NEA and Ministry of Regional Development and Infrastructure (MRDI) staff responsible for the assessment of need (NEA) and implementation of flood protection measures in the catchment (MRDI). The project takes an integrated and comprehensive approach by addressing critical gaps in land use policy and regulatory framework, fundamental to climate resilient flood management. The project will implement the Georgian Government's priorities for effective and long term measures for flood prevention and management by direct involvement of local municipalities and populations residing in the highly exposed locations. The project will enhance the capacity of all appropriate national agencies to timely and effectively deliver early warning. A balanced combination of policy, early warning and concrete adaptation actions will support Georgia to take steps towards long term resilience of the most vulnerable communities residing in the Rioni river basin region.

Component 1: Floodplain development policy introduced to improve long term resilience to climate change induced flood / flash flood risks

26. There have been rounds of modifications in spatial planning and land use policies in Georgia. Functions have been distributed across various Ministries and compartmentalized practice of land use decision-making has resulted. The Ministry of Justice is dealing with the cadastre and land registry; Ministry of Economic Development takes decisions on land management and property rights; Ministry of Agriculture is charged to oversee soil protection and enforce sustainable land management practice; and the Ministry of Environment - responsible for overall land protection policies. This overly fragmented institutional landscape leaves many regulatory gaps, institutional overlaps, and inconsistencies in land related policy decisions. Currently the water law sets water body protection zones that prohibit a number of economic activities, mainly chemical and other heavy industrial activities. Regulations on urban development and construction permits enforce construction quality and safety standards but fully overlook the risks associated with climate hazards. There is a recently enacted law on Protection of Population and Territories against Natural and Manmade Emergency Situations (2008), which has as its main goals, the avoidance of emergency situations and their development, the mitigation of the damage and loss caused by emergency situations and the elimination the consequences of emergency situations through unified management of emergency situations, all of which are essential elements of a framework of avoidance, mitigation and management of flood hazard. However, sub-laws and regulations are still underdeveloped to ensure adequate cross-sectoral enforcements. Decisions on zoning are largely delegated at the sub-national / municipal level, but the capacities for such policy formulation are largely limited. The project will build on the existing legislative and regulatory framework and will fully mainstream the climate risk management aspects, especially in relation to most widely spread hydro-meteorological hazards. The project takes a basin-wide view of flood risk in order to understand and respond to the critical processes that lead to flooding within the basin. Flood modeling and mapping will enable this and will enable to take account of future flood risk under climate change. This will underpin the floodplain development policy that the government will formulate to achieve a basin-wide resilience to increasing flood risks resultant from climate change. More specifically, the project will help formulate a comprehensive floodplain development policy, based on peculiarities of the Rioni river basin. The development of land in flood plains has historically taken place in many areas mainly due to a natural tendency for settlers to utilize land that is near bodies of water, not with consideration of emerging risks. The current regulatory weaknesses described above and absence of any floodplain zoning policies also contributed to this progressively increasing exposure and vulnerability. As a result, the potential for

flooding is often recognized only after the occurrence of climate hazard. An underlying principle within the Flood Prone Land Policy is that every effort must be made to have minimal adverse environmental impact to the natural flooding cycles of the floodplain through the construction of flood modification measures. Floodplain management is known as an effective means of flood prevention in the face of long term anticipated impacts of climate change. Floodplain management is a process that promotes the wise use of floodplains in order to minimize flood risks by improving floodplain functions of water saturation and transmission.

Output 1.1: Hazard and inundation maps produced

27. Hazard and inundation maps are essential for the assessment of current and future hazards and the design of flood management solutions that fully accounts for climate change considerations. There is currently no definitive or accurate hazard mapping for the Rioni basin. The strategic assessment of flood risk to future development areas under conditions of climate change is a government priority to support and guide local municipalities to wisely and rationally manage risk exposure of new developments to acceptable levels. Hazard and inundation maps under conditions of climate change will be developed for the entire project area. Based on the hazard and inundation maps, AF resources will be used to enable flood buffers to be established by Government with the following zoning categories: a climate change flood zone; a designated floodway fringe; a flood plain; a designated floodway; and lastly, the body of water itself. In addition, the hazard maps will be used by national and local authorities, and communities in the development of emergency preparedness and response plans, in the establishment of different flood insurance zones (see Component 1.5 below), for raising public awareness and improving community preparedness. The visual maps will benefit decision makers and all involved in natural hazard risk management at national and local level. It will also enable government and donor agencies to better focus their efforts in dealing with hazards in the basin in the future. A key benefit of this component is the establishment of physical characteristics of the basin based on surveys. These data sets and the models built from them can be used (and updated) in the future for use in future assessments and as such, systems will be established for this purpose. Importantly the hazard maps will provide the basis for the management of climate-induced hydrometeorological hazards in the Rioni basin now and in the future.

Output 1.2: Review and enhance land use regulations (land use planning, including zonings and development controls, e.g. on protection / buffer zones, settlement expansion; economic development categories etc)to ensure comprehensive floodplain management and spatial planning.

28. Land use planning limits and control mechanisms will be established as essential elements in managing likely flood risks. Local topography and flood response capacities will be considered in developing the requirements and controls. At the same time, regulatory incentives to avoid inappropriate land use practices in the floodplain areas given concerns about the implications of climate change will be set up. This is to respond to government's aspirations to minimise the exposure of vulnerable population to mounting risks of floods and flashfloods and thereby minimise losses of assets that will accelerate with the impacts of climate change on hydrological regime. For example, the introduction of fees for construction permits that are much higher in the hazard risk zone relative to those outside of the floodplain area can send a powerful signal to local developers and give directions to construction businesses and property owners towards less risk prone locations.

29. It is also recognized by Government that land use within flood plains may involve trade-offs between completing protecting against flood risks and ensuring that development is resilient to likely climate change impacts. Therefore, policy decisions need to strike a good balance between the floodplain protection for its flood management function and supporting productive uses that serve development purposes that do not disturb the critical function that flood plains perform in reducing the risks of flood. Essentially, the strategic approach of the project is to design the flood management policy which takes

climate change considerations into account that also maximizes the net-benefits from flood plains, rather than aims solely at minimizing flood damage that might potentially enter into conflict with development oriented land-use. For example, use of flood plains for short season crops, pastures, cattle rearing or agro-forestry are among viable productive use options in the context of Georgia. These decisions however, will be made based on hazard and inundation maps that identify critical hot spots and enable adequate zoning in order to maintain the natural capability of waterways to convey flood flows. The activities under this component will need to take account of the national requirements for enhancement of landuse regulations and adhere to requirement for Rioni river basin. To ensure that landuse policy is developed in line with the national requirements, an inter-agency working group will be established to determine current land use management functionality and to determine the most appropriate elements of a comprehensive land use policy framework for Rioni basin. Given the fragmented nature of the current elements of landuse regulations and policy in Georgia, this is an essential first step to ensure that all key agencies are involved and that consultation is as wide as possible to ensure buy-in to the final policy framework. The project will develop a robust set of policies to address the existing deficiencies in the regulations.

30. The gap in regulations relating to dams and reservoir safety will also be examined with the view to strengthen dam safety and maintenance in the Rioni basin under climate change considerations in the national context. As discussed above, dams, by their very nature, create risks, which increase substantially without proper maintenance under climate change. According to the classification of the International Commission on Large Dams (ICOLD), dams of 15 metres and higher, as well as dams of 5 to 15 metres with water storage of no less than 3 million m^3, are defined as large dams. The large dams on the Rioni basin and other dams throughout Georgia (existing and planned), and their reservoirs are of great importance to the economy of Georgia. They contribute to hydropower generation and water supply. They also contribute to seasonal and long-term regulation of river flow and therefore impact on river flooding. As discussed above, reservoir sedimentation reduces flood storage and changes channel morphology in the upsteam reaches, thus exacerbating flooding. As temperature increases with climate change, a greater range of seasonal fluctuations triggers more active rock erosion process that provides greater amount of hard material for sedimentation. Importantly, if properly maintained, reservoirs could provide flood storage and alleviation functions, while at the same time, increasing the efficiency of hydropower generation and water supply. The establishment of effective national legislation and specialized organizational structures in the area of dam safety are, therefore of great importance for Georgia, especially with the view of anticipated climate change impacts on hydrological regimes. The project will develop policies for the safety and maintenance of dams in the Rioni basin and will examine the potential role of the existing and planned dams in flood alleviation. The policy will establish dam safety guidelines for Georgia in line with international best practice. This will include development of guidelines for the categorisation of dams into different risk categories, the establishment of spillway discharge capacities that will need to be provided for dams of different risk categories, the establishment of dam safety inspection intervals, guidelines on the assessment and quantification of risks associated with dams, including risk of overtopping, exposure to landslides and increased sedimentation, and the development of appropriate risk management plans for individual dams. Stemming from the long term requirements under climate change, the project will assess the current and long-term ability to operate dams in a flood alleviation role during large flood events, to ensure that sufficient flood storage is provided at the start of large events, to ensure dam safety and to provide some attenuation of the flood wave. This will require the involvement of dam owners and operators in the development and eventual implementation of the overall flood management plan for Rioni, and the development of individual operating rules for each dam during floods, which meets the dam safety requirements for the dam, and which also fits into the Rioni basin flood management plan, particularly during large flood events. This will therefore involve optimisation of the dam operations for the dual uses of power generation and flood alleviation. At the very least, the policy should ensure that dams are maintained and operated in a manner which avoids exacerbation of the flood risk, and which takes account of the increasing risks they pose due to climate change.

31. Relating to this the project will reduce slope instability and soil erosion on steep slopes which currently leads to landslides and debris flow during flood events. The measures being proposed to address this include increasing vegetative cover (through agro-forestry, vegetative bundles and trees) for slope stabilisation (Component 2). This will help rehabilitate vegetative cover in the basin, and alleviate sedimentation of dams, as less soil will be transported into reservoirs. In addition, the proposed policy development for the management of dams, will also address sedimentation in the long-term, as policy changes aimed at increasing the safety and maintenance of dams will force dam owners to address all safety issues including the sedimentation of their dams. The requirement to provide flood storage, for example, will cause dam owners to address sedimentation as this currently limits their ability to provide adequate storage and also limits their generating capacity.

32. The project will deliver not only essential set of regulations for long term climate resilience flood management but will also involve the training of national and regional authorities to integrate new land use policies into national and regional development planning. This will include the development of management tools for implementing and enforcing the new land use policies (such as compulsory flood risk assessments for individual property developments in the riskier zones within the floodplain, as part of the decision making process for granting planning permission).

33. A key result of this output is the establishment of a single and comprehensive land use policy framework for the Rioni basin that will ensure a holistic, proactive approach to managing flood risk, and returning the floodplain to functional equilibrium under conditions of climate change. Importantly, effecting change at the policy level will also ensure national implementation to other river basins. The development of the new regulatory policy will therefore be cognizant of the wider national implications and bring to bear, the full national requirements within the framework.

Output 1.3: New building codes reviewed and streamlined for the housing rehabilitation schemes to flood proof new buildings (e.g. material standards, traditional house raising etc);

34. Flood proofing of buildings to expected risks under alternative climate change scenarios will be another important floodplain policy enhancement for the Rioni basin settlements. Building codes / standards will be designed to take into account climate change risks. For example, incentives for the construction of houses on stilts (houses with elevated floor levels often seen in old traditional houses in Samegrelo and other regions of the Rioni basin) or double brick construction standards for public schools and hospitals that can withstand inundation and may also require a hose and scrub down when the flood subsides will be introduced. The codes/standards will also include guidelines on retro-fitting existing properties with flood resilient designs with appropriate adjustments to the standards of storm water drains and locations. (as is common practice in many developed countries). The main outcome will be the harmonization and enhancement of the existing building codes to address resilience to climate change induced flooding. In addition, training and support will be provided to national and local authorities to integrate new building codes and standards into national and regional development planning, including the development of management tools that will be needed for implementing and enforcing the new building codes.

Output 1.4: Targeted training of national and local authorities responsible for climate risk management in advance methods of forward looking climate risk management planning and flood prevention measures

35. There is currently a lack of the necessary expertise within government in climate risk management assessment, planning and flood prevention. Local authorities at municipal level, regional development Ministry and even Ministry of Environment lack such skills that become increasingly important for climate sensitive decision-making. The long-term implementation and continued practice of

climate resilient risk management will therefore necessitate training at the national and local level. Hence national and regional staff will be trained in advanced climate risk management planning and flood prevention measures. The project will specifically target local municipalities that are engaged in local planning and decision-making with regards to local development priorities. The staff of the Ministry of Regional Development and the Ministry of Environment will benefit from acquiring such skill-sets. All other government organizations that have institutional functions to participate in land-use related decisions will be targeted as well. It is anticipated that this component will provide invaluable and essential capability improvements which will enhance Georgia's capacity to manage climate risks nationally and into the future.

Output 1.5: Community-based flood insurance scheme designed and implemented covering highly exposed villages under 6 municipalities

36. Insurance is one of a broad scope of risk management approaches that can facilitate adaptation to climate change and support sustainable development. In particular, the insurance industry can support adaptation efforts through:

- Expertise in risk management, particularly in areas such as risk and vulnerability assessment,
- Putting a price tag on risk, and the design of risk reduction and risk transfer activities.
- Prioritising adaptation measures by enhancing adaptive capacity and advising on the cost effectiveness of resilience measures
- Incentivising loss reduction by informing economic actors about the risks they face, advising
- them on risk mitigation options and providing them with existing insurance options for loss reduction
- Developing new insurance products which cover risks affected by climate and weather events, such as floods

37. The project will design and implement climate risk transfer instruments as flood insurance. In fact, the World Bank has recently appraised feasibility of Georgia's participation in Southeastern Europe and Caucasus Catastrophic Risk Insurance Facility (SEEC CRIF)[11]. However, this global multi-country pooling scheme may leave some of the most vulnerable and poor households outside of the insurance benefits. Therefore, the proposed project will operate in a small scale niche that is unlikely to be occupied by this regional, top-down risk insurance project that will work at supra-national level. The following actions will be undertaken to set up a successful flood insurance scheme. (i) community managed water gauging stations will be established to monitor the pre-agreed threshold to trigger the payouts in case of flood incident; and (ii) the flood insurance scheme itself with related rules and conditions will be designed with participation of local communities in flood prone areas. The insurance product will be developed through the engagement of private sector, mainly insurance and micro-finance institutions and municipalities that might need to cover the part of recapitalization in case of considerable losses.

38. There are three types of risks typically associated to index insurance at the community level that the project will consider: (i) financial literacy, (ii) inadequate pricing that may lead to default and (iii) human tempering.
(i) Insurance sector is very well developed in Georgia over 90% of total population is covered by some kind of insurance product (health, property, agriculture or life insurance). Therefore, financial literacy for how insurance products work is already available. That said, as a means of further increasing awareness of how the micro index insurance against flood risks will work and to reflect local context specific

[11] The Government of Georgia is keeping this issue under consideration, but at this stage it is yet been not accepted

information, local communities will be directly involved in the process of designing the insurance scheme.
(ii) Flood insurance provided at a community level can be fully loaded by municipality in cooperation with local insurance companies operating in the fairly developed sector in Georgia.
The index insurance scheme will be organized for all target municipalities that represent various micro watersheds at the upper, mid and lower reaches of the river, as a collective facility so that the risks can be pooled to provide insurance coverage at relatively low cost. This approach of pooling is widely practiced for index insurance in order to spread the risk and avoid the needs for payouts at the same time. Any impact of possible default in insurance premium will be covered by the hedging through municipal indirect subsidy. Availability of the index insurance product will also lift the municipal budget strains for rehabilitation works after the major flood events.
(iii) Prototype index insurance contract, designed to offset the early flood-induced losses, will be underwritten against recorded water levels. This is similar to any weather index insurance using measurements at meteorological stations, but in case of flood insurance using river gauge data as a proxy for flood damage. The flood event index is calculated as the maximum 3 day moving average of daily water levels at the existing station in the target location during the flood season. Indemnities are paid when the river level index reaches the pre-established threshold that triggers the damage (based on long term historical data). This approach excludes the possibility of human tempering as the product is designed based on objective observation data.
The small scale index insurance pilot offered by the project will design the project together with all associated legal, knowledge and technical skills. Once it is rolled out, it will pave the way to its subsequently broader application and full absorption into the insurance sector. This approach of a small scale roll out minimizes all associated risks and allows for lessons learned and necessary adjustments in the product and delivery mechanism.

39. The product will be designed in a way that stimulates the adaptation behaviour towards the flood risks. For example, the insurance won't be sold to the owners of farming plots or property that are located in high risk prone areas, thus prompting reversal of existing trends towards the expansion into the floodplain lands. The scheme will improve the financial literacy and raise the awareness of flood risks in the Rioni river basin. The scheme will target 300 people for the flood index insurance with the expectation that this will catalyze demand for further scaling up. It is noted that flood insurance is best implemented within a flood risk management framework which provides the best balance between the provision of flood protection measures and assessment and management of the residual risk that such measures fail to provide protection from. Hence if flood protection was provided to an acceptable level, and there is confidence in those measures, then insurance premiums should be lower as the residual risk would be low, as compared to the situation when the standard of protection provided is low, then the residual risk and hence insurance premiums would be high. A third component within that framework is the willingness of government to provide compensation after flood events. The Government of Georgia paid compensation of US$3 million in 1997 from the Government Reserve Fund and US$7.17 million from the President's Reserve Fund between1999-2007. In addition, municipality governments provide some compensation on an *ad hoc* basis when they can. Both sources of compensation are often inadequate and highly ineffective. The approach of providing a financial framework for accessing compensation which will also act as a means of influencing choices when engaging in economic activities in the floodplain is appropriate here as the risk management framework and appropriate standards of protect will also be provided by this project. It will be important that the scheme is developed to eventually operate within a free market, such that the cost of insurance is not subsidised, as this could limit the effectiveness in reducing activities in the floodplain, as owners backed with guarantees will continue to build there. Insurance companies could find themselves faced with the situation of large and growing number of houses at risk from flood, as planners and developers take advantage of the availability of cheap flood insurance. The combination of this insurance scheme with a robust development zoning regulatory framework will guarantee its success in the long-term.

Component 2: Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly exposed communities

40. During 1981-2000 the cost of national flood and flash-flood related land rehabilitation and anti-erosion works reached over US$1 billion, a significant proportion of which was spent in Rioni basin. During the last decade the cost of flood protection and rehabilitation works has doubled, largely due to intensified processes as a result of climate change. National Environmental Agency, formerly the main responsible institution for hazard risk assessment, monitoring and prevention allocated between US$1 – 10 million per year for river revetments and other river bank protection structural works designed to minimize the flood and flash-flood risks[12]. However, these conventional structural measures have already proved inadequate to resist progressively increasing flood discharge volumes and will therefore become increasingly so, in the face of climate change. Based on experience, the Government of Georgia has determined that traditional structural measures like the building of reservoirs and embankments cannot always be adopted in areas susceptible to flash floods. Georgia could therefore benefit from adopting more climate resilient and sustainable engineering solutions such as bio-engineering measures that involve the use of local natural material and vegetative cover to restore the physical, biological and chemical flood-plain functions to improve water saturation and transmission to minimize the damage However, knowledge of such advanced and climate-"smart" flood / flash flood management in Georgia is limited and traditional engineering solutions of Soviet legacy prevail. The project will fund a combined solution by improving existing structural and introducing non-structural, bio-engineering options that help increase natural infiltration and discharge transmission of the floodplain. This approach will be particularly effective, given the dominant terrain (complex mountainous topography) and limited availability of land areas suitable for structural measures of adequately large capacities that the expected increase in frequency and magnitude of flood events would require. Support is needed for the integrated floodplain rehabilitation and management that takes climate change risks into account so that floodplain functions for improved water saturation and transmission can be strengthened to prevent and mitigate against the increased severity of floods and their impacts. At the same time, some of the structural measures, such as trenching, cleaning from sediments and prevention from over sedimentation will need to continue. Therefore, smartly combined measures will be designed that includes vegetation and engineered structures and materials. The combination of hard structures and bio-engineering would be designed to lead to sediment deposition behind the structures, thus recovering some of the receded banks. Based on hazard and inundation maps produced under the component 1 and following some of the key floodplain policy measures that will be developed and implemented, the project under this component will invest in direct adaptation action and implement concrete long term climate resilient flood management activities, in selected high hazard risk municipalities of Lentekhi, Oni, Ambrolauri, Samtredia Tskaltubo and Tsageri. These "hot spot" locations represent upper, mid and lower reaches of the River Rioni enabling adequate coverage of relevant micro-watersheds, relatively typical topographic and socio-economic conditions in the main segments of the target water body. This geographic configuration around hot spots will allow for future upscaling of the adaptation measures and practices that will prove to be successful within the scope of the project. Over 800,000 people reside in the target region with total rate of unemployment reaching 33%, double the national average. High rural poverty rates determine social vulnerability that in combination with high exposure to climate hazards and low adaptive capacity points towards urgency of adaptation in this region.

41. The project will mobilize local communities to implement such flood risk adaptation measures as trenching, terracing, re-plantation, deep root bush and shrub zones, nut tree or tea plantations (traditional of the region). Additionally, at least five, local bioengineering treatments can be used in the target region. These can consist of live, but dormant cuttings of willow arranged in various configurations, such as vertical bundles with a tree revetment as protection. The other treatments may consist of brush mattresses,

[12] As of January 2011, the MRD is now the responsible ministry for river bank protection structural works

live willow clumps / bundles with roots attached and buried landward of a tree revetment that can serve as toe protection between dikes and stone barbs. And so called brush layering, that can be installed using dormant cuttings of willow along the inside face of a peaked stone dike.

