CTCN Technical Assistance

Request Submission Form

Please fill in the form in the grey spaces, by following the instructions in italic.

Requesting country:	Georgia

Request title:	Assessment of Suitable Flood Mitigation Measures in Tbilisi, Based on Tsavkisiskhevi River Extreme Flood Analysis

Contact information:

{Please fill in the table below with the requested information. The request proponent is the organization that the request originates from, if different from the National Designated Entity (NDE).}

	National Designated Entity	**Request Applicant**
Contact person:	*Grigol Lazriev*	George Kordzakhia
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Technology Needs Assessment (TNA):

{Select one of the three boxes below:}

☒ *The requesting country has conducted a TNA in 2012*

☐ *The requesting country is currently conducting a TNA*

☐ *The requesting country has never conducted a TNA*

{If the requesting country has completed a TNA, please indicate what climate technology priority this request directly relates to. Please indicate reference in TNA/TAP/Project Ideas.}

CTCN Request Incubator Programme:

{Please indicate if this request was developed with support from the Request Incubator Programme:}

☐ *Yes*

☒ *No*

Geographical focus:

{Select below the most relevant geographical level for this request:}

☐ *Community-based*

☒ *Sub-national*

☐ *National*
☐ *Multi-country*

{If the request is related to the sub-national or multi-country level, please indicate here the areas concerned (provinces, states, countries, regions, etc.)}

Theme:

{Select below the most relevant theme(s) for this request:}

☒ *Adaptation to climate change*
☐ *Mitigation to climate change*
☐ *Combination of adaptation and mitigation to climate change*

Sectors:

The main sectors related to the request are: Water, Health, Infrastructure/human settlement

Problem statement *(up to one page):*

In the past, the City of Tbilisi was crossed by a number of small rivers and temporary streams. Currently the majority of these streams flow through artificial tunnels, culverts and pipes. The land above these buried river beds is occupied by residential houses and other infrastructure. Hydraulic capacity of the piped and closed river sections is insufficient to carry flood discharges. Flash floods and mudflows occurring on these small rivers as a result of heavy rains hit from time to time different parts of Tbilisi, causing heavy damages or even catastrophes with number of victims. The most recent and most significant catastrophe was that of Vere River on 13th June 2015 with disastrous consequences.
Considering the disastrous effects of the 13th June Vere River flash flood, the alarming morphodynamic situation observed in the riverside areas of the rivers Tsavkisistskali, Digmistskali and Gldaniskhevi within the limits of Tbilisi should be noted; the streamside areas of these rivers are densely populated. In case of strong flash floods, their safety can hardly be ensured. Disasters in 1903 and 1955, in which flash floods in the Tsavkisistskali River destroyed large parts of Abanotubani can serve as an example. Since then the situation is even worse due to climate change and due to rapid and improper land development not taking into account natural phenomena of flood hazard.
There is real threat that similar catastrophe, comparable with that of Vere River 2015 flood, could develop in catchment of Tsavkisistskali River.

The River Tsavkisistskali (other given names- Leghvtakhevi, Dabakhana) is located in Tbilisi. The River originates from the south-eastern slopes of the Udzo mountain of the Mtatsminda ridge at 1,200 m above sea level. From the left side the River Tsavkisistskali has several small tributaries and two wet gorges. The river banks are low. In the advanced section of the valley is cultivated botanic garden, 175 years old. In the area of botanic garden the River Tsavkisistskali has generated a deep and narrow gorge (several ten meters). The River Tsavkisistskali enters the Mtkvari River by concrete pipe from the right side at 395 m above sea level at the East end of Sololaki hill. Based on this data, the drop in elevation of the Tsavkisiskhevi (the difference between its source and junction points) exceeds 800 m. The River runs through the ravine and inclination of the slopes is very steep. The length of the river Tsavkisistskali is 9 km, the catchment area is 27 km^2. The river is fed by rain (37 %), snow (29 %) and underground (29 %), waters. The river is characterized by spring floods and strong flash floods. The annual water discharge makes 0.11 m^3 / s, runoff layer is 150 mm, and the module is equal to 4.8 l / km^2.