42. Under this component, the Ministry of Regional Development that coordinates development efforts of the regional authorities and deploys funding from the Municipal Development Fund and Priority Regional Programme Fund will play a key role. The Ministry plans to use adaptation fund resources as a top up to domestic finances aimed at rural development to influence and catalyze long term climate resilient flood / flash flood prevention and management measures. As a result, the Municipal Development Fund and Priority Regional Programme Fund will incorporate flood-management measures, as integral part of municipal employment, local asset protection and development priorities. Prioritization setting is currently practiced through a bottom up approach. This approach that combines local employment through adaptation works and fund earmarking in the dedicated regional development funds will support the long term sustainability of the proposed adaptation solutions. It is also an essential means of ensuring that adaptation finance is aligned with domestic finance, a key requirement under the Paris Declaration for Aid Effectiveness.

Output 2.*1: Direct measures of flood prevention and risk mitigation measures that take into account climate change risks designed with participation of local governments and population in 6 municipalities (Lentekhi, Oni, Ambrolauri, Tskaltubo, Samtredia, Tsageri):*

43. While the site for this initiative is basin wide, six municipalities will directly implement climate resilient flood prevention and risk mitigation measures as described above. The target municiplaites were chosen through a consultative process involving Government, NGOs, and other stakeholders during the design phase based on the following criteria: (a) to represent the upper, middle and lower basin to ensure that all topography types and hazards are represented and basin-wide approach is ensured; (b) scope for scalability of solutions for each hazard type in the future; (c) vulnerability to floods and flash floods based on historical data and trend analysis; (d) SNC identified vulnerable regions under the sections specifically devoted to Rioni river basin and Svaneti region (upper reaches of Rioni). (e) The regions in the top list of NEA's flood mitigation priorities with committed budget funds for structural measures that underlined urgency of preventive actions and offer the opportunity to have a combined approach (structural and bio-engineering solutions) to climate resilient flood management.

44. The six municipalities – Lentekhi, Oni, Ambrolauri, Tskaltubo, Samtredia and Tsageri – have recorded the greatest number of flood and flash flood events and associated damages in the basin and are on the priority list of the NEA and MRDI. The MRDI, in collaboration with the NEA assesses flood protection needs and develops a list of prioritised hotspots based on urgency of need for repair/action and vulnerability (i.e. community and infrastructure at risk). The purpose of this is to determine how they will allocate their limited and insufficient budget each year. Based on the current prioritised list for each of the 6 municipalities, the Ministry of Regional Development currently needs an estimated 9.46 Million GEL (US$5.77 million) to address all flood protection works in these six municipalities. This is the business-as-usual cost of resolving current flood risks. However, the cost of additional and more advanced measures for climate resilient flood management solutions has not been counted in the current estimate. Under this project, US$2.9 million will be allocated to implement direct flood management measures necessary in light of expected climate change impacts as a result of the frequency and magnitude of these hydrological events. Annex 5 provides a list of indicative priority areas selected for the 6 municipalities and their business-as-usual costs. The list is based on current knowledge of priority risk areas. In addition, feasibility, outline and detailed design and detailed costing studies will be undertaken for each priority area. Based in current knowledge and as prioritized by the government, these six municipalities have the highest vulnerability and have committed NEA budgets for structural

measures that the proposed project will combine with non-structural, bio-engineering solutions for the reinforcement of long term resilience and impact.

Ambrolauri Municipality

45. Ambrolauri municipality is located on the southern slopes of the Greater Caucasus. Its south-east border runs along the Racha ridge, northern border – along the Lechkhumi ridge. Total area of the municipality is 1,141 km^2, of which agriculture lands occupy 240 km^2. Rioni and its tributaries: Krikhula, Znakura, Shareula, Lukhunistskali, Ritseula and Askilistskali flow in the municipality. Total population size is about 16,000 and population density – 16 persons per km^2. The city of Ambrolauri is the largest city in the Region and is situated in the valley of Rioni, surrounded by high mountains. Trade in Ambrolauri is very intensive in summer time, when tens of thousands of tourists visit the region. Agriculture is the biggest economic activity in the region with livestock raring being the main activity. Power generation is a major industry for the municipality with Shaori reservoir located there. Two sites have been prioritized in Ambrolauri for implementation of direct measures. The first is at Pshavella Street in Ambrolauri City where the Rioni banks are eroding, putting a road bridge and residential buildings at risk. The second is in Bugeuli village where river bank erosion is putting the population and central highway at risk. A total of US$0.18 million will be used by the Government to address these two issues by trenching and revetments. These priorities reflect the importance of transport infrastructure in this relatively remote municipality.

Tsageri Municipality

46. Tsageri Municipality is northwest of Ambrolauri and Tskaltubo municipalities and south of Lentekhi municipality, another site where AF resources will be utilized. The population size is over 16,000 and density - 22 persons per km^2. The municipal center is the city Tsageri, located by the river Tskhenistskali. The main agricultural activity is cattle raring. Power generation from the Lajanuri reservoir is the most important industry for the municipality. Lajanuri reservoir is built downstream on river Lajanuri by arch-type dam and the reservoir suffers high rates of sedimentation and severe bank erosion.

The region is most at risk from flash floods, landslides and mudflow. 58 villages in this region are at risk from landslides. The town of Tsageri has been identified as a high priority area. Up to 1,500 families live in town of Tsageri. The concrete river wall was built 30 year ago and is at risk of collapse in many locations along its 500m length. A breach of this flood defense will flood the town. Funding from the roads department of the MRDII is currently reconstructing part of the wall this year as a one-off project. A second priority area has been identified on the River Lajanuri banks. Here, 4 villages are at risk (Lajanuri, Sapatagori, Orbeli, Latsou villages). In 2009, one village completed flooded by flash flood and as a result the government provided equipment to build up the earth embankment. However, this temporary flood protection is not effective as the river banks are constantly washed away in this area. A total of US$0.473 million will be allocated under this project to address these four priority areas in Tsageri, including the rehabilitation of the river wall in Tsageri Town and bank erosion of Lajanuari river to ensure that they are able to withstand the increasing pressures brought upon them through more intense and frequent flash flooding.

Oni Municipality

47. Oni Municipality is bordered by Java district from the east, Lentekhi and Ambrolauri Municipalities from the west, Sachkhere Municipality – from the south and the republics of Kabardino-Balkaria and North Ossetia, Russian Federation from the north. Total area of the municipality is 1,236.3 km^2. Population size of the municipality is about 8,400 and population density – 5.4 persons per km^2. The

municipal center is located in the city of Oni – the only city in the municipality. The main economic activity in the municipality is agriculture. Landslides caused by precipitation and intensive rainfall was especially devastating for the village of Glola and tourist base "Shovi" in Oni Municipality, where the more than 10 cottages in the tourist base were destroyed, and the bridge connecting Shovi to Glola was swept away and posed a direct threat to the population of the village Glola. US$0.408 million will be allocated under this project to address prioritised landslide risk areas which threaten population and roads at 3 sites in Oni.

Lentekhi Municipality

48. Lentekhi Municipality from the south is bordered by Tsageri, Ambrolauri and Oni municipalities, from the west – by Martvili and Chkhorotskhu municipalities, from the north – by Zemo Svaneti and from the east – by Russian Federation. Total area of the municipality is 1,344 km^2, population size – over 8,500, population density – 6.7 persons per km^2. The municipal center is the town of Lentekhi, located on the banks of the river Laskanura, a tributary of River Tskenistskali. It is situated 102 km distance from the city of Kutaisi. The rivers in the Lentekhi municipality, pose a threat to communities and infrastructure. Since the 1950s there has been increased flooding particularly on the Tskenistskali and Reskho rivers. Local municipality staff has a good understanding of the hydrogeological risks in Lentekhi, although no detailed studies have ever been done. It is estimated that 80% of the region is in medium to high hazard zones and this is borne out in the high numbers of eco-migrants there which has caused social and political tensions. The main risks are to people, agriculture and infrastructure. The protection of roads from flooding and destruction is important here, as these remote communities can be cut off during high force events. According to the head of Lentekhi Municipality, there is no current programme of building and maintaining flood defenses, and no strategic plan for evacuation during disasters. Many years ago, a flood warning system was in place, but questions arose about the reliability of the forecasts. All populated areas, agricultural lands and critical transport links in Lentekhi are considered to be priority areas for assessment under this study. US$0.834 million will be allocated under this project to address river bank erosion and flooding which threatens communities and transportation networks in the municipality at 3 sites in Lentekhi, reflecting the importance of maintaining transportation links in this municipality.

Tskaltubo Municipality

49. Tskaltubo Municipality is located within the middle reach of the Rioni basin to the east of the Kolkheti lowland. It includes the rivers Rioni and Gubistskali. It is bordered by Tsageri and Ambrolauri municipalities in the northwest and northeast respectively, from the south – by Kutaisi municipality. Gumati and Rioni HPPs are located in the municipality and due to the the high sedimentation of these HPP reservoirs, flooding and river bank erosion has increased and pose a threat to villages where villages are regularly flooded, damaging both residential houses and agricultural land, causing extensive material losses. Zhoneti and Opurchkheti are examples of two villages located on the right bank of the Rioni just upstream of Gumati and Rioni HPPs, on Military Road, both of which are highly vulnerable to flooding and flash flooding. Both villages are characterized by an aging population, high unemployment and poor local services and infrastructure. In Zhoneti, 15 houses (60-75 people) are at risk as well as subsistence agricultural produce, domestic poultry and cattle. Flood waters cause on average of 1,500 GEL worth of damage per household per year. Zhoneti will be the location for the third reservoir in the planned Namakhvani cascade. In Opurchkheti village, 12 families (40 people) in a single 5-storey building – the so-called 'tea settlement' – an old building to accommodate then tea factory workers - are at risk of flooding, with average annual flood damages of 500-600 GEL per family. The main Kutaisi-Mamisoni highway is also at risk and when flooded the villages are cut off. US$0.572 million will be allocated

under this project for river bank fortification works in Tskaltubo municipality in the villages of Geguti and Zarati on River Rioni where railway, communities and agricultural lands are at risk.

Samtredia Municipality

50. The majority of the territory of Samtredia Municipality is located on the Kolkheti Lowland and very small part of the Sajavakho plateau. Total area of the district is 341.1 km^2, population size – 60,300 and density – about 166 persons per km^2 which isa very high population density. There are 50 settlements in the municipality, including 1 city – Samtredia, 1 town – Kulashi and the rest – communities. In Samtredia municipality floods have threatened the population in the last 10 years due to the damaged drainage system of Vartsikhe HPP cascade. The village is flooded at least twice a year and causes extensive damage not only to the villagers, but also to agriculture. The population of the Bashi village is forced to seek new settlement areas and sources of living as a result of flooding. US$0.403 million will be allocated as part of this project to undertake river bank fortifications in Samtredia where communities and a school are at risk. The proportion of investment reflects the relatively high population at risk in this municipality.

51. These priority areas will be refined using the accurate and detailed mapping produced in Component 1. In order to ensure climate resilience, direct measures will be designed to take account of current and future hazards under climate change. It is likely that bioengineering solutions will provide better long-term cost effectiveness than the traditional methods that would otherwise be applied.

Output 2.2: Community-based adaptation measures, such as bank terracing, vegetative buffers, bundles and tree revetments implemented through the municipality employment and guarantee scheme.

52. The project will work directly with the local municipalities, listed above, to help design an employment guarantee scheme for flood management that will provide seasonal employment opportunities related to climate-induced risk management for the local populations. One of the key approaches to adaptive capacity development at local community level is to build household assets that can provide some contingency finance for mitigating climate-related risks. Seasonal employment is already practiced for ex post measures of rehabilitation in Georgia, but not for ex ante measures of prevention and adaptation. These seasonal schemes usually guarantee fixed number of employment days for fixed wages set by the Municipalities. The project will help target municipalities to directly engage local communities in climate resilient floodplain rehabilitation and related bio-engineering works. This will stimulate the mobilization of local workforce for this activity and help municipalities to turn these adaptation measures into the employment opportunities. The proposed adaptation works will contribute towards long term climate resilience of local settlements and productive systems to intensified flood and flashflood occurrences. Some 200 people from the 6 target municipalities will benefit from the scheme. The Adaptation Fund resources will be used to design such employment scheme, based on existing municipal, seasonal employment programmes. Site-specific bio-engeneering measures noted above will be designed, based on hazard maps by the NEA assigned staff and relevant municipalities with direct involvement and participation of local communities. Based on the municipal employment programmes the actual works will be implemented in the target areas.

Output 2.3: Floodplain seasonal productive systems (e.g short season annual cropping, cattle rearing plots or seasonal pastures, agro-forestry) benefit 200,000 people and improve resilience to flood threat.

53. The floodplains of the Rioni river basin support a large percentage of the agricultural activities (which accounts for 71% of all economic activity in the basin) and incurs extensive losses to agricultural crops and loss of lifestock when flooded. In general, seasonal floodplains retain water for months at a time, largely during the wet and post-wet seasons.

54. Extensive flood damages to floodplain cropland and the associated agricultural infrastructure are preventable with strategic agricultural practices including seasonal agriculture, designated cattle grazing and rearing pastures and agroforestry. Major forms of damage that can be addressed by strategic management of agricultural activity include flooding, debris accumulation, scour erosion, and sand deposition. Historically, trees performed some important functions and their presence in the river floodplains significantly influenced the floodplain landscapes farmed today. Woody vegetation stabilized the soil and controlled scour erosion. Stands of trees absorbed the energy from floodwaters and caused the deposition of water borne sediments. Floodplain forests stored the overflow waters and drove many of the processes to support aquatic life systems and improve water quality. Woody vegetation on floodplains causes significant reductions in flow velocity and improves flood conveyance. Scour erosion is controlled by the dense mat of intertwined, fibrous roots that reinforce the top layers of soil in the forest floor. Trees develop root systems that can extend horizontal distances of up to 2 times tree height and the soil below the forest floor will contain the intermingled roots several different trees. Some agroforestry systems with specific application to floodplains include windbreaks to stabilize sandy soils, filter strips and riparian areas for bank stabilization and water quality, alley cropping for enhanced crop production and protection, wildlife habitat, woodlots and fuelwood plantations. Tree species adapted to the floodplains include species valued for their lumber, and those valued for their crop value such as nuts.

55. Agro-forestry is already being practiced in Georgia and benefits such as reduced soil erosion, increased infiltration rates have been reported[13].An analysis of the benefits of existing agro-forestry systems in the country has shown that they address hydrological erosion risks; Agroforestry is well recognized measure for reclamation of flood damaged areas. It helps improve and stabilize the land; control runoff and soil erosion, thereby reducing losses of water, soil material, organic matter and nutrients. It also offers a productive land use option in the exposed floodplain areas that the communities can benefit from. Some trees (hazelnuts, berry-bushes, other wild fruit-trees) have good combination of anti-erosion qualities (e.g. roots) and economic values (fruits) that augments their importance.

56. Given the challenges of balancing flood risk management and economic activity in the Rioni basin there is a clear need to promote multiple-use of the floodplain to maximise productivity of the floodplain, as well as environmental and ecological enhancement and avoidance of flood damage to crops and livestock. Under this output the project aims to reduce slope instability and soil erosion on steep slopes which currently leads to landslides and debris flow during flood events. The measures being proposed to address this include increasing vegetative cover (through agro-forestry, vegetative bundles and trees) for slope stabilisation. This will also help alleviate sedimentation of dams, as less soil will be transported into reservoirs. The table below shows the results of studies that have been conducted to provide a comparison of conditions with and without agro-forestry in relation to slope erosion.

Vegetation cover of soils	Indicator(parameter) of erosion (E)	Indicator of aggregation (indicates resilience to erosion, it is higher in top layers than in lower layers)
Pine-trees	2.55/3.49/2.44*	0.67/0.49/0.49**
Fir-trees	1.94/3.17/7.50	0.72/0.50/0.29
Grassland	2.73/4.09**	0.55/0.45
w/o any vegetation	4.12/5.94**	0.35/0.33

*According to depth (low, medium, deep)
** Medium and deep

[13] G. Kharaishvili (2007) "Protective role of antihydro-erosion forestry and a method of their plantation in Georgia"

57. Floodplain agroforestry systems will be designed for the Rioni basin, taking into consideration, all of the possible alternatives of maintaining productive agriculture while increasing environmental stability and protecting the agricultural infrastructure of the floodplains.

58. Approximately, 500 ha will be covered by the plantations of Acacia, hazelnuts and walnuts these varieties have land reclamation properties and high economic value. For example, Acacia plantations can grow rapidly in the humid climates (such as the target region), delivering in as little as seven years, even on degraded and infertile soils where other tree species cannot be successfully established. These local tree varieties are already popular in the target region, with high demand and saturation in the local market. They can control runoff and soil erosion, thereby reducing losses of water, soil material, organic matter and nutrients. Additionally, they have critical soil fixation properties, especially in sloppy terrains that dominate in the project site. The project has already identified the key strategic locations for their plantations for the flood-management and land reclamation purposes. In total 14 territorial units (in Lentekhi and Tsageri regions) and 266 plots will be covered. Bio-engineering measures will be implemented in all selected locations covering additional 600 ha and in combination these will improve three critical functions of the target basin at a broader landscape level necessary for climate resilient flood management: transmission, saturation and storage. A range of innovative techniques (such as bio-engeneering technology) combined with integrated farm-level management will be employed to reduce exposure. The project will focus on community-based initiatives to ensure multiple and seasonal floodplain use approaches to enhance the social and ecological resilience of the floodplain. Municipalities will mobilize local communities and channel necessary resources, including the equipment for plantation works for windbreaks and bank stabilization functions. Municipalities will establish community-based monitoring and maintenance protocols.

Output 2.4: Lessons learned and best practices documented and disseminated to raise awareness of effective climate risk management options for further up-scaling;

59. The project will be the first in Georgia to formally implement climate resilient direct flood resilience measures like bioengineering flood defenses, seasonal floodplain agricultural usage, agro-forestry, and community-based adaptation implemented via an employee-guarantee scheme. In this regard, the Rioni basin will provide important evidence-based scaling up to other areas on a national basis. Building on the participatory processes initiated under this component, the project will draw on the technical experiences of implementing climate resilient direct measures to the Rioni basin and will introduce targeted activities to enable the analysis, replication and upscaling of the project approach to other basins vulnerable to hydrometeorological risks. This will entail a campaign to present the findings from the project to different national entities and partners, as well as other regional entities with similar degrees of vulnerability. By taking a systematic approach to the codification, analysis and dissemination of knowledge about hydrometeorological risks and how they can be addressed by climate resilient direct measures, the project will allow replication of effective risk reduction measures to other river basins. This proposed initiative will contribute to a critical mass of such experience in Georgia and will enhance systematic regional cooperation on this critical adaptation issue.

Component 3. Early warning system in place to improve preparedness and adaptive capacity of population

60. As noted above, the frequency of extreme water flow is increasing in Georgia. The alerts on extremely high water levels from the primary measurement gauges in Georgia were exceeded more than 100 times, while the flood levels - more than 50 times during 1986-2006 (this is almost twice as frequent and volatile than during the 1960-1980s). This ultimately means that when the water stage reaches or exceeds the alert value, the hydrometric observations should be communicated more frequently than

under the normal circumstances of natural climate variability. According to the SNC projections noted above, there is a potential for extremely high water flows and seasonal anomalies in the immediate and long term future. Early warnings and forecasts are key measures within a suite of steps required to reduce the social and economic impact of climate hazards, including floods. In response, the government has put early warning high on the national agenda. This is indeed a strategic activity at a time when climate change is likely to produce more extreme climate events. As an important step towards improved observation and forecasting capacity, the National Environment Agency (NEA) has just recently finalized a comprehensive assessment, commissioned by UNDP, on the development of flood early warning system in Georgia[14]. The proposed project is a direct response to some of the critical priorities underlined by the assessment. The focus of this component is placed on floods, even if the project adopts a more integrated approach to all interrelated hydrometeorological hazards that will intensify with climate change. The approach under this component is based on a physical reality: floods can be forecasted in real time, while, for many other related hazards (flash floods, mudflows, landslides) the risk can be assessed but the occurrence time remains unknown). Improving flood early warning system however will offer a solid ground for future integrated warning systems as further advancements in forecasting emerge. Good practice of early warning consists of four key elements: (i) risk knowledge, (i) monitoring and warning services, (iii) dissemination and communication, and (iv) response capabilities. Under all these critical capabilities there is number of institutions performing some elements of these functions with certain degree of overlap. For example, National Security Council provides overall coordination of crisis management. The National Environment Agency under the Ministry of Environment has the direct role in the three critical elements of a) risk assessment; b) monitoring and forecasting; and c) dissemination and communication. Ministry of Regional Development and Infrastructure has emerged as an important player in this regard. According to the recent amendment [15] to the Law of Georgia on Protection of Population and Territories against Natural and Manmade Emergency Situations, MRDII became responsible for any disaster risk reduction and prevention activities at regional and local levels. This makes this Ministry strategically important in the context of supporting long term adaptation solutions at the sub-national level. Emergency Management Department (EMD) under the Ministry of Interior has the strong role and capacity in emergency response and crisis management situations, which is a key element of long-term climate adaptation of provision within a framework of accurate forecasting and early warning. Their role will be integrated into the overall early warning and response functions to be developed as part of this project. In addition, the EMD will benefit from further training at national and local level of staff in the field of risk assessment and preparedness, and as first responders to emergencies will have access to the improved forecasting and early warning information systems being developed. The EMD is therefore also strategically important in the context of long-term adaptation solutions at the national and sub-national level.

61. Therefore, stemming from the current distribution of institutional roles and functions with regards to early warning, the main target institution for capacity development purposes will be the National Environmental Agency under the Ministry of Environment. The project will cover three main critical aspects of strengthening the institutional mandate of the NEA: (i) Risk Knowledge: The project will enhance knowledge and skill sets of technical officers in latest methods of hazard risk assessments. The project will enable the NEA to develop gross flood hazard and risk maps for prioritizing and informing the emergency rescue operators on potential hazards and risks (scale: 1:50,000); flood risk maps for priority flood plain of Rioni Basin. This region was chosen based on the high hazard levels and risks for large number of people as well as value and importance of assets under risk in case of high flows (scale: 1:20,000 and 1:10,000) will also be developed. The project will digitize, save and systematize/structure historical hydrometeorological observations, measurements and other data and link them to GIS systems

[14] Ministry of Environment of Georgia (2010) "Assessment Report on the Development of Flood Early Warning System in Georgia"
[15] Amendment N1566 of 31.07.2009

that are essential for prospective planning and are currently missing in the Early Warning System. (ii) Monitoring and Forecasting: AF resources will be used to procure and install essential monitoring equipment such as 3 automatic hydro-meteorological stations, one at the upper reaches and two at the lower reaches; 2 portable Doppler flow/stream measures; 20 telemetric precipitation gauges; and 10 telemetric water gauges. These are essential to improve the density and adequate coverage that is currently missing in the Rioni Basin for improved observation and forecasting capacity. It is worth noting that NEA through its hydromet service already implements systematic observations. However, in its current capacity, it possesses only 15 weather stations (among them 7 automatic that were renewed with the support from the state budget), 27 weather gauges (partially renovated – 15 automatic renewed with support from the state budget) and 30 hydrological gauges (among them 11 automatic that were renewed with the bilateral support from the governments of Canada and Finland). The additional installations requested from the AF are needed to improve the observation and forecasting that is necessary to respond to climate change driven frequency and intensity of flood events that require far better coverage in this priority, flood-prone Rioni river basin. The project will also help in river bed and flood plain surveys and profile mapping. NEA staff engaged in monitoring will be trained in operations and development of stations O/M plan and protocols. For the long term forecasting, the project will downscale the grid of the regional weather forecasts from 14*14 km to 7*7 km; as for the short-term forecasting Rioni flood forecasting model will be developed, specifically by coupling the outputs from meso-scale meteorological systems to HMS hydrological model; and establishment of on-line interface between the hydrological telemetric stations and Deltares-FEWS. (iii) Dissemination and communication: the project will work with NEA to set up GIS-based integrated hydrometeorological and related database at the NEA.

62. Thus, the project will help fill up the critical capacity gaps identified through the above mentioned comprehensive needs assessment. The capacity development approach covers the combination of the skill set and knowledge enhancement through targeted training; physical monitoring capacity and advanced forecasting and communication methods. This component will further enhance the EWS in the Rioni river basin and minimize magnitude of impacts. The specific activities under this component will complement planned long-term national activities in the development of a comprehensive national EWS. In this regard, the Rioni basin will be used as a pilot basin and the system developed will be such that it can integrated with and updated to a national EWS. Hence the design of the Rioni EWS will take account of the national requirement for EWS to ensure national compatibility. It should also be noted that since national staff will be trained, then the eventual establishment of a national EWS will benefit from the experience and training gained on Rioni. Hence it is envisaged that in addition to EW capacity development, this project will also be used as best practice to be replicated in other regions and nationally.

Output 3.1: Long term historical observation data digitised and used in policy formulation and risk management practices for Rioni river basin

63. Essential to the assessment of risk, is the historical data for all risk variables. In addition, essential to the establishment of a flood forecasting and early warning system is the establishment of a hydrometric database which will be the central repository for all hydrometric data important in hazard assessment. Such a database will be used to store historical data and receive data for flood forecasting and early warning from monitoring stations. Georgia does not currently have a centrally held hydrometric database. Historical data records exist in many formats including paper and a major task will be the digitization of this historical data. The NEA has secured funding for a state-of-the-art database from the Czech Government and under this project, funding will be provided to assist in the cost of entering their extensive datasets into this database. Importantly, the database will enable better manipulation and analysis of the extensive datasets, and their effective use in flood hazard assessment and management.

Output 3.2 Multi hazard risk assessment for the Rioni river basin (floods, flash floods, associated mudflows and landslides, linked with climatic alterations under alternative scenarios);

64. A flood forecasting model will be developed for Rioni, which will couple outputs from downscaled meso-scale meteorological systems to HEC-HMS hydrological models. This flood forecasting met-hydrological model will be linked to flood hydraulic routing model developed in Component 1.1 to enable flood level forecasting where appropriate and flood hazard forecast mapping. The project will develop definitive hazard maps for emergency responders for alternative climate change scenarios.

Output 3.3 Series of targeted training delivered for the NEA staff and partner organisations in the advanced methods of risk assessment and forecasting;

65. National and local staff will be trained in weather, hydrological, flood, flash flood, landslide and mudflow risk assessment and forecasting and early warning systems (Delft-FEWS training), GIS and data management software and in the operations and maintenance of observation stations. Each regional authority and accordingly municipality has newly formed 'emergency management units' staffed with local personnel mainly to coordinate emergency preparedness planning and response. In some cases these responses exist only on paper. Due to limited resources the Emergency Response department is unable to provide the specialized training needed. Under this project training of local emergency response staff will be undertaken will to strengthen capacity of municipal-level emergency planning groups and provide training in local emergency preparedness planning and response coordination.

Output 3.4: Essential equipment to increase monitoring and forecasting capabilities in the target basin procured and installed

66. Accurate and representative rainfall measurement is essential to accurate forecasting of floods and particularly flash floods. The same is true of river flow measurements, which are important in the development and calibration of the computer models on which flood forecasting is to be based. It is important for emergency responders and the population at risk, to know when and where flooding will occur and flood modelling, mapping and forecasting are key to providing such information. Longer the lead times and the more accurate the forecasted location and extent of flooding will result in more effective flood warnings and response. The use of spatially distributed rainfall data as input to the flood models not only increases the forecast lead-time accuracy, but also the accuracy of forecast peak stage across a range of basin sizes. Rain gauge density over the forecast basins is one of the main determinants of forecast accuracy during an extreme event that is likely to result in significant flooding and flash flooding. The Rioni basin is characterised by large spatial and temporal variability in rainfall and flow and it is therefore necessary to have sufficient coverage (number and distribution of rain and flow gauges) to provide accurate forecasts. Since the 1990s the number of rain gauges in the Rioni basin has been reduced from 20 to 4 because of well know economic breakdown and governance crisis characteristic of the decade in all post Soviet countries. Of the 4 operational gauges in Rioni, two are in as state of dilapidation (the pictures below are of Kutaisi gauging station which shows the dilapidated state and woeful inadequacy of measuring equipment). The pictures below show that the stations are ill equipped for hydrometeorological measurements, and these will not meet the requirements of automatic data inputs to forecasting models.

a)atmospheric temperature and humidity loggers

b) instrument for measuring ice

c) Rain gauge

d) Soil temperature gauge

e) Hydrometric Station building

f) Charts and equipment with the hydrometric station

67. The project will establish/rehabilitate 5 meteorological stations, 20 meteorological posts and 10 hydrological posts, equipped with modern equipment. An observation network of all hydrological and meteorological variables will be established to provide an appropriate level of spatial resolution of these variables for early warning. Details of the equipment have been described above. While this project will establish and rehabilitate these monitoring stations, their long-term maintenance will be assured by the government of Georgia and specifically by the NEA that has the dedicated staff and associated budget allocations for continued maintenance and operation of monitoring and early warning systems. Under the project, the training of staff will ensure that the capbability and competences are established. More specifically, the Ministry of Environment and its National Environmental Agency that includes the Hydrometeorological department has a dedicated staff (total of 277 persons) and the budget for systematic observation and monitoring (annual budget of around US$2,600,000). This capacity provides a solid basis for ensuring adequate maintenance of the new software and hardware for improved early warning system that the AF resources will be used for. Indeed, increased intensity of floods will require greater density of stations and better coverage in highly exposed areas. This is an additional climate change risk related cost that is requested from the Adaptation Fund. In relation to this, targeted and specialized training will be delivered to the NEA staff on how to operate and maintain the newly acquired software and hardware.

Output 3.5: Systems established at the national and sub-national level led by the NEA for long and short term flood forecasting of hydrological risks; including dissemination and communication of forecasts.

68. The project will establish a fully integrated flood early warning system (Deltares-FEWS) which links forecasting models to telemetered data as input and forecasting reporting and warning systems as output. It will establish an early warning communication network using different communication links such as telephone trees, SMS and e-mail networks. GIS-based website wil be developed for the dissemination of hazard maps and associated information, such as hydrometeorological telemetric and Deltares-FEWS data to central and local government stakeholders. In addition a public-facing website will also be developed to provide key layers of information to the public, with the potential to disseminate early warning information. Early warning awareness and training workshops will be provided for community, NGOs, government and media representatives.

2. Describe how the project / programme provides economic, social and environmental benefits, with particular reference to the most vulnerable communities.

69. Georgia is one of the most vulnerable countries of Eastern Europe to the projected impacts of climate change. Climate change will bring more frequent occurrence of hydro-meteorological hazards such as floods, flash floods and associated catastrophic events of mudflows and landslides. Despite considerable investments into the response and preventive measures, the country is failing to cope with the mounting pressures from climate hazards that increase in frequency and intensity as a result of climate change. The damages that result from natural disasters in Georgia are direct and indirect, and also tangible and intangible. Direct tangible damages such as physical damage to property, capital assets and inventories, recovery funds allocated by Government for resettlement of eco-migrants and purchasing of houses for them, rehabilitation of roads and other infrastructure amounted to US$20 million on average, between 1995 and 2008. This does not include indirect damages such as socio-economic, legal and often political problems arising in eco-migrant resettlement sites. Between 1999 and 2007, 8.17 Million GEL was spent from the President's Reserve Fund to provide assistance to those affected by natural disasters. In addition between 2005 and 2007, 12.7 Million GEL was spent on the rehabilitation of roads damaged by natural disasters mainly in mountainous areas. Damage to utilities is also a serious problem and between 2001 and 2007, 3.55 Million GEL was spent on the rehabilitation of electricity lines damaged by natural disasters. Compare and contrast these direct damage costs with the annual budgets of the NEA (2Million GEL on average between 2006 and 2008 for all of Georgia, or 6% of the Ministry of Environmental Protection and Natural Resources annual budget) and the MRDI (4.5 Million GEL in 2010 for all of Georgia) and it becomes apparent that the currently reactive framework within which natural disaster are dealt, is highly ineffective and costly to the government and to the communities affected. Intangible damages (direct and indirect) are more difficult (or undesirable) to quantify (such as loss of life, physical injury, loss of heritage or archaeological site), but are potentially more significant than direct tangible damages. The trend analysis provided in the above sections indicates that the magnitude of damages is on rise. If put into the perspective of long term climate change scenario that points at higher temperatures, greater concentration of precipitation amounts in the shorter periods of time and as a result, more frequent and intensive flood and flash-flood events, immediate actions are required to put more robust systems for flood/flash flood management. This project is seeking to provide direct adaptation measures to reduce flood levels experienced, and provide flood warning to improve the ability of the affected population to respond and move out of danger during a flood. In addition, it is seeking to develop long-term sustainable approaches to climate change risk management. The project introduces a combined method of structural defense and non-structural prevention that has proven the most effective in many countries of the developed world. Smart flood management options that take advantage of flood cycles by using the floodplain lands for more resilient productive systems (agro-forestry, short season cropping farms, pastures etc) will deliver considerable socio-economic and environmental benefits to the people residing in the Rioni River basin. The floodplain rehabilitation and improved management in key target micro-watersheds that will help recover floodplain functions for improved water infiltration and transmission that both prevent and mitigate severity of floods / flashfloods and their impacts. The soft, non-structural flood and flashflood management measures, otherwise termed as bio-engineering, often tend to be more effective than structural and hard protective measures. This is true especially in the complex mountain terrains as of Georgia and particularly for the prevention of freshets that will more frequently occur as a result of the combined effect of localized, intensive rainfalls and early snow melt due to climate change driven warming. Moreover, watertight materials of hard constructions are thought to make runoff 2 to 6 times greater in comparison to terrains with natural coverage (fields, meadows, forests). Their rehabilitation as part of the floodplain landscape improves ecosystem functions for flood management. These will also abate land erosion processes on over 8,000 km2 (both directly and through up-scaling)

that delivers significant environmental benefits both in terms of land productivity and stability for all types of land infrastructure.

70. The focus of the project is on the promotion of the most appropriate mix of structural and non-structural flood management measures. Natural floodplain management measures will include reconnection of the river with its floodplain (through development zoning), re-establishment of the natural floodplain by designating floodways to help store and slow down floodwater, the use of bio-engineering measures such as bank terracing, vegetative buffers, bundles and tree revetments and flood plain seasonal productive systems e.g. short season annual cropping, cattle rearing plots or seasonal pastures, and agro-forestry which can store and slow down water during events and otherwise be high value agricultural areas. These measures will also help protect soils from eroding and contributing to landslides and mudflow. Natural floodplain management measures such as these, achieve typical benefits such as avoided costs of damage to society, human health and well being, economic activities, infrastructure, and the environment. Environmental benefits for the Rioni basin will comprise a complex set of environmental attributes from which a range of market and non-market goods and services derive. These will include:

- Habitat creation through the restoration of the natural floodplain by zoning development away from the functional floodplain and creating floodways;
- Maintenance/restoration of biodiversity by strengthening the functionality of the ecosystems;
- Enhanced landuse management through the use of agro-forestry which will help to alleviate the current pressures of deforestation (via contribution of fuel wood production) in the upland catchments as well as other harmful landuse practices;
- Control runoff and soil erosion through agro-forestry, thereby reducing losses of water, soil material, organic matter and nutrients. Maintained soil organic matter and biological activity at levels satisfactory for soil fertility. This depends on an adequate proportion of trees in the system - normally at least 20% crown cover of trees to maintain organic matter over systems as a whole. Agroforestry maintains more favourable soil physical properties than agriculture, through organic matter maintenance and the effects of tree roots;
- Improvement in water quality and restoration;
- Improvement in water resources through improved infiltration, and transmission an all other functions of the full water cycle;
- Contribution to the development of a green economy by providing jobs and business opportunities to local people.

71. In general the environmental goods and services provided by flood management, relates to local and regional user populations in terms of the final benefits such as those identified in Table 1 below. The primary indirect user populations are households in the Rioni catchment that benefit from flood risk reductions.

72. Table 1 lists the environmental benefits that are likely to be realised by floodplain restoration and habitat creation under this project.

Table 1: Typical ecosystem services of wetland habitat that might be created within the Rioni basin under this project.

Ecosystem Service	**Contribution to Ecosystem function**	**Final goods and services**	**TEV**	**Population**
Food and Water	Primary production, habitat provision, nutrient cycling, water quality	Livestock grazing	DU	Local
		Products of agro-forestry, including fuel wood	DU	Local

Water Regulation	Soil formation and retention	Flood protection	IU	Local/Regional
Water purification	Cycling processes, Soil formation & retention	Drinking water quality & quantity	IU	Local/Regional
Landscape	Primary production, habitat provision, landscape, biodiversity	Landscape (amenity to local residents)	DU	Local
Habitat provision	Primary production, habitat provision, landscape, biodiversity	Biodiversity	NU	Local/Regional/National

Note: TEV= component of the total economic value; DU=direct use value; IU=indirect use value; NU=non-use value.

73. In terms of direct beneficiaries of adaptation measures, 203,000 people of key hot spot municipalities of Lentekhi, Ambrolauri, Oni, Tskaltubo, Samtredia and Tsageri will benefit. Among them majority are women, elderly and children. Participation of local communities residing in high-risk areas in all of the project activities will be ensured. In addition, local population will be directly engaged in the hybrid structural and non-structural measures of re-plantation, construction of vegetative revetments, trenching, terracing and other traditional and innovative measures. Their engagement will be arranged through the municipal employment guarantee scheme that will grant seasonal adaptation works for the most exposed groups of the population. Building codes that will flood proof public houses such as schools and hospitals in the highly hazard prone municipalities, as well as a recovery of traditional house raising for private buildings will improve safety and long term resilience of the vulnerable communities.

3. Describe or provide an analysis of the cost-effectiveness of the proposed project / programme.

74. The project has considered the option of addressing the climate change problem through alternative solutions. For example, consideration was given to scaling up in place traditional structural measures (including embankments, building fences and dikes etc) by considering forward looking hazard profiles in relation to climate change scenarios and adjusting engineering parameters of defence structures, including locations and scale. The cost of this would be approximately US$14.9 million without maintenance cost. This is calculated based on the cost of existing flood protection infrastructure for 6 target locations only that would need to be at least doubled given the necessity of expansion with the view of anticipated increase in intensity and frequency of floods. However, based on the latest data of past 10-20 years that indicate increased occurrence of devastating flash floods this solution, was deemed to be not cost-effective. Given the inherent uncertainties with how climate change will alter hydrological regime and how the inevitable changes will be expressed locally, the measures that yield immediate and long term adaptation benefits are required as opposed to localized, short-term and typical, defense infrastructure oriented, disaster risk reduction methods. AF project will therefore deliver adaptation benefits in the most cost-effective way. With slightly over US$5million critical functions of water saturation, storage and transmission will be improved and even restored at a basin level. From the hydrological point of view, factors that have a decisive influence on the occurrence of flash floods - apart from the intensity and duration of the rainfall - are the topography, soil conditions, and coverage of the terrain. Disadvantageous topographical conditions such as high-exposure (steeply sloping) highland terrains, narrow valleys or ravines hasten the runoff and increase the likelihood of flash flood occurrence.

75. It is well known, that urbanization processes and affiliated construction, including hard structural defense infrastructure with watertight materials make runoff 2 to 6 times greater in comparison to terrains with natural coverage (fields, meadows, forests). Hence, the latter option allows for more saturation, transmission and storage and as a result, minimizes the flood water volume, velocity and subsequent impacts. This therefore allows delivering adaptation benefits towards achieving greater resilience at a broader landscape level than location specific structural defense options. This ratio can directly correlate to the ratio of minimum adaptation benefits that the project will deliver by minimizing the exposure to and impacts of floods (2-6 times greater than without the project in business-as-usual scenario).

76. The project is cost-effective in as much as it implements flood / flash flood management measures that are more resilient to long term impacts of climate change on hydrological dynamic and increased frequency and intensity of climate hazards. The country that looses on average 5-10% of GDP as a result of floods of magnitude similar to those of 1997 and spends approximately US$1-10 million annually on river embankments, dams and other flood defense structures requires a more long term vision to effectively prevent and adapt to climate hazard risks that are to be exacerbated based on regional and national climate change scenarios. The project has closely examined the current, business-as-usual scenario of flood / flash flood risk management that progresses in cost and regresses in effectiveness due to aggravated forces of climatic hazards. As such, abundant snowfalls /thick snow cover in mountains, intensive early snowmelt together with increasing amounts of rainfall; more frequent heavy rainstorms during summer and autumn; large territorial frontal rains during the autumn; and intensive rainfall during the winter season are key conditions that get intensified as a result of climate change. Therefore, effectiveness of business-as-usual measures is already questionable now, under the current climate variability, let alone the future climate change scenarios described above. Doing “more of the same” has been considered among the options. However, the cost of structural measures will be extremely high and barely affordable for the country like Georgia facing intensified catastrophic events. Given the complexity of the topography such measures may not always be effective. With more forceful floods and flash floods in the upper reaches of Rioni the flow velocity can be so high that can often destroy the defense structures and pick up the solid matter that has even stronger destructive powers. IPCC 4th Assessment report [AR4 Intergovernmental Panel on Climate Change, 2007] stressed the increase of climate-related hazards (e.g. floods) across Europe and high relationship with geographical localization. Therefore, the project takes more context specific approach in designing flood plain development policy and offers a suite of structural and non-structural measures the best suited to the local circumstances and the long term hydrological alterations due to climate change. Based on initial calculations of payback rate per unit of investment in types of measures offered by the project (vegetative revetments, economic benefits generated from flood plain productive systems, improvements in floodplain services of water transmission and infiltration etc) can amount to at least 1:10 ratio compared to current modes of flood management by artificial embankments and structural protection measures. Table 2 below shows the damages caused by each of the three main hazards as well as the total damages by year for all of Georgia (It was not possible to obtain Rioni specific data during the development of this project document). On average, 97 Million GEL damage is incurred in Georgia per year over the period. Assuming 22% of damages occur in Rioni basin (based on the proportion of total population living in Rioni), then 22 Million GEL of damages are incurred in Rioni per annum. Table 3 shows the results of a high level assessment of the benefit-cost ratio for this project for the Rioni basin (assuming damages in Rioni are 22% of the national total in any given year). The return period of the events resulting in damages in each year is not known (in fact it is not known whether the damages are incurred in one event, or several over the year), however, the figures can be used as a means of assessing the benefit-cost ratio at a very high level. Assuming that the current situation is the Do Nothing (baseline) scenario, it is reasonable to assume that the Do Something scenario will achieve 100% benefits for Rioni basin. The Do nothing Present Value damages is assumed to be 100% of the damages in any given year. The PV cost is the cost of the project (5.32 Million USD). Hence with 100% damages averted the maximum benefit-cost ratio for Rioni is 5.7 if the project delivers a standard of protection equivalent to the 1995 equivalent PV benefits. It

should be noted that the benefit-cost ratios for 2007 to 2009 are less than 1 even with relatively high flood damages. This is because there is no data on landslide and mudflow damages in these years. Importantly, this highlights the fact that the most economically viable approach to addressing natural hazard risk reduction in Rioni, is to address all three hazards. It is noted that these estimates do not take account of intangibles or indirect benefits. The project will undertake more detailed assessment of economic benefits of each component which will provide a better assessment of benefit-cost ratio.

Table 2: Damage to property from various natural disasters for the whole of Georgia 1995-2008

Year	Flood	Landslide	Mudflow	Total Damage
	Damage/ (mln GEL)	Damage/ (mln GEL)	Damage/ (mln GEL)	Damage/ (mln GEL)
1995	3.2	132.0	96.0	231.2
1996	28.5	80.3	27.0	135.8
1997	38.0	102.0	44.0	184.0
1998	2.0	67.0	20.0	89.0
1999	30.5	12.0	4.5	47.0
2000	2.0	13.0	3.0	18.0
2001	4.1	15.0	4.0	23.1
2002	78.7	13.8	2.5	95.0
2003	4.2	14.5	4.0	22.7
2004	20.5	147.0	28.0	195.5
2005	80.0	96.0	9.0	185.0
2006	15.0	70.5	40.0	125.5
2007	40.3	NA	NA	40.3
2008	38.0	NA	NA	38.0
2009	30.0	NA	NA	30.0

Source: National Environmental Agency, Division of Hydro-meteorological Hazards and Damage Mitigation

Table 3: Indicative benefit-cost ratio for Rioni basin.

Year	PV Benefits for Georgia/ (mln GEL)	PV Benefits for Rioni / (mln GEL)	PV Benefits for Rioni / (mln USD)	Benfit-Cost Ratio
1995	231.2	50.9	30.5	5.7
2004	195.5	43.0	25.8	4.9
2005	185.0	40.7	24.4	4.6
1997	184.0	40.5	24.3	4.6
1996	135.8	29.9	17.9	3.4
2006	125.5	27.6	16.6	3.1
2002	95.0	20.9	12.5	2.4
1998	89.0	19.6	11.7	2.2
1999	47.0	10.3	6.2	1.2
2007	40.3	8.9	5.3	1.0
2008	38.0	8.4	5.0	0.9

2009	30.0	6.6	4.0	0.7
2001	23.1	5.1	3.0	0.6
2003	22.7	5.0	3.0	0.6
2000	18.0	4.0	2.4	0.4

77. The above damages analysis does not include the government's contributions to annual maintenance of the flood defenses, as these are business-as-usual costs associated with the government's normal annual budgets to deal with flooding emergencies. The damages data used in the analysis are on top of the government's business as usual costs, and so the analysis shows the government expenditure over and above its annual budget, to deal with flood risk. The benefits analysis is therefore more in line with a 'business as usual' scenario (or Do Minimum) than a Do nothing. Do nothing is therefore used in the context of 'No project'. The analysis shows that if the government continues to undertake reactive, reparatory and *ad hoc* measures, it will continue to spend up to 22 Million GEL per annum to respond to flooding. If the project is undertaken and provides benefits through its basin-level and long term climate change resilient flood management measures, then the benefit to cost ratio is 5.7. It is not possible to quantify the benefit provided by other funds as, although there are other projects in the region, none provides the level of intervention and hence benefits that this project would, because the technical and geographical focus of other project does not align with the focus of this project.

78. The current approach to flood risk management in Georgia is largely reactive, with DRR interventions focusing on response, recovery and compensation. This includes the implementation of works to reconstruction/repair flood walls to existing levels thus providing the same standard of protection despite the increasing risk (frequency and magnitude) of failure of defenses under climate change. Indeed present disaster risk reduction activities in Georgia, including in Rioni river basin are mainly focusing on developing local capacities to cope with recurrent disasters: floods, flash floods, mudflows, etc. These actions are not taking into account long-term efforts to adapt to changing climate. Thus this proposed project is the first ever attempt to address long-term flood management measures and strengthen capacity of relevant institutions.

79. The aim of this project is to put in place, long-term flood management measures which will enable the government of Georgia to manage flood risk in a more sustainable manner. Flood plain management measures such as development zoning, for example, should reduce the need for response and recovery as the populations at risk will be greatly reduced. In addition, the need to compensate for flood damage will be reduced, as less properties will be affected by flooding. Under this project, direct measures including the construction of structural defenses which take account of climate change will provide a higher standard of protection that takes account of changing flood levels with climate change. This will reduce the risk of defense structure failure (operational and structural failure). Under this project a number of direct intervention structural measures will be implemented, which will complement and improve on the government's annual river wall defense work. This project therefore offers the critical long-term adaptation and climate resilient flood management measures required for the basin. It will also develop and provide the tools (e.g. modeling, monitoring, forecasting and early warning) that will enable the government to manage flood risk in a more sustainable and cost-effective manner.

80. Given the high priority assigned to hydro-meteorological threats in Georgia there are a number of on-going initiatives that the project will take account of. However, there is no intention or opportunity to co-finance the activities with other funding sources as the focuses (both technical and geographic) of these other projects is different to that of this project. For example the most important project to consider is the USAID – Integrated Environmental Management in Watersheds of Georgia" (INRMW) project, which will mainly focus on issues of water distribution, resource management, minimization of pollution and the

improvement of an overall management practice. The activities will mainly focus on large urban systems and also watershed management as relate to hydropower sector development in Georgia. This is different to the basin-wide approach of this project which is focused on flood risk reduction. Hence there is no opportunity to include any other funding source in this project and hence no additional direct economic benefit that can be derived from other projects in the same thematic context.

4. Describe how the project / programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programmes of action, or other relevant instruments, where they exist.

81. The project is a direct response to the priorities that have emerged from the Second National Communication. The SNC under its V&A assessment has looked into the Rioni River and its delta for the combined effects of intensified floods and coastal land submersion due to sea level rise. The project is designed to respond to the flood and flash flood risks in the most vulnerable river basin – Rioni, in the areas the most stricken by poverty and inhabited by many internally displaced people (IDPs) that are among the most vulnerable social groups of the Georgian society. The project, by pursuing objective of improving resilience of highly exposed regions of Georgia to hydro-meteorological threats, induced by climate change, directly contributes to some of the strategic policies that have been developed lately. For example, Georgia has recently prepared the second National Environment Action Plan (NEAP) for the period of 2010-2020. It has a dedicated section on natural and anthropogenic disasters that includes the aims related to mitigation and reduction of impacts posed by floods and flash floods in the main river basins. NEAP along with agriculture development strategy also prioritizes agro-forestry development as the strategic means for high economic value reforestation, soil stabilization, fuel wood provision and rural income generation. The project objective also fully resonates with the Regional Development Strategy for 2010-2017 that places climate hazard risk management squarely into the core of regional development objective. It specifically underscores importance of hazard mapping that is to underpin local development plans and signifies importance of early warning system for greater safety of local population and improved conditions for development through avoidance of economic losses and damage to community assets and infrastructure.

5. Describe how the project / programme meets relevant national technical standards, where applicable.

82. The project offers the solution that does not require any special permits or environmental impact assessment (EIA). The project will align with and contribute to the implementation of the law on Protection of Population and Territories against Natural and Manmade Emergency Situations; Water law and soil protection law. Moreover, the Georgian legislation currently lacks any legal standards or regulations on zoning in the floodplain areas or high hazard prone regions. The project will therefore help develop the legislative framework, a set of regulations and incentives that will help steer inappropriate development away from the areas with a high potential for damage and ensure that potential damage to developments likely to be affected by projected intensity of floods is limited to acceptable levels by means of standards, legal incentives and regulations (e.g. land use regulations, zoning, establishment of buffers in the floodplain areas, climate-resilient productive systems, building codes for flood proofing etc).

83. All UNDP supported donor funded projects are required to follow the mandatory requirements outlined in the UNDP Programme and Operational Policies and Procedures (UNDP POPP). This includes the requirement that all UNDP development solutions must always reflect local circumstances and

aspirations and draw upon national actors and capabilities. In addition, all UNDP supported donor funded projects are appraised before approval. During appraisal, appropriate UNDP representatives and stakeholders ensure that the project has been designed with a clear focus on agreed results. The appraisal is conducted through the formal meeting of the Project Appraisal Committee (PAC) established by the UNDP Resident Representative. The PAC representatives are independent in that they should not have participated in the formulation of the project and should have no vested interest in the approval of the project. Appraisal is based on a detailed quality programming checklist which ensures, amongst other issues, that necessary safeguards have been addressed and incorporated into the project design.

84. In line with new Georgian rules, the project concept document was submitted to the Office to the Prime Minster and has been approved.

6. Describe if there is duplication of project / programme with other funding sources, if any.

85. Given the high priority assigned to hydro-meteorological threats in Georgia there are number of on-going initiatives that the project will look to coordinate some of its activities with. Consultations were held with all key NGOs during the development of this project document. A review was undertaken of all previous and ongoing studies in the Rioni basin and also country-wide It was found that, while there are some projects that can be of use on in some aspects, there were none that would constitute duplication of effort. The USAID project will provide opportunities for coordination of efforts, however, as some of the scoping and background information it is seeking to collect, would be of use to the Rioni. However, the proposed project is unique in its scope and geographic coverage and is ambitious in that regard. It will be the first project of its kind in Georgia and will be critical to providing a benchmark for how Georgia undertakes flood risk management in other basins.

86. Annex 6 is a table summarising all information provided by NGOs about relevant projects. The most important initiatives are described below:

USAID – Integrated Environmental Management in Watersheds of Georgia" (INRMW).

87. In October 2010 USAID-Caucasus launched a 6 Million USD multi-year project: "Integrated Environmental Management in Watersheds of Georgia" (INRMW). The primary goal of the INRMW Programme is to improve current and future lives of people in Georgia by utilizing and managing natural resources more sustainably, including water, soil, vegetation, and the ecosystems that encompass them. The project aims to introduce innovative approaches and practical models of participatory integrated natural resources management in targeted watersheds, by facilitating reforms to and harmonization of national policies, and by increasing the capacity of national and regional institutions to replicate these approaches and models throughout the country. These models will be introduced in four representative watersheds of Rioni and Alazani-Iori River Basins and efforts will be made to upscale and disseminate them across the country. An initial Rapid Basin Assessment was recently completed, the objective of which was to collect, synthesize and analyze the baseline situation existing in the three river basins in terms of their ecological status and the use of natural resources there as well as to identify linkages among the use of natural resources and ecosystem functions. In addition, the baseline has defined resource use opportunities, where sustainable and integrated management of these resources to realise the immediate health, environment and ecological benefits. The focus is on sectors for water, land, biological and mineral resources management as well as on sectors having adverse impacts on ecosystems, including agriculture, energy and water supply. The existing enabling environment and current practices for management of wastes, natural disasters and climate change, significantly affecting the resource base of the targeted river basins are also considered. The assessment analyzes the current situation, the gaps and the areas of conflicts among sectors in the context of integrated natural resources management. The

results of the analysis will be used for selection of four smaller watersheds for concrete interventions and management plans. In addition, USAID will provide design and implementation assistance and advice to the Government of Georgia and coordination between the various agencies involved. The USAID project will mainly focus on issues of water distribution, resource management, minimization of pollution and the improvement of an overall management practice. The activities will mainly focus on large urban systems and also watershed management as relate to hydropower sector development in Georgia. The consultations with USAID local office in Georgia confirmed the need for close cooperation both at the project design and implementation stage. The projects can potentially share background data, and the baseline data already collected by USAID will be of value to this project and could save time and effort. Further collaboration opportunities will become apparent when the INRMW project selects target areas. Ideally, to maximize coverage of implemented intervention measures, the INRMW project should look to select different target areas to those selected for this project. During the feasibility phase, close consultations have been undertaken with the USAID project office and a cooperation MoU has been considered as one of the viable options ensuring effective coordination during the implementation.

USAID – Climate Change Adaptation and Disaster Mitigation (CCADM)

88. USAID funded "Climate Change Adaptation and Disaster Mitigation (CCADM)" project with total budget of 100,000 and implementation period through 2012 covers the regions of Eastern, Southern and Western Georgia. The overall goal of the project is to develop flexible and resilient societies and economies in rural areas of Georgia capable of coping with the impacts of current climate variability and future climate change. Specific objective of the Project is to reduce the susceptibility of local communities in the pilot rural areas of Georgia (Samtskhe-Javakheti, Adjara and Kakheti regions - regions that do not overlap Riv.Rioni-basin area) to negative climate impacts through post-conflict environmental rehabilitation, natural disaster risk reduction (DRR) and climate change adaptation (CCA). Lessons learned will be transferred to the current project that might be of value even if the geographical coverage of the project does not coincide with the target areas of this project.

World Bank - Europe and Central Asia Climate Change Risk Mitigation Measures project

89. The aim of this project is to introduce a simple and cheap community-operable system of early warning on the expected floods to rural communities of upstream Rioni river basin (in Racha). A small network of community-operated monitoring instruments was installed and provides flood risk warnings within the pilot region of Racha, upstream Rioni basin. Staff of Hydromet service was trained in installation of the community-operable monitoring networks for flood warning and in interpretation of data incoming from such networks. This project will provide lessons-learned but has no overlap with the current project.

EC Delegation on Georgia - Strengthening local capacity and developing structured dialogue and partnerships for mitigating natural disasters and reducing poverty in Georgia

90. EC Delegation funds this project which will run through 2011 to accomplish the following aims: (i) Strengthen local capacity to empower affected communities and local authorities to prevent and reduce the natural disasters risks and promote sustainable rural development in the targeted regions of Georgia; (ii) Develop issue-based coalition and partnerships to stimulate structural dialogue between the local communities, local authorities and central government concerned with the natural disaster risk reduction (DRR) and management; (iii) Prioritize the natural disaster risk reduction (DRR) and management in the State agenda as key factors for eradication of poverty and lobbying for allocation of funds to competent central (Ministry of Environment, Ministry of Agriculture) and local authorities to address natural disasters.

91. Similarly, the MATRA programme through the Dutch bilateral aid funds the institutional capacity development project – "Institutional Building for Natural Disaster Risk Reduction (DRR) in Georgia" The Project objective is institutional capacity building in DRR via introduction of modern spatial approaches and technologies and risk communication strategy in spatial planning in Georgia. The project will also run through 2011. CENN also implements number of small scale community mobilization and DRR awareness raising projects in high hazard prone regions. This project will provide useful lessons learned with respect to GIS training and the establishment of a EWS web-based GIS framework. This project will draw on those lessons, and will review the project outcomes prior to implementing similar components.

92. Annex 6 indicates that there is a plethora of relevant projects that have been or are being undertaken that would be of benefit to the current study. Most of the studies either have narrower geographic coverage compared to the basin wide coverage of this project, or are short-term with limited budget and narrowly focused in scope. Even though a stocktaking exercise has been conducted during the preparatory phase of this project more detailed review of key results, including lessons learned will be undertaken during the implementation to fully feed existing knowledge and experience.

7. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

93. A dedicated knowledge management output will be delivered under the component 2 that tests and implements concrete adaptation measures in relation to flood/flash flood risk management in the face of climate change. This will include three distinct categories of activities: (i) identify and recover traditional non-structural flood mitigation and management measures in Georgia; (ii) identify and transfer good practices from the international experience that can be customised under the conditions of the targeted geographic areas; and (iii) capture, codify and disseminate lessons learned and best practices generated by the project. These three categories of knowledge management actions will help generate the valuable lessons and consolidate the knowledge that can be widely exchanged through the Adaptation Learning Mechanism (ALM) and other networks.

94. The project will establish an Expert Team – Consultation Group under the Project Board that will be tasked to take stock of all research and study material conducted by various organizations, including those in the framework of the donor or government funded projects and programmes. The Group will codify and distill all available lessons learned and good practices as they come out from other related initiatives and advise the project team and the Board on adequate actions. The expert team will provide advisory service so that all adaptation measures are scientifically sound and have strong technical grounding

8. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation.

95. The potential stakeholders and partners of the project were identified and consulted during the proposed concept development. Further consultations were undertaken during development of the project document and field missions organized in the target areas. Consultation was undertaken at the central and local governmental level. All six targeted regions have been covered during the consultations. Through local authorities (governor's office) the community meetings were organised in Oni, Lentekhi, Ambrolauri, Tsageri, Tskaltubo and Samtredia in order to conduct detailed field surveys. The field surveys have been done in all municipalities by the national experts and NEA staff, as part of the project feasibility. The sites/communities for surveys were chosen according to the detailed list of high exposure sites provided by the NEA and MRDI. Direct consultations with the communities (by national and

international consultants) have been held in the following venues: Tsageri municipality, Asatiani Museum at the central part of the municipality, St. Michael cemetery at the outskirts of the villages, Lentekhi municipality, Zarati and Gumati villages. Tsageri municipality meeting however was attended by representatives of all municipalities selected according to the list of affected sites. In total over 180 community members attended the consultations among which 60% were women. During the field visits Tsageri and Lentechi municipalities were given more attention because of higher level of exposure and vulnerability to floods and particularly flash floods due to their upstream geographic location and consequently greater concentration of project activities foreseen in these areas.

96. Participants represented a wide range of social groups in the basin, such as municipal authorities, teachers, farmers, elderly (pensioners), schoolchildren, and local business community. Such a wide range of representation was necessary to better understand socio-economic implications of floods locally, perceptions of risks, already practiced responses and the measures that the community would feel fully committed to support to minimize the impacts from floods and flash floods. Each consultation meeting was structured around the following main topics:

1. Perception of community about frequency and intensity of extreme weather events and climate hazards (floods, flash floods mudslides, etc);

2. Type and magnitude of losses due to these hazards (human losses, damage to infrastructure, economic losses such as crop failures etc)

3. Assessment of key vulnerabilities, current coping mechanisms and capacities (infrastructure and settlement expansion towards the floodplain, types of protection, existing compensation and rehabilitation support from the Municipalities and the central government, types of local response measures, plantations, revetments, digging the tranches and sloping terraces etc);
4. Priority needs to address additional vulnerability induced by climatic risks and actions for risk reduction (introduction of risk insurance, landscape level measures, zoning policies).

97. Participants of all targeted municipalities confirmed that the floods incidents have increased since 1950s. Better forecasting of floods are necessary, currently this is complicated as there are no sufficient stations and many gauges need to be re-instated and modernized (mainly participants from Oni and Ambrolauri) People know that in May, June, August the flood risk is greatest, so they try prepare accordingly, but more reliable forecasts and early warning would help enormously. 80% of the region lives in the hazard zone, population fear that many bank fortifications (such as cement river walls) may breach and flood nearby towns and villages. Maintenance costs of hard defenses are also high and other measures that may improve protection are needed (Lentekhi, Tsageri) All participants welcomed bioengineering measures as they will also employ lots of people. Regions have high unemployment so if this can be done and will establish itself as a municipal practice then approximately 1,000- 2,000 people in each region can be employed. Under the current legislation, permission is required to build in the floodplain. Hence ‘zoning’ already exists. However, it is less elaborate (no sub categories of various types of zones; and is not based on hazard maps or long term scenarios for flood risks) and loosely applied in order not to conflict with socio-economic interests of the local population. But if certain categories will allow for agroforestry or seasonal pastures that will have obvious local economic gains it will be strongly supported. All community representatives agreed that if flood risk can be eliminated, all other economic activities can flourish, including tourism.

98. Annex 7 lists the main consultees that contributed to the formulation of this project.

9. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

1. Floodplain development policy introduced to improve long term resilience to flood / flash flood risks

Baseline (without AF resources)

99. Without the AF support Georgia will continue to treat floods, flash floods and associated disasters (mudflows and landslides) only after the occurrence of these events, mainly focusing on recovery. Despite the latest moves towards the prevention, the dynamic of hydrometeorological threats due to projected climate change are not duly considered or reflected in sectoral policies or national legislation. As a result, there are considerable regulatory gaps in land use policies that are essential for any meaningful, long term flood / flash flood risk management in the face of climate change. Technical capacities will remain limited to correlate land use and spatial planning methods with flood risk prevention and management.

Additional (with AF resources)

100. The project will help develop floodplain development policy and fill all land use regulatory gaps in this regard. Based on thorough trade-off analysis, the project will design a set of zoning regulations and legal incentives that will steer the development away from the climate risks and considerably reduce exposure and vulnerability to the flood and flash flood risks. Such productive use of land that generates economic benefit from the flood cycles and improves discharge transmission or water infiltration will be established. Flood proofing of housing schemes and integration of climate risk management into the construction permits will contribute to long term resilience. Flood insurance scheme at local level will raise awareness of exacerbating flood risks and help communities transfer at least part of the residual risks after the above noted adaptation measures have been fully enforced.

2. Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly exposed communities

Baseline (without AF resources)

101. The government has an annual budget allocation for flood and flash flood prevention measures through targeted embankments and river bank revetments. These structural measures that often prove inadequate or ineffective due to exacerbated flood events will continue to encroach on the state budget and maintenance works will remain under funded as these structures will be in constant need of revamping due to amplified impacts of climate change on flood cycles. Despite number of local initiatives currently underway, the flood risk management is largely limited to traditional Disaster Risk Reduction activities without due consideration of long term impacts of climate change on hydrological regimes of the main rivers.

Additional (with AF resources)

102. The project will design and implement adaptation measures that are more resilient to long term climate change risks. It will engage local communities in the direct action through the local employment scheme that will provide for labour intensive, seasonal works of terracing, trenching, re-planting of vegetative buffers, plant / tree revetments and other bio-engineering measures that will improve the stability of certain protection infrastructure (e.g. dikes) and improve resilience of the settlements and local economic assets. These measures will be designed based on traditional knowledge, local topographic and other bio-physical conditions and with a full awareness and knowledge of the international best practice. Since the proposed bio-engineering measures are non-structural in their nature they do not require, according to the national law, environmental impact assessments. Moreover, as discussed in the section

on socio-economic and environmental benefits, these measures carry important role of reinforcing natural functions of floodplains (saturation and transmission capacities) and soil stabilization along the banks.

3. Early warning system in place to improve preparedness and adaptive capacity of population

Baseline (without AF resources)

103. Early warning systems have gained lots of attention recently and is placed very high up on the national agenda. The government allocated an unprecedented amount of US$600,000 in 2010 to purchase and install number of automatic meteorological stations and meteorological gauges. 7 meteorological gauges and 7 meteorological posts have been installed with support of the Finish government. Some other donors have also contributed in strengthening the observation and forecasting capacity of the National Environment Agency. Despite these advancements, the recent capacity needs assessment for Early Warning System in Georgia highlighted considerable capacity gaps both in terms of risk assessment methods, observation, forecasting and communication. The recently installed observation capacities have improved the system but because of complex topography and micro-climatic conditions in Georgia, density of the observation networks needs to be much greater. Without the AF support, the advanced methods of risk assessment, forecasting and dissemination of early warnings will remain outdated following the old soviet standards.

Additional (with AF resources)

104. The project will cover the cost of targeted training for the NEA staff; improve the risk assessment, forecasting and early warning communication methods at this key institution and build up its observation capacity for the Rioni river basin that will eventually improve the climate monitoring and observation system for wider region of the Western Georgia that is particularly susceptible to flood and flash flood risks (see the annex 3).

PART III: IMPLEMENTATION ARRANGEMENTS

A. Describe the arrangements for project / programme implementation.

105. Upon the request of the Government of Georgia, UNDP is the Multilateral Implementing Entity (MIE) for the project. The project is nationally implemented (NIM16) in line with the Standard Basic Assistance Agreement (SBAA, 1993) and the UN Development Assistance Framework (UNDAF) for the period of 2011-2015 signed between the UN and the Government of Georgia. The project is also in line with the UNDP's Country Programme Document (CPD) for the period of 2011-2015, approved by UNDP's Executive Board and Country Programme Action Plan (CPAP) 2011-2015 signed by UNDP and Government of Georgia in April 2011.

106. While UNDP is the MIE for the Project, the Ministry of Environmental Protection (MoEP) is the government institution that will act as the Implementing Partner/Executing Agency (EA)17. The project will be implemented through MoEP's National Environment Agency (NEA)18. While NEA will be responsible for overall project implementation and will be the project executing entity, the Ministry of Regional Development will be a major partner under the components 1 and 2 (see more in point 8). The role of MRDI vis-à-vis the NEA in the project is important for components 1 and 2 as these will address floodplain development policy development to improve long term resilience to flood / flash flood risks

[16] National Implementation Modality

[17] In accordance with UNDP programme guidelines, for UNDP it will be 'Implementing Partner'. The 'executing entity' for AF is the same as 'implemented partner' for UNDP

[18] NEA is a Legal Entity of Public Law under the Ministry of Environment Protection

and introduce flood direct measures of long term flood prevention and risk mitigation. The MRDI is the main institution responsible for regional development strategies and local budgetary investments through the Municipal Development Fund and Regional Priority Programmes. The MRDI is responsible for infrastructure rehabilitation and construction in all regions of Georgia, including river bank protection measures (mainly structural). This increases its role in disaster risk reduction, as the risk of floods/flash floods are quite high in Rioni river basin.

107. NEA's role in the framework of the project is fully in line with its leading institutional role in climate resilient flood management. Indeed MRDI is a responsible for infrastructure development in the country and therefore is a critical partner of the project as described above, but it is not charged with the tasks for flood management. NEA as a part of the Ministry of Environment has been established by the consolidation of key state departments, such as Department of Hydrometeorology, Geological hazards management, Environmental Pollution Monitoring and Environmental Protection Information Service. NEA is responsible for provision of key technical inputs, collection and analysis of hydro-meteorological and geological monitoring data, including medium-and long-term forecasting for further processing by relevant sectorial ministries and state entities. NEA also carries out EIAs or technical review-based clearances on parameters and locations for any infrastructure projects. Thus, NEA holds a key location and crucial role in the overall hazard and risk identification, assessment, monitoring and forecasting chain. Therefore, embedding necessary technical capacities for climate resilient flood management at this very agency is a strategic decision for long lasting impacts. Moreover, the NEA has the critical role and mandate in flood management related decisions, especially for preventive and adaptation measures.

108. As a Multilateral Implementing Entity, UNDP is responsible for providing a number of key general management and specialized technical support services. These services are provided through UNDP's global network of country, regional and headquarters offices and units and include assistance in: project formulation and appraisal; determination of execution modality and local capacity assessment; briefing and de-briefing of project staff and consultants; general oversight and monitoring, including participation in project reviews; receipt, allocation and reporting to the donor of financial resources; thematic and technical backstopping; provision of systems, IT infrastructure, branding, and knowledge transfer; research and development; participation in policy negotiations; policy advisory services; programme identification and development; identifying, accessing, combining and sequencing financing; troubleshooting; identification and consolidation of learning; and training and capacity building.

109. As outlined in UNDP's application to the Adaptation Fund Board for accreditation as a Multilateral Implementing Entity, UNDP employs a number of project execution modalities determined on country demand, the specificities of an intervention, and a country context. Under the national implementation modality proposed to be used for this project, UNDP selects a government entity as the Implementing Partner based on relevant capacity assessments performed by UNDP. The Implementing Partner is the institutional entity entrusted with and fully accountable to UNDP for successfully managing and delivering project outputs. It is responsible to UNDP for activities including: the preparation and implementation of project work plans and annual audit plans; preparation and operation of project budgets and budget revisions; disbursement and administration of funds; recruitment of national and international consultants and project personnel; financial and progress reporting; and monitoring and evaluation.

110. However, as per the established practice for majority of UNDP projects in Georgia, a Standard Letter of Agreement between UNDP Country Office and the Governmental entity. Thus, as stated above, UNDP retains ultimate accountability for the effective implementation of the project as well as ensures application of UNDP rules and procedures for procurement of services and goods and recruitment of personnel. The UNDP will provide support to the National Project Director (appointed by MoEP) in order to maximize the programme's impact as well as the quality of its products. Moreover, it will be responsible for administering resources in accordance with the specific objectives defined in the Project

Document, and in keeping with the key principles of transparency, competitiveness, efficiency and economy. The financial management and accountability for the resources allocated, as well as other activities related to the execution of programme activities will be undertaken under the direct supervision of the UNDP Country Office.

111. As stated above, the MoEP, through its National Environmental Agency is identified as UNDP's Implementing Partner (i.e. Executing Agency as per the terminology used by the AF). The MoEP will assume responsibility for the project implementation, and the timely and verifiable attainment of project objectives and outcomes. It will provide support to the project management unit, and inputs for the implementation of all project activities. The MoEP will nominate a high level official who will serve as the National Project Director (NPD) for the project implementation. For the purpose of directing the project, the Project Executive Board (PEB) will be established and serve as ultimate decision-maker and ensure that the project remains on course to deliver the desired outcomes of the required quality. The PEB will meet on a quarterly basis (or more often if required). The Project Manager that will be recruited to ensure day-to-day management of the project, will submit quarterly progress reports for the previous period and a work plan for the next one. The PEB will evaluate submitted documents and be in charge of approving plans and budgets.

112. The MRDI is a key stakeholder and partner for the project, especially for components 1 and 2. The MRDI is the main institution responsible for regional development strategies and local budgetary investments through the Municipal Development Fund and Regional Priority Programmes. National Execution enables the project to exercise greater national ownership. UNDP will provide technical backstopping, quality assurance and compliance with fiduciary standards in its capacity of MIE.

113. And lastly, to ensure day-to-day operation and smooth implementation of the planned activities, the Project Management Unit (PMU) will be established and staffed with the Project Manager and support staff. Short-and medium term expertise and consultancies will be also procured, as necessary, for specific planned actions. The PMU will be integrated to the existing structures of the MoEP to ensure alignment and coordination with other ongoing national initiatives.

114. It is noteworthy that the Project Assurance role is the responsibility of each Project Board member; however, this role will be delegated to the UNDP Environment and Energy Portfolio Team Leader and Portfolio Associate. This will ensure appropriate project milestones are managed and completed as well as objective project oversight and monitoring achieved. UNDP's Regional Centre in Bratislava will provide support services to the country office.

B. Describe the measures for financial and project / programme risk management.

Key risks underlying the project have been analyzed and qualitatively assessed in connection with the context of the target sites for the project. Potential risks include:

No	Risk	Classification	Possible Measures for Addressing the Risk
1	Unforeseen delays in undertaking essential surveys due to weather/access issues etc.	High	Surveys to be scheduled to maximise favourable weather conditions. Early reconnaissance visits to remote areas will determine potential access difficulties. Issues/Risks will be raised to the PEB and adequate mitigation measures will be

			discussed/approved by PEB and implemented.
2	Adverse climatic conditions may also pose risks to workforce health and safety, or damage adaptation measures being implemented	High	The project will draw up an engineering and safety plan to reduce immediate risks of hazard occurrence during works. Health and safety precautions for the workforce will be established in the inception phase, drawing on lessons from other high altitude projects. Contingency and evacuation plans will be prepared.. All sub-contracted firms will need to have H&S insurance for its employees.
3	Resistance of certain government institutions to introduce floodplain development policy that sets number of land use limiting regulations and floodplain zoning rules.	Medium	Bottom-up approach to the policy development with active engagement of local population and authorities will enable the project to follow the principles of subsidiarily and participation underlined in the Regional Development Strategy and help local authorities make decentralised climate compatible development decisions. Engagement of the Regional Development Ministry will help the flood plain policy to emerge in full consistency with the development priorities that will be supported to embark on climate resilient pathway.
4	Lack of incentives for particular local communities to cooperate in activities that do not yield immediate financial value, but aim at longer-term resilience, may reduce stakeholder engagement and comprehensive participation.	Medium	The project incorporates activities that yield immediate benefits for communities in terms of awareness, preparedness, skill development and income generation (employee guarantee scheme). This will be emphasized during all meetings and consultations with community representatives during the inception phase
5	Due to staff turnover at the target Ministries the trained staff may leave for the other job opportunities undermining installed technical capacity	Low	Special training conditions and / or training for trainers will be arranged to keep the trained staff at the target Ministries. Staff retention and succession plans will be developed
6	Delays in recruitment of qualified project staff may affect the timeframe of different project activities.	Low	A pro-active coordination mechanism will be established by UNDP during the project inception phase. TORs for project staff will be prepared immediately after project endorsement by the AF Board

7		Low	Inception workshop will be used to confirm institutional mechanism for project implementation. Inception report will be used to reflect any changes or amendments as required,
	Changes in the governmnet structures and functions of the Min of EP.	Low	Closely monitor situation and keep regularly updated on any developments in this regards; call immediately PEB meeting.

115. Over the course of the project, a UNDP risk log will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified. At the time of project formulation, strong political commitment from national as well as municipal authorities is evident which will limit a number of risks from materializing. Consistent involvement of a diverse set of partners, including local municipalities, community organizations and NGOs will further reduce these risks.

C. Describe the monitoring and evaluation arrangements and provide a budgeted M&E plan.

116. Project monitoring and evaluation (M&E) will be in accordance with established UNDP procedures and will be carried out by the Project team, verified by the Ministry of Environment, NEA and MRDI and the UNDP Country Office in Georgia. Dedicated support by the technical adaptation teams in the UNDP Regional Center for ECIS and UNDP New York will be provided on a regular basis. A comprehensive Results Framework of the project will defines execution indicators for project implementation as well as the respective means of verification. A Monitoring and Evaluation system for the project will be established based on these indicators and means of verification. Targeted M&E activities for the proposed project include the following:

117. A **Project Inception Workshop** will be conducted within two months of project start up with the full project team, relevant government counterparts and UNDP. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan. A fundamental objective of the Inception Workshop will be to present the modalities of project implementation and execution, document mutual agreement for the proposed executive arrangements amongst stakeholders, and assist the project team to understand and take ownership of the project's goals and objectives. Another key objective of the Inception Workshop is to introduce the project team which will support the project during its implementation. An Inception Workshop Report will be prepared and shared with participants to formalize various agreements decided during the meeting.

118. A UNDP **risk log** will be regularly updated in intervals of no less than every six months in which critical risks to the project have been identified. **Quarterly Progress Reports** will be prepared by the Project team and verified by the Project Board. **Annual Project Reports** will be prepared to monitor progress made since project start and in particular for the previous reporting period. These annual reports include, but are not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative);
- Project outputs delivered per project Outcome (annual);
- Lessons learned/good practices;
- Annual expenditure reports;
- Reporting on project risk management.

119. Government authorities, members of Project Board and UNDP staff will conduct regular **field visits** to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress.

120. In terms of financial monitoring, the project team will provide UNDP with **certified periodic financial statements,** and with an **annual audit** of the financial statements relating to the status of funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted in accordance with UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects by a legally recognized auditor of the Government, or by a commercial auditor engaged by the Government.

121. The project will undergo an independent **Mid-Term Evaluation (MTE)** at the mid-point of project implementation, which will determine progress being made toward the achievement of outcomes and identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. Final **External Evaluation** will be conducted 3 months before project closure.

The budgeted Monitoring & Evaluation plan is as follows:

Type of M&E activity	**Responsible Parties**	**Budget US$*** *(does not include staff time)*	**Time frame**
Inception workshop	Project Manager NEA UNDP-CO	500	Within first two months of project start up
Inception Report	Project team UNDP-CO	None	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	Project Manager	None	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	Project Manager		Annually prior yearly reports and to the definition of annual work plans
Monthy / quarterly reports	Project team	None	At the end of each month
Annual reports	Project team UNDP-CO	$500	At the end of each year
Meetings of the Project Coordination Committee (Project executive Board? This is a term used for all UNDP projects,	Project Manager UNDP-CO	None	After the inception workshop and thereafter at least once a year
Technical reports	Project team External consultants	None	To be determined by Project team & UNDP CO
Mid-term external evaluation	Project team UNDP-CO External consultants	20,000	At the mid-point of project implementation.
Final external evaluation	Project team UNDP-CO External consultants	20,000	At the end of project implementation
Final Report	Project team UNDP-CO	None	At least one month before the end of the project
Publication of lessons learned	Project team	17,500 (average 4,375 per year)	Yearly
Audit	UNDP-CO Project team	28,000 (average 7,000 per year)	Yearly
Visits to field sites (UNDP		2,000	Yearly

Type of M&E activity	Responsible Parties	Budget US$* *(does not include staff time)*	Time frame
staff travel costs to be charged to IA fees)	UNDP-CO		
TOTAL INDICATIVE COST		**88,500**	

D. Include a results framework for the project proposal, including milestones, targets and indicators.

A results framework including milestones, targets and indicators is presented in Annex 9.

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. RECORD OF ENDORSEMENT ON BEHALF OF THE GOVERNMENT[19]

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

Giorgi Zedgenidze, Deputy Minister of Environment Protection and Natural Resources	Date*:* July 7, 2011

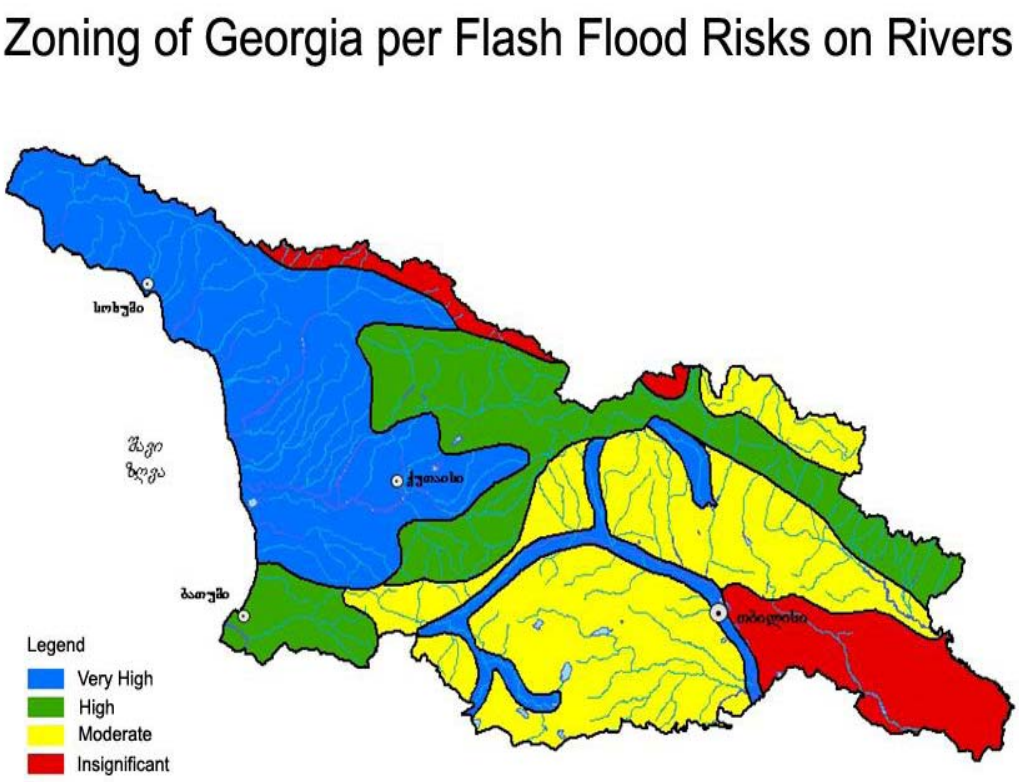
B. IMPLEMENTING ENTITY CERTIFICATION

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, understands that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
Y. Glemarec Yannick Glemarec Director Environmental Finance UNDP Implementing Entity Coordinator	
Date: November 7, 2011	Tel. and email: Yannick.glemarec@undp.org; +1 212 906-5143
Project Contact Person: Adriana Dinu (Green-LECRDS)	
Tel. And Email: +421 259337 332; adriana.dinu@undp.org	

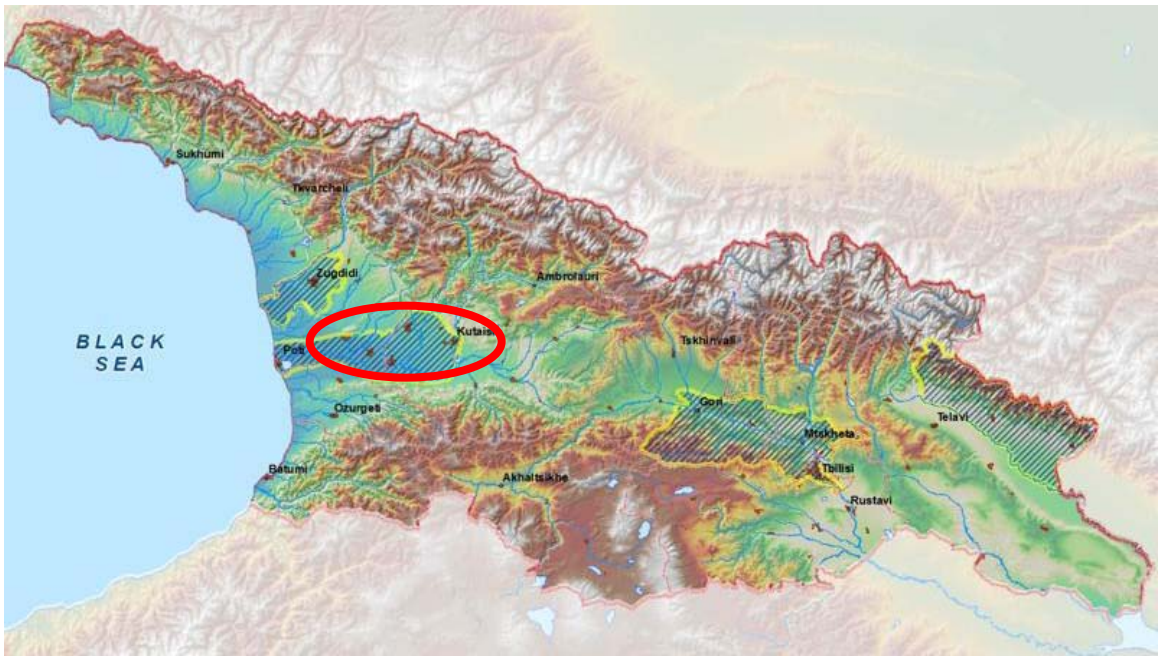
6. Each Party shall designate and communicate to the Secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

Annex 1[20]: Map of flood and flash flooding risks in Georgia



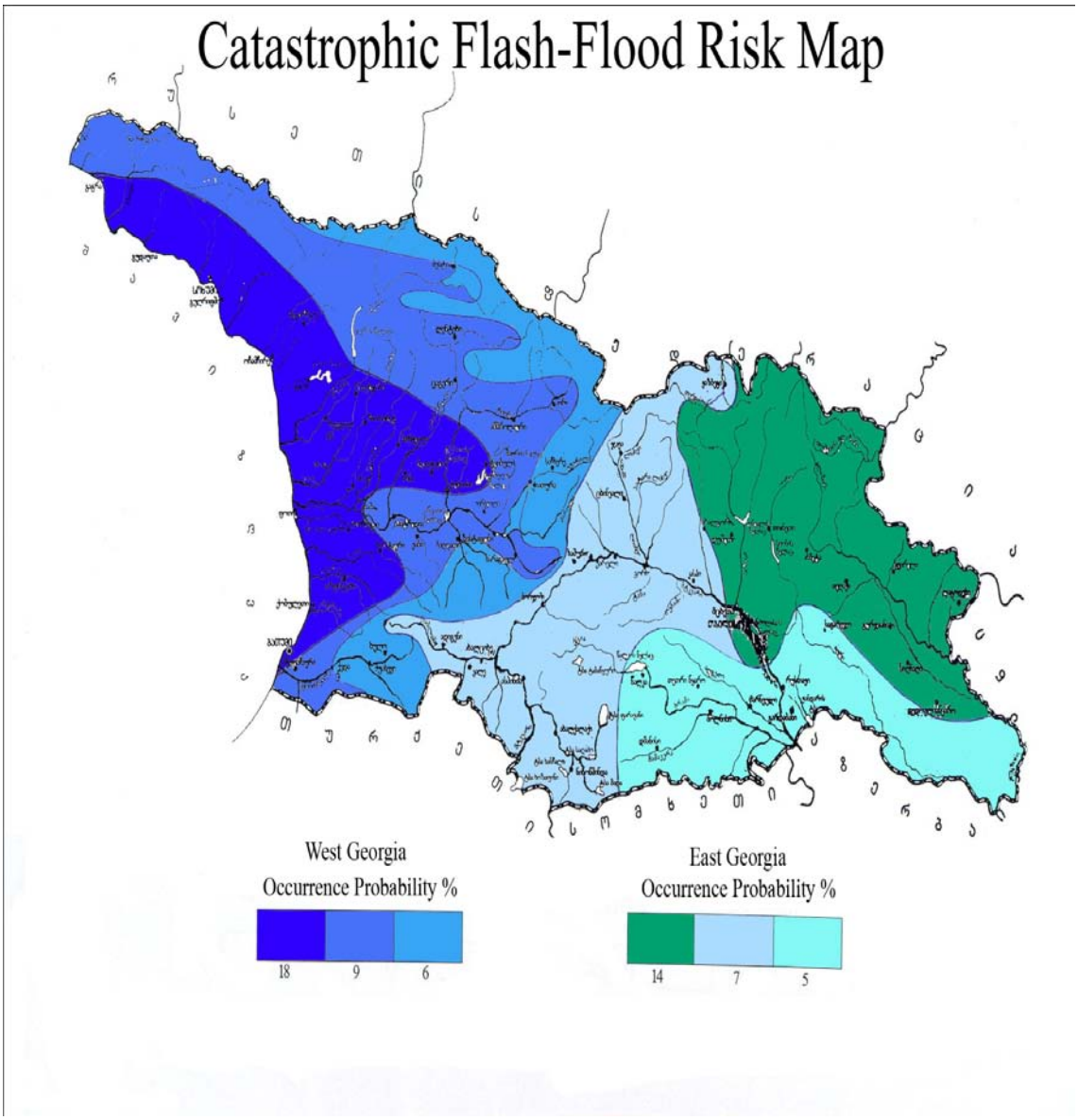
[20] All maps are prepared by NEA

Annex 2: Priority sub-catchments for floods and flash flood hazards in Georgia; Marked project area in the Rioni River basin (upper, mid and low reaches)



Annex 3: Catastrophic Flash-Flood Risk Map

Indicates high hazard occurrence probabilities in the Western Georgia



Annex 4: UNDP Environmental Finance – Specialized Technical Services

The implementing entity fee will be utilized by UNDP to cover its indirect costs in the provision of general management support and specialized technical support services. The table below provides an indicative breakdown of the estimated costs of providing these services. If the national entity carrying out the project requests additional Implementation Support Services (ISS), an additional fee will apply in accordance with UNDP fee policy regarding ISS and would be charged directly to the project budget.

Category	Indicative Services[1] Provided by UNDP	Estimated Cost of Providing Services[2]
Identification, Sourcing and Screening of Ideas	Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF). Engage in upstream policy dialogue related to a potential application to the AF. Verify soundness and potential eligibility of identified idea for AF.	20,825
Feasibility Assessment / Due Diligence Review	Provide up-front guidance on converting general idea into a feasible project/programme. Source technical expertise in line with the scope of the project/programme. Verify technical reports and project conceptualization. Provide detailed screening against technical, financial, social and risk criteria and provide statement of likely eligibility against AF requirements. Determination of execution modality and local capacity assessment of the national executing entity. Assist in identifying technical partners. Validate partner technical abilities. Obtain clearances from AF.	62,475
Development & Preparation	Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project/programme. Source technical expertise in line with the scope of the project/programme needs. Verify technical reports and project conceptualization. Verify technical soundness, quality of preparation, and match with AF expectations. Negotiate and obtain clearances by AF. Respond to information requests, arrange revisions etc.	83,300
Implementation	Technical support in preparing TORs and verifying expertise for technical positions.	187,425

	Provide technical and operational guidance project teams. Verification of technical validity / match with AF expectations of inception report. Provide technical information as needed to facilitate implementation of the project activities. Provide advisory services as required. Provide technical support, participation as necessary during project activities. Provide troubleshooting support if needed. Provide support and oversight missions as necessary. Provide technical monitoring, progress monitoring, validation and quality assurance throughout. Allocate and monitor Annual Spending Limits based on agreed work plans. Receipt, allocation and reporting to the AFB of financial resources. Oversight and monitoring of AF funds. Return unspent funds to AF.	
Evaluation and Reporting	Provide technical support in preparing TOR and verify expertise for technical positions involving evaluation and reporting. Participate in briefing / debriefing. Verify technical validity / match with AF expectations of all evaluation and other reports Undertake technical analysis, validate results, compile lessons. Disseminate technical findings	62,475
Total		**416,500**

[1] This is an indicative list only. Actual services provided may vary and may include additional services not listed here. The level and volume of services provided varies according to need.
[2] The breakdown of estimated costs is indicative only.

[i] This is the total fee for UNDP services provided as Implementing Entity. If the Implementing Partner (the national entity carrying out the project) requests additional Implementation Support Services (ISS), an additional fee will apply in accordance with UNDP fee policy regarding ISS. Whilst the total fee will be US$229,500, the breakdown provided is an estimate only.

Service standards:

1. initial response to communication within 2 working days
2. full response to communication (with the exception of a response requiring travel) within 10 working days

Annex 5: list of prioritized locations in the 6 target municipalities

Priority within the Municipality	Municipality	Address of the object	Description of damage	What is under threat	Works needs to be carried out	Cost (GEL)
1	Abrolauri city	Territory adjacent to the Vazha-Pshavela st.	Rioni is eroding river bank	Pillar of the bridge and living building (block)	Costal fortification with boulders	150,000
2	Ambrolauri	Village Bugeuli, R. Rioni	River erodes central highway	Central highway	Costal fortification with boulders	150,000
1	Oni	Oni, Lebanidze bank	0	Population and the street	Construction of gabion	180,000
2	Oni	Oni, Vakhtang VI St.	0	population	Construction of gabion	24,000
3	Oni	Village Shardometi		Road, population	Construction of gabion	476,000
1	Lentekhi	Village Rtskhmeluri	Bank fortification gabion damaged	community	Construction of gabion	1,000,000
2	Lentekhi	Village Mami	Village is eroded by r. Tskhenistskali	Community, church, graveyard	Stone embankment	180,000
3	Lentekhi	V. Babili	Village is eroded by r. Tskhenistskali	highway ; community	Stone embankment	210,000
1	Samtredia	V. Sajavakho	River bed is changed to the left side and flooded state and private plots	Population and school	Fortification of left bank of the river	672,000
1	Tskaltubo	V. Geguti on the R. Rioni	River bank is damaged	Railway rail, population of the village, agricultural grounds	Bank fortification works	400,000

2	Tskaltubo	V. Zarati on the R. Rioni	River bank is damaged	population of the village, agricultural grounds	Bank fortification works	550,000
1	Tsageri	town Tsageri, Sanapiro St.	Rehabilitation of protection wall on the right bank of the river	Population of the town	Rehabilitation several segments of protecting concrete wall	500,000
2	Tsageri	Town Tsageri Territory adjacent to landfill and brick factory territory	Right bank of the river	grounds	Construction of protection railing (dam?)	108,000
3	Tsageri	Village Lasuriashi	Protecting wall on the left bank of the river	Road to the school and agricultural grounds	Need in wire netting gabion	72,000
4	Tsageri	Village Tchalistavi	Right bank of the river	Community agricultural grounds	Need in wire netting gabion	108,000
Total (GEL)						**4,780,000**
Total (USD)						**2,868,000**

Annex 6: Relevant aid-funded projects

Organisation	Project Title/Partners/Stakeholders	Project Objectives/Coverage/beneficiaries/Schedule	Project Outputs	Relevance to current project	Recommended Action
USAID	Title: Integrated Natural Resources Management in Watersheds of Georgia (INRMW) Partners: Global Water for Sustainability – GLOWS / The Florida International University (FIU) (Contractor – CENN) Stakeholders: Local communities, national and local government	Principal Objective: The primary goal of the INRMW Programme is to improve the current and future lives of people in Georgia by utilizing and managing natural resources more sustainably, including water, soil, vegetation, and the ecosystems that encompass them. Specific objectives: introduce innovative approaches and practical models of participatory integrated natural resources management in targeted watersheds, by facilitating reforms to and harmonization of national policies, and by increasing the capacity of national and regional institutions to replicate these approaches and models throughout the country. Geographical Coverage: Alazani, Ioni and Rioni river basins Implementation schedule: Sept 2010 to Sept 2014	- Empower local communities and authorities in the process of natural resources management by promoting local governance mechanisms that enable rural people to advocate for change that betters their lives. - Achieve tangible results in behaviour change of women and men that visibly illustrate the linkages between ecosystem services and human benefits. Facilitate behavior change at the community level and across the entire spatial hierarchy - local to national - of government authorities. - Reduce threats to natural resource sustainability in targeted watersheds; improve water quality and productivity, ecosystem protection, and energy efficiency, and reduce vulnerability to climate change and natural disasters. - Increase capacity for integrated and adaptive natural resources management at community, municipal, regional, and national levels by developing knowledge, skills, and improved management tools within key institutions. - Catalyze more widespread implementation of integrated natural resource management by raising public awareness and supporting the development of more enabling policy and institutional frameworks.	Highly relevant in geographical coverage and scope.	- Seek close coordination/collaboration with USAID

USAID/Caucasus Mission	Title: Climate Change Adaptation and Disaster Mitigation (CCADM) Partners: Contractor - CENN	Principal Objectives: The overall goal of the project is to develop flexible and resilient societies and economies in rural areas of Georgia capable of coping with the impacts of current climate variability and future climate change. Specific objective: of the Project is to reduce the susceptibility of local communities in the pilot rural areas of Georgia Samtskhe-Javakheti, Adjara and Kakheti regions) to negative climate impacts through post-conflict environmental rehabilitation, natural disaster risk reduction (DRR) and climate change adaptation (CCA). Geographical Coverage: Georgia Implementation schedule: Oct 2009 to Oct 2012	-	Relevant for DRR and CCA components	- Transfer lessons learned -
World Bank	Title: Europe and Central Asia Climate Change Risk Mitigation Measures project Partners: Funding - Government of Canada (CIDA) Administration - The World Bank (IDA) Grant amount - USD 142482 Stakeholders: Hydromet Service of Georgia under the National Environmental Agency	Principal Objective - introduce a simple and cheap community-operable system of early warning on the expected floods Beneficiaries: - rural communities of upstream Rioni river basin (in Racha)	- A small network of community-operated monitoring instruments installed and provides flood risk warnings within the pilot region of Racha, upstream Rioni basin; - Staff of Hydromet service trained in installation of the community-operable monitoring networks for flood warning and in interpretation of data incoming from such networks.	Highly relevant due to geographical coverage and outcomes. Network of monitoring stations should be incorporated into EWS monitoring network to be developed as part of this project if possible	- Transfer lessons learned - Build on lesson learned - Incorporate monitoring stations into EWS

Swiss Agency for Cooperation and Development (SDC)	Title: DRR Project / Reducing Disaster Risks in Tsageri and Lentekhi Municipalities Stakeholders: Ministry of Regional Development and Infrastructure; - National Environment Agency; - Emergency Management Department; - Governor's Office of Racha Lechkhumi and Kvemo Svaneti Region; - Caucasus Environmental NGO Network - Municipalities of Tsageri and Lentekhi - Communities of Tsageri and Lentekhi;	Principal Objectives: The overall goal of the project is to save lives and reduce economic losses due to natural disasters by supporting the prevention and preparedness efforts on the local level by the introduction of community awareness building, structural policy dialogue with local stakeholders, establishment of a simple and local Disaster Management Strategy, fire fighters/rescuers training and simple engineering prevention measures. Specific Objectives: The project aimed to be as complete as possible introducing disaster risk identification, community awareness building and policy dialogue with local stakeholders as prevention measures, engineering and bio-engineering measures for mitigation of the risks, and fire fighters training and provision of equipment as preparedness measures. Geographical coverage: Racha - Lechkhumi, Lower Svaneti region: Tsageri and Lentekhi Municipalities. Beneficiaries: Local population; Local Government; Municipal fire fighters Implementation Schedule: 2009-2010	- The risks of natural hazards in Tsageri and Lentekhi Municipalities are identified and the understanding of disaster risks of the local communities and local authorities has been increased - A simple local Disaster Management Strategy is established. Awareness regarding DRR among local communities and authorities is raised. - Disaster prevention works to protect local communities and rural infrastructures from natural disasters are implemented - The rescue capacities in Lentekhi and Tsageri Municipalities are strengthened - A participatory risk identification was carried out, the hazards, the vulnerabilities and the capacities are identified and a risk map is created - An awareness campaign was organized, trainings for capacity building are completed and policy dialogue – including the establishment of a Disaster Management Strategy – has taken place - Engineering and bio-engineering prevention measures are in place in highly hazard-prone areas - The fire fighters and rescuers of Tsageri	Highly relevant due to geographic coverage and objectives. Lessons learned will be important for all components of this project.	- Transfer lessons learned - Build on lessons learned
OXFAM	Title: Participatory multi-hazard disaster risk reduction in Armenia, Azerbaijan and Georgia-Adjara Autonomous Republic, Khulo, Shuakhevi, and Keda, 22 communities, Stakeholders: The project is implemented through implementing partner BSEA, with joint collaboration of ESMD, Environmental Centre of Monitoring and Prognosis, The Directorate for Environment and Natural Resources of Adjara, Ministry of Education of Adjara, community members, local Municipalities.	Principal Objective: To increase resilience and reduce vulnerability of local communities and national institutions by supporting strategies that enable them to prepare for, mitigate and respond to natural disasters, in the South Caucasus Region. Specific Objective: Supporting 22 communities to develop their resilience through an institutionalized community based model, promoted within district and national DRR strategic development in Adjara Autonomous Republic, Georgia. Geographical coverage: Adjara Autonomous Republic, Georgia. Beneficiaries: Local vulnerable population, CBO representatives, Members of Municipality Emergency Groups, local Government representatives, schoolteachers, school pupils, ESMD members, mobilised community members. Implementation schedule: 1st March 2010-July 31 2011	- Local communities have established a culture of safety and resilience through raising awareness, knowledge, and skills in DRR initiatives - District plans establish coordination mechanisms with communities and strengthen community based disaster risk reduction initiatives - Strengthened disaster risk reduction strategies through increased dialogue, coordination, and information exchange between regional, national and local stakeholders -	The target area is outside of the study area of this project, but lessons learned could be useful.	- Transfer general lessons learned to this project.
Danish Red Cross	Title: *Regional Programme for Building Safer Local*	Principal Objective: To increase resilience and reduce vulnerability of local communities and institutions through	- Target communities have completed Hazard Vulnerability and Capacity Assessment	Relevant due to geographical	- Transfer lessons

	Communities in South Caucasus", implemented by GRCS. Partners: The project is jointly implemented with community members/volunteers, Red Cross Branch staff / volunteers & HQ staff and local / regional / national authorities. Stakeholders: Lessons learned and best practices are shared with local, regional, national and global stakeholder involved in DM/DRR platforms and forums.	support to strategies that enable them to better prepare for, mitigate and respond to natural disasters. Specific Objective: Targeted local communities and institutions are better able to prepare for, mitigate and respond to natural disasters affecting the most vulnerable. Geographical coverage: Racha-Lechkhumi region: Ambrolauri, Oni, Tsageri and Lentekhi districts. Beneficiaries: a) Inhabitants of rural communities of the mountain regions, b) School teachers and schoolchildren aged from 7 to 17 years, c) Decision-makers, stakeholders and community leaders, d) Community volunteers and e) Red Cross HQ & Branch staff and volunteers Implementation schedule: April 15th 2010 – July 15th 2011	(HVCA). - Target communities have developed their preparedness and response plans (CPRP) based on sex and age-disaggregated data and gender analysis. - Volunteer Community Disaster Preparedness and Response Teams are established (20 members each both women and men) as a first line response of communities linked to regional DM structure/mechanism. - Relevant local stakeholders are trained / briefed in DRR, HFA and climate change. - Age, gender and country tailored awareness raising materials on DRR, climate change and earthquake non-structural mitigation are developed, compiling existing local and international materials in close cooperation with relevant stakeholders. - Teachers are trained and equipped with relevant teaching and educational materials to educate pupils on DRR, climate change and earthquake non-structural mitigation. - Representatives of mass-media are briefed on DRR, climate change and earthquake non-structural mitigation to support awareness raising among community members. - The municipal development strategies are elaborated together with DRR expertise in at least two out of three target municipalities. - At least four development projects are implemented in target communities with DRR as an integral component.	coverage and outcomes.	learned
EC Delegation to Georgia	Title: Strengthening local capacity and developing structured dialogue and partnerships for mitigating natural disasters and reducing poverty in Georgia Partners: Contractor CENN	Principal Objectives: The overall objective of the action is to reduce poverty, enhance food security and income and ensure sustainable development by strengthening the civil society and promoting good governance and policy dialogue for sustainable natural resources management at the local and national levels. Specific objectives: 1. Strengthening local capacity to empower affected communities and local authorities to prevent and reduce the natural disasters risks and promote sustainable rural development in the targeted regions of Georgia 2. Developing issue based coalition and partnerships to stimulate structural dialogue between the local communities, local authorities and central government concerned with the	-	Relevant due to scope	- Transfer lessons learned

		natural disaster risk reduction (DRR) and management 3. Prioritising the natural disaster risk reduction (DRR) and management in the State agenda as key factors for eradication of poverty and lobbying for allocation of funds to competent central (Ministry of Environment, Ministry of Agriculture) and local authorities to address natural disasters Geographical coverage: Georgia Implementation Schedule: Feb 2009 – Feb 2011			
Civil Society Programme (MATRA)	Title: Institutional Building for Natural Disaster Risk Reduction (DRR) in Georgia Partners: Contractor - CENN	Principal Objectives: The Project objective is institutional capacity building in disaster risk reduction (DRR) via introduction of modern spatial approaches and technologies and risk communication strategy in spatial planning in Georgia Geographical coverage: Georgia Implementation Schedule: May 2009 to Nov 2011 Beneficiaries: NEA staff	- Guidelines for risk assessment and incorporation of hazard and risk information into spatial planning and - EIA/SEA are developed, communicated and thoroughly explained to stakeholders and tested - 2. The guidelines are endorsed by the Parliamentary Committee on Environment and approved by the Ministry of Environment Protection and Natural Resources - 3. Capacity of staff of the National Environmental Agency of the MoEP is raised in modern technologies and approaches for DRR - 4. New system for DRR data management and analysis is designed and national web-based risk atlas is developed and are in use in the National Environmental Agency - 5. Modern technologies and approaches for DRR are tested and specific case studies (information packages) are developed and published to address different types of geo-hazards - 6. Risk communication strategy involving local stakeholders is elaborated and a framework of early warning system for DRR is developed and introduced	Highly relevant due to scope. GIS and EW framework can be adopted as part of this project or built upon as necessary	- Transfer lessons learned - Build on lessons learned

Annex 7: Stakeholder list

Organisation	Name	Role
Central Government		
Ministry of Environment	G. Zedginidze	Deputy Minister
Ministry of Environment	N. Tkhilava	Head of the Department of Environmental Policy and International Relations
Ministry of Environment	M. Tushishvili	Head of the Department of Integrated Environmental Management
Ministry of Environment	I. Gurguliani	Chief Specialist of the Department of Environmental Policy and International Relations
MoEP	G. Lazriev	Head of Hydrometeorology and Climate Change Division (H&CC)/ Dept. of Integrated Environmental Management
MoEP	M. Inashvili	Chief Specialist of the Division of H&CC/ Dept. of Integrated Environmental Management
MoEP	M. Shvangiradze	Project Manager, 'Second National Communication'
MoEP – NEA	S. Javakhadze	Head of NEA
MoEP – NEA	R. Chitanava	Head of the Department of Hydrometeorology of NEA
MoEP – NEA	E. Tsereteli	Head of the Department of Geological Risk Management of NEA
MoEP – NEA	O. Gogrichiani	Main specialist of the Department of Geological Risk Management of NEA
MoEP – NEA	G. Kordzakhia	Advisor of the Head of NEA
MoEP – NEA	Technical Staff	Various
Ministry of Regional Development and Infrastructure	S. Kereselidze	Chief Specialist of the Department of Regional Development
Ministry of Internal Affairs	A. Nizharadze	Police Colonel, Emergency Management Department
Ministry of Agriculture	V. Gogladze	Deputy Head of Agriculture Development Department
Ministry of Justice	Paata Chipashvili	Freelance staff (former Head of the Department of Land Use under the Ministry of Environment and Natural resources)
Local Government		
Branch of NEA	A. Qvachakhidze	Head of Kolkheti hydrometeorological Observatory of the Department of Hydrometeorology of NEA
Tsageri Municipality	Dimitri Asatiani	Head of Tsageri Municipality
Lentekhi Municipality	Roman Mukbaniani	Head of Lentekhi Municipality
NGOs		
CENN	Nana Janashia	Executive Director
CENN	Kakha Bakhtadze	Programme Officer
UNICEF	Nino Gvetadze	Project Officer
REC	Sophiko Akhobadze	Executive Director

Georgian Red Cross	Kakha Mamuladze	DM Coordinator
Swiss Agency for development and Cooperation	David Tchitchinadze	Project Officer
USAID	Mariam Ubilava	Project Management Specialist - Office of Energy and Environment
USAID	Mariam Shotadze	Project Manager
Embassy of Check Republic	Katerina Silhankova	Attaché for Development Cooperation

Annex 8: Detailed breakdown of the budget for the project

Project Budget

Award ID:	**TBC after AFB approval**
Project ID:	**Project 00076540 (PIMS 4583; Proposal 00060698)**
Business unit	**UNDP/GEF**
Project title:	**Developing Climate resilient flood and flash flood management practices to protect vulnerable communities of Georgia**
Implementing partner	**Ministry fo Environmental Protection of Georgia**

					yr1	yr2	yr3	yr4	
Project Outcome/Atlas Activity	**implementing agent**	**Donor name**	**Budget description**	**Total (USD)**	**2012**	**2013**	**2014**	**2015**	**Budget**
OUTCOME 1: Floodplain development policy introduced to improve long term resilience flood/flash flood risks									
Output 1.1 Hazard and inundation maps produced	**MoE**		Travel	10,000	10,000				1
			Sub-Contracts	200,000	200,000				2
			Field&survey equipment	100,000	100,000				3
			International Experts	40,000	40,000				4
			National Experts	50,000	50,000				5
			Printing and publication	52,000	52,000				6
			Misc	3,000	3,000				7
			Sub-Total Output 1.1	**455,000**	**455,000**		**0**	**0**	
Output 1.2 Review and change land use regulations (land use planning, including zonings and development controls, e.g. on protection / buffer zones, settlement expansion; economic development categories etc) to internalize climate change risks into floodplain management and spatial planning.	**MoE**		Stakeholder consultation	10,000		10,000			8
			National Experts	40,000		40,000			9
			Sub-contracts	20,000		20,000			10
			Printing & Publication	6,225		6,225			11
			Sub-Total Output 1.2	**76,225**		**76,225**	**0**	**0**	
Output 1.3 New building codes reviewed and streamlined for the housing rehabilitation schemes to flood proof new buildings (e.g. material standards, traditional house raising etc) taking into account alternative climate change scenarios	**MoE**	**Adaption Fund**	Stakeholder consultation	10,000		10,000			12
			National Experts	2,000		2,000			13
			Sub-contracts	16,000		16,000			14
			Printing & Publication	3,225		3,225			15
			Sub-Total Output 1.3	**31,225**	**0**	**31,225**	**0**	**0**	
Output 1.4 Targeted training of national and local authorities responsible for climate risk management in advanced methods of forward looking climate risk management planning and flood prevention measures	**MoE**		Training	41,325			41,325		16
			National Experts	15,000			15,000		17
			Sub-contracts	5,000			5,000		18
			Sub-Total Output 1.4	**61,325**	**0**	**0**	**61,325**	**0**	
Output 1.5 Community-based flood insurance scheme designed and implemented covering highly exposed villages under 6 municipalities	**MoE**		Stakeholder consultation	18,000		18,000			19
			National Experts	5,000		5,000			20
			Sub-contracts	15,000		15,000			21
			Printing & Publication	6,225		6,225			22
			Misc	2,000		2,000			23
			Sub-Total Output 1.5	**46,225**		**46,225**	**0**	**0**	
			Sub Total Outcome 1	***670,000***	***455,000***	***153,675***	***61,325***	***0***	
OUTCOME 2: Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly exposed communities									
Output 2.1 Direct measures of long term flood prevention and risk	**MoE**		Travel	15,000		5,000	5,000	5,000	24
			International Experts	58,000		18,000	20,000	20,000	25
			National Experts	85,000		25,000	30,000	30,000	26
			Sub-contracts	729,000		125,000	302,000	302,000	27

mitigation designed with participation of local governments and population in 6 municipalities (Lentekhi, Oni, Ambrolauri, Tskaltubo, Samtredia, Tsageri)			Printing & Publication	55,000		15,000	20,000	20,000	28
			Misc	14,667		3,333	5,667	5,667	29
			Sub-Total Output 2.1	**956,667**	**0**	**191,333**	**382,667**	**382,667**	
Output 2.2 Community-based adaptation measures, such as bank terracing, vegetative buffers, bundles and tree revetments implemented building on an existing municipal employment guarantee scheme	**MoE**	**Adaptation Fund**	Travel	15,000		5,000	5,000	5,000	30
			International Experts	58,000		18,000	20,000	20,000	31
			National Experts	73,000		25,000	30,000	30,000	32
			Sub-contracts	729,000		125,000	302,000	302,000	33
			Printing & Publication	55,000		15,000	20,000	20,000	34
			Misc	14,667		3,333	5,667	5,667	35
			Sub-Total Output 2.2	**956,667**	**0**	**191,333**	**382,667**	**382,667**	
Output 2.3 Flood plain seasonal productive systems (e.g. short season annual cropping, cattle rearing plots or seasonal pastures, agro-forestry) benefit 200,000 people and improve resilience to flood threat	**MoE**		Travel	15,000		5,000	5,000	5,000	36
			International Experts	58,000		18,000	20,000	20,000	37
			National Experts	73,000		25,000	30,000	30,000	38
			Sub-contracts	729,000		125,000	302,000	302,000	39
			Printing & Publication	55,000		15,000	20,000	20,000	40
			Misc	14,666		3,333	5,667	5,666	41
			Sub-Total Output 2.3	**956,666**		**191,333**	**382,667**	**382,666**	
Output 2.4 Lessons learned and best practices documented and disseminated to raise awareness of effective climate risk management options for further up-scaling	**MoE**		National Experts	10,000				10,000	42
			Printing & Publication	20,000				20,000	43
			Sub-Total Output 2.4	**30,000**	**0**	**0**	**0**	**30,000**	
			Sub Total Outcome 2	***2,900,000***	***0***	***573,999***	***1,148,001***	***1,176,000***	
OUTCOME 3: Early warning system in place to improve preparedness and adaptive capacity									
Output 3.1 Long-term historical observation data digitised and used in policy formulation and risk management practices	**MoE**	**Adaptation Fund**	IT equipment	20,000	20,000				44
			National Experts	95,000	95,000				45
			Sub-Total Output 3.1	**115,000**	**115,000**				
Output 3.2 Multi hazard risk assessment for the Rioni river basin (floods, flash floods, associated mudflows and landslides, linked with climatic alterations under alternative scenarios)	**MoE**		sub-contracts	10,000		10,000			46
			National Experts	50,000		50,000			47
			Printing and publication	10,000		10,000			48
			Sub-Total Output 3.2	**70,000**		**70,000**			
Output 3.3 Series of targeted training delivered for the NEA staff and partner organisations in the advanced methods of risk assessment and forecasting	**MoE**		Sub-contracts	15,000		15,000			49
			Travel	5,000		5,000			50
			National Experts	20,000		20,000			51
			Sub-Total Output 3.3	**40,000**		**40,000**			
Output 3.4 Essential equipment to increase monitoring and forecasting capabilities in the target basin procured and installed	**MoE**		Equipment for meteo stations	225,000	112,500	112,500			52
			installation of meteo posts	170,000	85,000	85,000			53
			installation of hydro posts	70,000	35,000	35,000			54
			IT equipment	10,000	5,000	5,000			55
			arrangemnet fo regime net	100,000	50,000	50,000			56
			Sub-Total Output 3.4	**575,000**	**287,500**	**287,500**			
Component 3.5: Systems establised at the national and sub-national level led by the NEA for long and short term flood forecasting of hydrological risks; including dissemination and communication of forecasts	**MoE**		Travel	10,000			5,000	5,000	57
			sub-contracts	150,000			75,000	75,000	58
			National Experts	20,000			10,000	10,000	59
			Printing and publication	16,000			8,000	8,000	60
			Misc	4,000			2,000	2,000	61
			Sub-Total Output 3.5	**200,000**			**100,000**	**100,000**	

			Sub Total Outcome 3	*1,000,000*	*402,500*	*397,500*	*100,000*	*100,000*	
Project/Programme Execution									
Project Management		**Adaptation Fund**	Monitoring & Evaluation Cost	58,000	14,500	14,500	14,500	14,500	62
			Contractual Services (Project	240,000	60,000	60,000	60,000	60,000	63
			Supplies	32,000	8,000	8,000	8,000	8,000	64
			Sub Total Project Managem	**330,000**	**82,500**	**82,500**	**82,500**	**82,500**	
			Sub Total Project/Programm	**330,000**	**82,500**	**82,500**	**82,500**	**82,500**	
TOTAL Project Implementation Costs				**4,900,000**	**940,000**	**1,207,674**	**1,391,826**	**1,360,500**	
MIE fee for services detailed in ANNEX V (8.5%)				**416,500**	**104,125**	**104,125**	**104,125**	**104,125**	
GRAND TOTAL				**5,316,500**	**1,044,125**	**1,311,799**	**1,495,951**	**1,464,625**	

Budget Notes:

1. Travel associated with conducted site surveys
2. Costs of survey sub-contractors
3. Purchase of field survey equipment
4. International Expert (3 staff months) to provide expertise and technical assistance in inundation modelling and mapping
5. National experts to provide expertise and technical assistance in inudnation modelling and mapping
6. Costs of printing and publications associated with producing hazard inudnation maps
7. Miscellaneous costs associated with implementation of the activity
8. Costs associated with undertaking stakeholder consultations, including holding workshops
9. National experts to provide expertise and technical assistance in developing landuse management policy
10. Costs of sub-contracts associated with developing landuse management policy
11. Costs of printing and publications associated with the development of landuse management policy
12. Costs associated with undertaking stakeholder consultations, including holding workshops
13. National experts to provide expertise and technical assistance in developing new building codes
14. Costs of sub-contracts associated with developing new building codes
15. Costs of printing and publications associated with the development of new building codes
16. Cost of undertaking targeted training for national and local authority staff in climate change risk management planning and prevention measures
17. National experts to provide expertise and technical assistance in the provision of targeted training
18. Cost of sub-contracts associated with provision of targeted training
19. Costs associated with undertaking stakeholder consultations on community-based flood insurance scheme, including holding workshops
20. National experts to provide expertise and technical assistance development of cummunity-based flood insurance scheme
21. Costs of sub-contracts associated with developing a community-based flood insurance scheme
22. Costs of printing and publications associated with the development of community-based flood insurance scheme
23. Miscellaneous costs associated with implementation of the activity
24. Travel associated with the design of direct flood prevantion measures e.g site visits to assess feasibility of designs
25. International Expert (3.5 staff months) to provide expertise and technical assistance in the design of direction flood mitigation measures
26. National experts to provide expertise and technical assistance in the design of direct flood mitigation measures
27. Costs of sub-contracts to undertake the implementation and building of the direct flood mitigation measures
28. Costs of printing and publications associated with the design and implementation of the direct flood prevention mitigation measures
29. Miscellaneous costs associated with the implementation of the activity
30. Travel associated with the design and implementation of the community-basd adaptation measures
31. International Expert (3.5 staff months) to provide expertise and technical assistance in the design of community-based adaptation measures
32. National experts to provide expertise and technical assistance in the design of community-based adaptation measures
33. Costs of sub-contracts to undertake the design and implementation of community-based adaptation measures
34. Costs of printing and publications associated with the development of a community-based adaptation measures (e.g. printing of information leaflets for rainsing community awareness)
35. Miscellaneous costs associated with the implementation of the activity
36. Travel associated with the design implementation of floodplain seasonal productive systems
37. International Expert (3.5 staff months) to provide expertise and technical assistance in the design of floodplain seasonal productive systems
38. National experts to provide expertise and technical assistance in the design of floodplain seasonal productive systems
33. Costs of sub-contracts to undertake the design and implementation of community-based adaptation measures
40. Costs of printing and publications associated with the development of floodplain seasonal adaptive systems (e.g. printing of information leaflets for raising community awareness)
41. Miscellaneous costs associated with the implementation of the activity

42. National experts to develop and implement a programme for dissemminating lessons learned
43. Costs of printing and publications associated with the disseminating lessons learned (e.g. printing of information leaflets for raising community awareness)
44. Purchase of IT equipment (low capability computers- 20, high capability computers - 10, including 1 high capability server)
45. National experts to provide expertise and technical assistance in the establishment of the hydrometric database at NEA
46. Costs of sub-contracts to provide technical assistance in multi-hazard risk assessment
47. National experts to provide technical assistance in multu-hazard risk assessment
48. Costs of printing and publications associated with the activity
49. Costs of sub-contracts to provide technical assistance in the targeted training of NEA staff and partner organisation staff in advanced risk assessment of forecasting
50. Travel associated with provision of target training
47. National experts to provide technical assistance in the targeted training of NEA and partner organisation staff in advanced risk assessment and forecasting
52. Purchase of Met stations (5 x $45k)
53. Purchase and installation of meteorological posts (20 x $8.5k)
54. Purchase and installation of hydrological posts (10 x $7k)
55. Purchase (24 core) computer to hasten the forecast model process - 18 core - 14 core - 4
56. Arragement of the regime net (bore-hole, checkpoints etc) on 3 researched landslide area - 3 years & Purchase of boring machine and other equipment
57. Travel associated with the establishment of the FFEWS
58. Costs of sub-contracts to provide technical assistance in the establishment of the FFEWS
59. National experts to provide technical assistance in the establisment of the FFEWS
60. Costs of printing and publications associated with the activity
61. Miscellaneous costs associated with the implementation of the activity
62. Consultancy fee and travel costs for international expert for conducting monitoring and evaluation of the project progress
63. Contracts of project management and support staff
64. Cost of office supplies and disposables

Annex 9: Results framework including milestones, targets and indicators.

Objective: To improve resilience of highly exposed regions of Georgia to hydro-meteorological threats that are increasing in frequency and intensity as a result of climate change. **Indicator:** number of people protected from the flood and flash flood risks in the Rioni river basin;				
Outcomes and indicators	**Baseline**	**Targets and Milestones**	**Source of Verification**	**Outputs and indicators**
Outcome 1: Floodplain development policies in place to minimise exposure of highly vulnerable people of Rioni river basin to climate change induced flood risks.	Fragmentation and gaps in policies and national regulations for long-term flood/flash floods under climate change	Floodplain land use and development policy which addresses fragmentation and gaps in place by project completion	National law journal	**Output 1.1.** Hazard and inundation maps produced for whole basin
	Lack of appropriate hazard maps on which to base floodplain policy	Local-level flood insurance scheme to steer development away from high risk areas in place by project closure	Project annual reports; Mid-term evaluation, final report; training test results;	**Indicator 1.1.1:** Studies conducted to develop to model and map the hydrometeorological hazards of the whole Rioni basin
	Low capacity among national and regional staff to undertake hazard mapping and risk assessment to support development of floodplain policy	Accurate hazard and risk maps on which to base development policy	Project annual reports; Mid-term evaluation, final report; training test results;	**Output 1.2**. Enhanced landuse regulations introduced (landuse planning, including zoming and development controls, e.g. expansion, economic development catagories etc.) to ensure comprehensive floodplain management and spatial planning

		at least 42NEA staff and 60 municipality staff (at least 50% women) trained in modern hazard mapping and risk assessment techniques	staff training record and certification	**Indicator 1.2.1**. A comprehensive and robust land use and floodplain development policy framework for Rioni basin.
Indicator 1.1: Floodplain development policies in place, which minimise Climate change vulnerability implemented by close of the project				**Output 1.3.** New building codes reviewed and streamlined for the housing rehabilitation schemes to flood proof new buildings (e.g. material standards, traditional house raising etc); **Indicator 1.3.1.** New building codes including building flood resilience measures **Output 1.4.** Targeted training of national and local authorities responsible for climate risk management in advanced methods of forward looking climate risk management planning and flood prevention measures; **Indicator 1.4.1.** at least 42NEA staff and 60 municipality staff trained in modern hazard mapping and risk assessment techniques **Output 1.5.** Community-based flood insurance scheme designed and implemented covering highly exposed villages under 6 municipalities.

				Indicator 1.5.1. At least 1 pilot community-based flood insurance scheme in place
Outcome 2: Direct investments and local actions in highly exposed and vulnerable communities improve flood management practice on 8,400km^2 and build resilience of 200,000 people	Investment in flood intervention measures limited and annual, falls short of what is required	Implementation of adaptation measures that are a mix of traditional engineering and bioengineering solutions	Project annual reports; Mid-term evaluation, final report; training test results;	**Output 2.1.** Direct measures of long term flood prevention and risk mitigation designed with participation of local governments and population in 6 municipalities (Lentekhi, Oni, Ambrolauri, Tskaltubo, Samtredia, Tsageri);
	Traditional engineering measures employed which to not take account of climate change and fail in subsequent hazard events. Climate resilience not built into current approach to direct flood intervention measures. Current approaches do not involve local communities in the implementation of measures and do not address the recurring problem of loss of agricultural property to flood damage	Set up and implement employee guarantee scheme (targeting 200 employees in each municipality, at least 50% women)		**Incicator 2.1.1.** Feasibility outline and detailed design studies undertaken to ensure the best climate resilient intervention measures are adopted which will include bioengineering solutions as well as traditional hard engineering options. **Indicator 2.1.2.** 15 schemes implemented in the 6 municipalities
Indicator 2. 1: Number of community based adaptation solutions implemented at the local level upon project				**Output 2.2.** Community-based adaptation measures, such as bank terracing, vegetative buffers, bundles and tree revetments implemented through the municipal employment guarantee scheme;

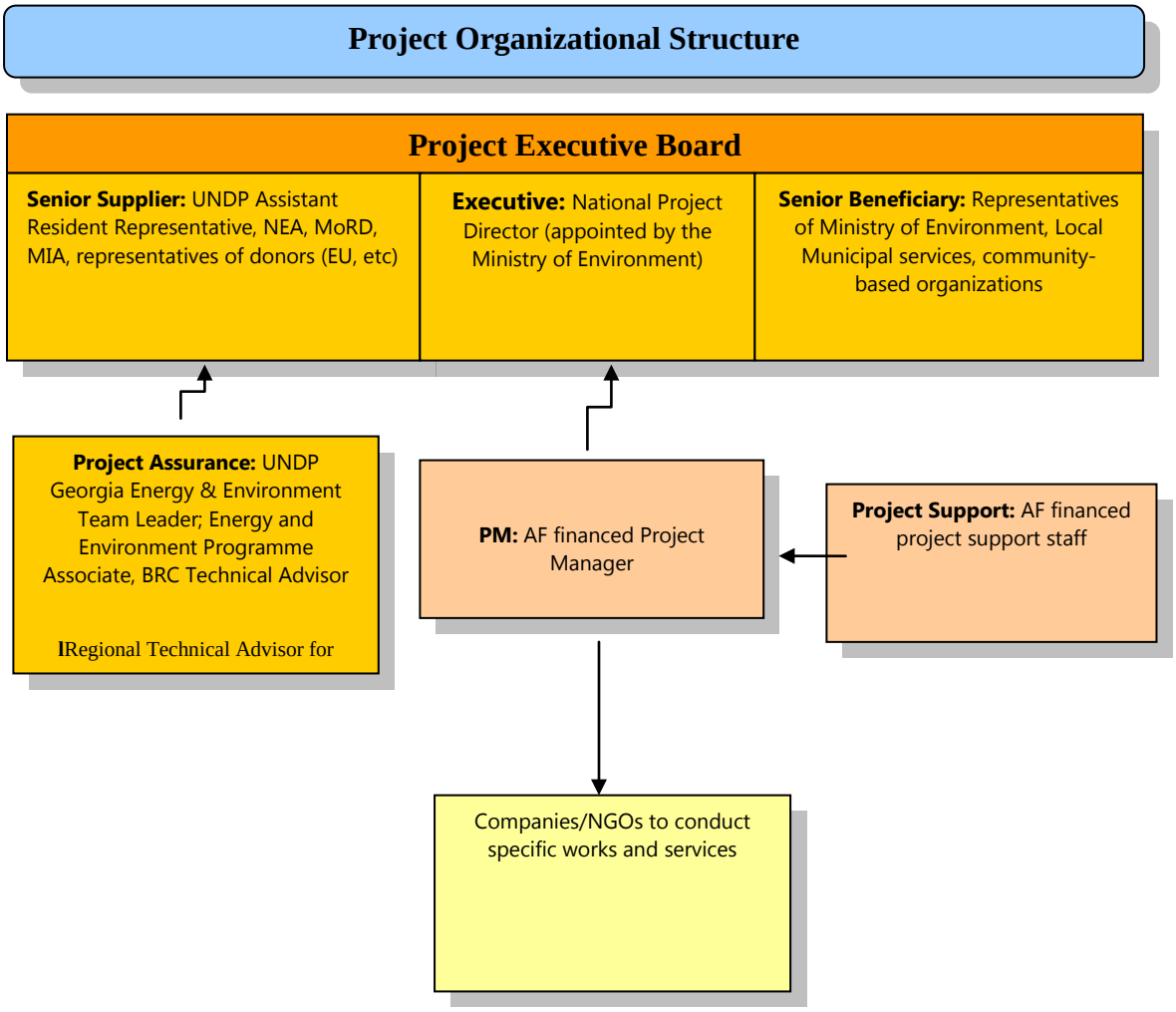
closure. **Indicator 2.2:** % of population with improved water management practices resilient to climate change impacts in the targeted regions.				**Indicator 2.2.1**. Municipal employment-guarantee scheme employing local people in the implementation of the adaptation schemes being implemented. Long-term involvement of local population in the maintenance of flood protection infrastructure **Output 2.3.** Flood plain seasonal productive systems (e.g. short season annual cropping, cattle rearing plots or seasonal pastures, agro-forestry) benefit 200,000 people and improve resilience to flood threat; **Indicator 2.3.1.** Agro-forestry, cattle rearing plots and seasonal cropping measures adopted in all 6 municipalities established **Output 2.4.** Lessons learned and best practices documented and disseminated to raise awareness of effective climate risk management options for further up-scaling; **Indicator 2.4.1.** Municipal records of employees guarantee scheme and number of people employed per year

Outcome 3: Institutional Capacity developed for early warning and timely alert communication to vulnerable communities of the Rioni river basin	Monitoring network in the Rioni basin was reduced from 22 to 4 meteorological stations since the early 1990s. The 4 remaoning meterological stations covering all of Rioni basin is inadequate for effective early warning.	Implemenattion of adaptation measures that are a mix of traditional engineering and bioengineering solutions	Project annual reports; Mid-term evaluation, final report; Community Surveys;	**Output 3.1.** Long term historical observation data digitised and used in policy formulation and risk management practices;
Indicator 3.1. Flood forecasting and early warning systems introduced to benefit over 200,000 people at risk in the Rioni basin from flood, flash flood and landslide risk in the basin.	There is currently limited capability among national NEA staff for undertaking flood risk assessment and forecasting and limited experience of EW systems implementation and operation	Set up and implement employee guarantee scheme (targeting 200 employees in each municipality, at least 50% women)	Social programme budget statements	**Indicator 3.1.1.** Database of historical observation data for Rioni digitised
	Various out-of-date and inadequate hazard maps are used for emergency planning and response by different agencies	Purchase and install 5 Met stations, 20 Met posts, and 10 Hydrological posts		**Output 3.2.** Multi hazard risk assessment for the Rioni river basin (floods, flash floods, associated mudflows and landslides, linked with climatic alterations under alternative scenarios);
Indicator 3.2. Establishment/rehabilitation of monitoring stations to increase spatial coverage	Emergency plans currently availabe at MIA but propriey of the information is unknown	At least 10 NEA staff with gender balanced composition trained in risk assessment and forecasting and EWS		**Indicator 3.2.1.** Rioni flood forecasting model developed, which will couple outputs from downscaled meso-scale meteorological systems to HEC-HMS hydrological models. Linked forecasting met-hydrological-hydraulic model.

Number of associations with improved institutional capacity to deliver water services to target communities. **Indicator 3.2:** % of targeted population with more to early warning in the face of climate change **Indicator 3.3.** Number of national and local staff with flood forecasting, early warning and flood risk assessment capabilities	Currently limited warnings to communities	Provision of access to up-to-date, definitive hazards and forecast information via single GIS-based data management and dissemination system Development of emergency plans 90% of people in Rioni basin to have access to early warning messages/signals by completion of project		**Output 3.3.** Series of targeted training delivered for the NEA staff and partner organisations in the advanced methods of risk assessment and forecasting; **Indicator 3.3.1.** At least 10 NEA staff trained in risk assessment and forecasting and EWS. Municipality emergency staff trained in emergency response. Strengthened capacity of national and local staff in monitoring, flood forecasting, early warning and emergency response **Output 3.4.** Essential equipment to increase monitoring and forecasting capabilities in the target basin procured and installed; **Indicator 3.4.1.** Purchase and install 5 Met stations, 20 Met posts, and 10 Hydrological posts. Observation network of all hydrological and meteorological variables to provide an appropriate level of spatial resolution of these variables for early warning

				Output 3.5. Systems established at the national and sub-national level led by the NEA for long and short term flood forecasting of hydrological risks; including dissemination and communication of forecasts. **Indicator 3.5.1.** A fully integrated flood early warning system (Deltares-FEWS) which links forecasting models to telemetered data as input and forecasting reporting and warning systems as output. **Indicator 3.5.2.** An early warning communication network using different communication links such as telephone trees, SMS and e-mail networks **Indicator 3.5.3.** GIS-based website for dissemination of hazard maps and associated information, such as hydrometeorological telemetric and Deltares-FEWS data to central and local government stakeholders. **Indicator 3.5.4.** A public-facing website presenting key layers of information, with the potential to disseminate early warning information to the public. **Indicator 3.5.5.** Early warning awareness and training workshops for community, NGOs, government and media representatives.

Annex 10: Project Management Structure



Annex 11: Detailed Budget

Project Component Activity	Responsible party/ implementing agent	Donor name	Budget description	Total (USD)
COMPONENT 1: Floodplain development policy introduced to improve long term resilience to flood/flash flood risks				
Component 1.1: Hazard and inundation maps produced	**MoE with sub-consultants**	**Adaptation Fund**		
			Purchase of field and survey equipment	100,000
			Topographic and other surveys (areas/river reaches to be defined)	125,000
			Flood numerical modelling and mapping (hydrology, hydraulic, climate change)	125,000
			Geotechnical and geomorphological assessments, modelling and mapping	105,000
			Sub-Total Component 1.1	**455,000**
Component 1.2:Review and enhance landuse regulations designed and introduced (landuse planning, including zoming and development controls, e.g. expansion, economic development catagories etc.) to ensure comprehensive floodplain management and spatial planning	**MoE**	**Adaptation Fund**		
			Stakeholder consultation (central government and regional stakeholders)	10000
			Development of policy framework and guidelines for landuse planning in Georgia	60000
			Printing and publication	6,225
			Sub-Total Component 1.2	**76,225**
Component 1.3: New Building codes reviewed and streamlined for the housing and rehabilitation schemes to flood proof new buildings (e.g material standards, traditional house raising etc.)	**MoE**	**Adaptation Fund**		
			Review of existing building codes	2,000
			Stakeholder consultation (central government and regional stakeholders)	10,000
			Development of new building codes	19,225
			Sub-Total Component 1.3	**31,225**
Component 1.4: Targeted training of national and local authorities responsible for climate risk management in advanced methods of forward looking climate risk management planning and flood prevention measures	**MoE (mainly sub-consultants)**	**Adaptation Fund**		
			Training of 10 NEA staff in advance climate risk management methods	41,325
			Training of 6 staff from local authorities in advance climake risk methods	15,000
			Development of continued professional development (CPD), succession and retention plans	5,000

			Sub-Total Component 1.4	**61,325**
Component 1.5: Community-based flood insurance scheme designed and implemented covering highly exposed villages under 6 municipalities	**MoE**	**Adaptation Fund**		
			Review of best-practice	5,000
			Stakeholder Consultation (micro-finance companies, communities, municipalities)	18,000
			Development of flood insurance scheme	15,000
			Prnting and publication	6,225
			Expenses	2,000
			Sub-Total Component 1.5	**46,225**
			Sub Total Component 1	***670,000***
COMPONENT 2: Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly				
Component 2.1: Direct measures of long-term flood prevention and risk mitigation designed with participation of local governments and population in 6 municipalities	**MRD**	**Adaptation Fund**		
			Ambrolauri flood alleviation schemes (1,2)	180,000
			Tsageri flood alleviation schemes (1,2,3&4)	472,800
			Lentekhi flood alleviation schemes (1,2,&3)	834,000
			Oni flood alleviation schemes (1,2,&3)	408,000
			Tskaltubo flood alleviation scheme (1&2)	572,000
			Samtredia flood alleviation scheme (1)	403,200
			Sub-Total Component 2.1	**2,870,000**
Component 2.2: Community-based adaptation measures, such as bank terracing, vegetative bufers, bundles and tree revetments implemented through municipality employment guarantee scheme	**MRD**	**Adaptation Fund**		
			Establish community employment guarantee schemes in collaboration with local government and communities	10,000
			Sub-Total Component 2.2	**10,000**
Component 2.3: Floodplain seasonal productive systems (e.g. short season annual cropping, cattle rearing plots or seasonal pastures, agro-forestry) benefit 200,000 people and improve resilience to flood threat	**MRD**	**Adaptation Fund**		
			Identify areas suitable for short season annual cropping, cattle raring plots and seasonal pasuture, agro-frestry	10,000
			Sub-Total Component 2.3	**10,000**
Component 2.4: Lessons learned and best practices documented and disseminated to raise awareness of effective climate risk management options for further upscaling	**MRD**	**Adaptation Fund**		

			Documentation and dissemination of lessons learned and best practice	10,000
			Sub-Total Component 2.4	**10,000**
			Sub Total Component 2	***2,900,000***
COMPONENT 3: Early warning system in place to improve preparedness and adaptive capacity				
Component 3.1: Long-term historical observation data digitised and used in policy formulation and risk management practices	**MoE**	**Adaptation Fund**		
			Historical (Hydrological and Meteorological) data transfer in digital format and formation of data base	
			Computer purchase: low capability - 20, high capability - 10, including 1 high capability server	20000
			Hire of 7 specialist during 1 year for the data input (115 post 55 200 month) and data quality control	20,000
			station - 22 800 month; 94 post - 34 492 month) and data quality control	40,000
			Hire of 3 specialist during 3 year for the geological hazard (landslide, mudflow, erosion, etc) data input	35,000
			Sub-Total Component 3.1	**115,000**
Component 3.2: Multi hazard risk assessment for the Rioni basin (floods, flash floods, associated mudflows and landslides, linked with climatic alterations under alternative scenarios)	**MoE**	**Adaptation Fund**		
			Develop flood hydrological forecasting model	60,000
			Develop hazard maps for emergency planning	10,000
			Sub-Total Component 3.2	**70,000**
Component 3.3: Series of targeted training delivered for the NEA staff and partner organisations in the advanced methods of risk assessment and forecasting	**MoE with sub-consultants**	**Adaptation Fund**		
			Training NEA and municipality staff in:	
			Weather, hydrological forecastand climate change assessment and modelling	20,000
			Operation and maintenance of observaion stations	
			GIS and using other modern technologies, hydrometeorological and geological information treatment	10,000
			Early warning/Emergency planning	10,000
			Sub-Total Component 3.3	**40,000**
Component 3.4: Essential equipment to increase monitoring and forecasting capabilities in the target basin procured and installed	**MoE**	**Adaptation Fund**		

			Purchase and installation of meteorological stations (5 x $45k)	225,000
			Purchase and installation of meteorological posts (20 x $8.5k)	170,000
			Purchase and installation of hydrological posts (10 x $7k)	70,000
			Purchase (24 core) computer to hasten the forecast model process - 1 8 core - 1 4 core - 4	10,000
			Arragement of the regime net (bore-hole, checkpoints etc) on 3 researched landslide area - 3 years & Purchase of boring machine and other equipment	100,000
			Sub-Total Component 3.4	**575,000**
Component 3.5: Systems establised at the national and sub-national level led by the NEA for long and short term flood forecasting of hydrological risks; including dissemination and communication of forecasts	**MoE**	**Adaptation Fund**		
			Implementation of Delft-FEWS	100,000
			Establishment EW Communiction network	25,000
			Design of a GIS system and GIS-based web site	75,000
			Sub-Total Component 3.5	**200,000**
			Sub Total Component 3	***1,000,000***
Component 4: Project/Programme Execution				
			Monitoring & Evaluation Costs (incl. Travel)	**110,000**
			Contractual Services (Project Management & Administration)	**220,000**
			Supplies	**0**
Project Management		**Adaptation Fund**	**Sub Total Project Management**	**330,000**
			Sub Total Project/Programme Execution	**330,000**
TOTAL Project Implementation Costs				**4,900,000**
MIE fee for services detailed in ANNEX V (8.5%)				**416,500**
GRAND TOTAL				**5,316,500**

Annex 12: Gantt Chart

	Yr-1				Yr-2				Yr-3				Yr-4				TOTAL BUDGET (USD)
	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	QR-1	QR-2	QR-3	QR-4	
COMPONENT 1: Floodplain development policy introduced to improve long term resilience to flood/flash flood risks																	
Component 1.1: Hazard and inundation maps produced	455,000																455,000
Component 1.2: Review and change land use regulations (land use planning, including zonings and development controls, e.g. on protection / buffer zones, settlement expansion; economic development categories etc) to internalize climate change risks into floodplain management and spatial planning.					76,225												76,225
Component 1.3: New building codes reviewed and streamlined for the housing rehabilitation schemes to flood proof new buildings (e.g. material standards, traditional house raising etc) taking into account alternative climate change scenarios							31,225										31,225
Component 1.4: Targeted training of national and local authorities responsible for climate risk management in advanced methods of forward looking climate risk management planning and flood prevention measures									61,325								61,325
Component 1.5: Community-based flood insurance scheme designed and implemented covering highly exposed villages under 6 municipalities							46,225										46,225
SUB TOTAL	**455,000**				**153,675**				**61,325**				**0**				**670,000**
COMPONENT 2: Climate resilient practices of flood management developed and implemented to reduce vulnerability of highly exposed communities																	
Component 2.1: Direct measures of long term flood prevention and risk mitigation designed with participation of local governments and population in 6 municipalities (Lentekhi, Oni, Ambrolauri, Tskaltubo, Samtredia, Tsageri)					191,333				382,667				382,667				956,667
Component 2.2: Community-based adaptation measures, such as bank terracing, vegetative bufers, bundles and tree revetments implemented through municipality employment guarantee scheme					191,333				382,667				382,667				956,667
Component 2.3: Floodplain seasonal productive systems (e.g. short season annual cropping, cattle rearing plots or seasonal pastures, agro-forestry) benefit 200,000 people and improve resilience to flood threat					191,333				382,667				382,666				956,666
Component 2.4: Lessons learned and best practices documented and disseminated to raise awareness of effective climate risk management options for further upscaling													30,000				30,000
SUB TOTAL	**0**				**573,999**				**1,148,001**				**1,178,000**				**2,900,000**

COMPONENT 3: Early warning system in place to improve preparedness and adaptive capacity					
Component 3.1: Long-term historical observation data digitised and used in policy formulation and risk management practices	115,000				115,000
Component 3.2: Multi hazard risk assessment for the Rioni basin (floods, flash floods, associated mudflows and landslides, linked with climatic alterations under alternative scenarios)		70,000			70,000
Component 3.3: Series of targeted training delivered for the NEA staff and partner organisations in the advanced methods of risk assessment and forecasting		40,000			40,000
Component 3.4: Essential equipment to increase monitoring and forecasting capabilities in the target basin procured and installed	287,500	287,500			575,000
Component 3.5: Systems estabilised at the national and sub-national level led by the NEA for long and short term flood forecasting of hydrological risks; including dissemination and communication of forecasts			100,000	100,000	200,000
SUB TOTAL	**402,500**	**397,500**	**100,000**	**100,000**	**1,000,000**
MIE Fee for Services	**104,125**	**104,125**	**104,125**	**104,125**	**416,500**
EXECUTION COSTS	**82,500**	**82,500**	**82,500**	**82,500**	**330,000**
GRAND TOTAL	**1,044,125**	**1,311,799**	**1,495,951**	**1,464,625**	**5,316,500**

Note: Some of the activities description has been shortened under this table, but its full content be refered under Part II in the project Document.

საქართველოს გარემოს დაცვის სამინისტრო
MINISTRY OF ENVIRONMENT PROTECTION OF GEORGIA

KA030181766262111

საქართველო, 0114 თბილისი, გ.გულუას ქ. N6; ტელ:2727200, 2727220, ფაქსი:2727237; www.moe.gov.ge
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 # 181 **11 / ოქტომბერი / 2011 წ.**

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email:Secretariat@Adapation-Fund.org
Fax:202 522 3240/5

Subject: Endorsement letter for the project "Developing Climate Resilient Flood and Flash Flood Management Practices to Protect vulnerable communities of Georgia"

Dear Sir/Madam,

In my capacity as designated authority for the Adaptation Fund in Georgia, I confirm that the national project proposal "Developing Climate Resilient Flood and Flash Flood Management Practices to Protect Vulnerable Communities of Georgia" is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks posed by climate change in Georgia.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the proposal will be implemented by United Nations Development programme (UNDP) and executed by the Ministry of Environment Protection of Georgia through the National Environment Agency.

Sincerely,

Deputy Minister George Zedginidze

Alignment of Project Objectives/Outcomes with Adaptation Fund Results Framework

Any project or programme funded through the Adaptation Fund (AF) must align with the Fund's results framework and directly contribute to the Fund's overall objective and outcomes outlined. Not every project/programme outcome will align directly with the Fund's framework but at least one outcome and output indicator from the Adaptation Fund's Strategic Results Framework must be included at the project design stage.

There is currently, no place within the project document where an explicit link to the AF's results framework is delineated. As such, the secretariat is requesting project proponents to fill out the table below to directly link, where relevant, project objectives and outcomes to the Fund level outcome and outputs.

Project Objective(s)[1]	**Project Objective Indicator(s)**	**Fund Outcome**	**Fund Outcome Indicator**
To improve resilience of highly exposed regions of Georgia to hydro-meteorological threats that are increasing in frequency and intensity as a result of climate change	Number of people protected from the flood and flash flood risks in the Rioni river basin;	**Outcome 2:** Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.2. Number of people with reduced risk to extreme weather events
Project Outcome(s)	**Project Outcome Indicator(s)**	**Fund Output**	**Fund Output Indicator**
Floodplain development policies in place to minimise exposure of highly vulnerable people of Rioni river basin to climate change induced flood risks	Number and type of flood prevention and management measures reduce exposure to flood risks of Rioni basin population	***Output 2.2:*** Targeted population groups covered by adequate risk reduction systems	2.2.1. Percentage of population covered by adequate risk-reduction systems
Direct investments and local actions in highly exposed and vulnerable communities improve flood management practice on 8,400km^2 and build resilience of 200,000 people	Number of community based adaptation solutions implemented at the local level	***Output 3***: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.1 No. and type of risk reduction actions or strategies introduced at local level

[1] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

Institutional Capacity developed for early warning and timely alert communication to vulnerable communities of the Rioni river basin	Flood forecasting and early warning systems introduced to benefit over 200,000 people at risk in the Rioni basin from flood, flash flood and landslide risk in the basin	***Output 1:*** Risk and vulnerability assessments conducted and updated at a national level	1.2 Development of early warning systems

Annex: the AF Results Framework

Objective: Reduce vulnerability and increase adaptive capacity to respond to the impacts of climate change, including variability at local and national levels.

EXPECTED RESULTS	INDICATORS
Goal: Assist developing-country Parties to the Kyoto Protocol that are particularly vulnerable to the adverse effects of climate change in meeting the costs of concrete adaptation projects and programmes in order to implement climate-resilient measures.	
Impact: Increased resiliency at the community, national, and regional levels to climate variability and change.	
Outcome 1: Reduced exposure at national level to climate-related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis
Output 1: Risk and vulnerability assessments conducted and updated at a national level	1.1. No. and type of projects that conduct and update risk and vulnerability assessments
	1.2 Development of early warning systems
Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. No. and type of targeted institutions with increased capacity to minimize exposure to climate variability risks
	2.2. Number of people with reduced risk to extreme weather events
Output 2.1: Strengthened capacity of national and regional centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events
Output 2.2: Targeted population groups covered by adequate risk reduction systems	2.1.2. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased
	2.2.1. Percentage of population covered by adequate risk-reduction systems
	2.2.2. No. of people affected by climate variability
Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1. Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses
	3.2. Modification in behavior of targeted population

Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1.1 No. and type of risk reduction actions or strategies introduced at local level
	3.1.2 No. of news outlets in the local press and media that have covered the topic
Outcome 4: Increased adaptive capacity within relevant development and natural resource sectors	4.1. Development sectors' services responsive to evolving needs from changing and variable climate
	4.2. Physical infrastructure improved to withstand climate change and variability-induced stress
Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	4.1.1. No. and type of health or social infrastructure developed or modified to respond to new conditions resulting from climate variability and change (by type)
	4.1.2. No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by asset types)
Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural assets maintained or improved under climate change and variability-induced stress
Output 5: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability	5.1. No. and type of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type of assets)
Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure (increased) access to livelihood assets
	6.2. Percentage of targeted population with sustained climate-resilient livelihoods
Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1.No. and type of adaptation assets (physical as well as knowledge) created in support of individual- or community-livelihood strategies
	6.1.2. Type of income sources for households generated under climate change scenario
Outcome 7: Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy
Output 7: Improved integration of climate-resilience strategies into country development plans	7.1. No., type, and sector of policies introduced or adjusted to address climate change risks
	7.2. No. or targeted development strategies with incorporated climate change priorities enforced