From the flash floods events those that took place in 1903 and 1955 would be noted. As result casualties and big material losses occurred. Estimated (calculated) peak discharge of the 1955 flash flood was 100 m^3/s. The hydrological observations do not exist in the Tsavkisistskali River catchment. Knowledge based measures should be put in place to prevent or mitigate flood hazard and flood risk in vulnerable parts of Tsavkisistskali River catchment in Tbilisi.

There is an increasing understanding to identify links, and the needs to create synergies between Climate Change Adaptation (CCA) and Disasters Risk Reduction (DRR). The IPCC-REX reports and the "Implementation of the Hyogo Framework for Action" (UNISDR 2013) both strongly encourage the actors from both fields to coordinate their actions more closely. Each of these fields has different concepts and approaches that provide important inputs to the knowledge base on how to deal with climate-related events. So proper implementation of CCA through DRR gives the effective results for Developing Climate Resilient Practices for Several Disasters. In case of the present project proposal requested assistance is required for Protection Vulnerable Community of c. Tbilisi from Floods and Flash Floods.

Past and ongoing efforts *(up to half a page):*

- Europe Aid Project „Programme for the Prevention, Preparedness and Response to man-made and natural disasters in the ENPI East Region (PPRD-East)", 2010 -2014.
- CENN, Strengthening local capacity and developing structured dialogue and partnerships for mitigating natural disasters and reducing poverty in Georgia;
- CENN, Institutional building for natural disaster risk reduction (DRR) in Georgia;
- NATO, 2008. Project SfP 977991 "South Caucasus River Monitoring". Progress Report, Tbilisi;
- TACIS Project „Joint River Management Programme - Kura Basin". Final Report, 2004;
- UNDP/GEF "Reducing Transboundary Degradation in Kura-Aras Basin". Main Deposits, Useful Storage and Current Condition of Groundwater in the Republic of Armenia. Report, Yerevan, 2006;
- USAID South Caucasus Water Programme, Strengthen the Capacity of National Water Resources Management Agencies. Deliverables Report, 2006;
- USAID South Caucasus Water Programme, Strategic Water Monitoring Plan for Transboundary Rivers. Review Report, 2007;
- Adaptation Fund supported Project "Developing Climate Resilient Flood and Flash Flood Management Practices to Protect Vulnerable Communities of Georgia". The focus of the project was on the promotion of the most appropriate mix of structural and non-structural flood management measures. As one of the solutions was developed river basin livelihoods, the use of agroforestry etc. 2013;
- Slovak AID project „Support of the implementation process of the EU Directive on assessment of the flood risks into the legislation in Georgia", 2014;

Assistance requested *(up to one page):*

Requested is assistance leading to knowledge-based recommendations of appropriate actions preventing disastrous consequences of possible floods of Tsavkisiskhevi River within Tbilisi, as part of climate change adaptation. Envisaged are mainly following analyses and services:

- Rainfall – runoff hydrological modelling of Tsavkisiskhevi River catchment, based on analogical extreme rainfall from 2015 Vere River disastrous flood (neighbouring catchment).

The aim of the simulation will be definition of the Tsavkisiskhevi River extreme flood discharge. Evaluation of climate change consequences to extreme flood regime will be also studied.

- Hydrodynamic modelling of extreme flood water levels for analogical hydrological situation of June 2015 Vere River disaster, projected into Tsavkisiskhevi River catchment. The hydrodynamic model could be possibly calibrated on the basis of reconstruction of relevant historical flood event, where calibration parameters of model could be set to values which enable real representation of local conditions.
- Detailed field surveys and topographical measurements for parameters and data needed for both hydrological and hydraulic modelling in the Tsavkisiskhevi River catchment.
- Detail flood mapping – production of flood hazard and flood risk maps of Tsavkisiskhevi River floodplains in Tbilisi
- Calculation and evaluation of necessary parameters of hydraulic structures as for example bridges, piped sections and tunnels, their hydraulic capacity and hydraulic performance, based on hydrodynamic modelling of Tsavkisiskhevi River, taking into account climate change effects
- Recommendations for eventual establishment of regular hydro-meteorological observations and monitoring in Tsavkisiskhevi River catchment
- Proposal of preventive measures (one of which could be flood forecasting and warning system) to prevent or mitigate further flood disasters on Tsavkisiskhevi River, taking into account climate change effects
- Training and technology transfer to relevant Georgian institution personnel, which will allow to perform similar hydrological and hydrodynamic modelling analyses (definition of flood discharges, flood hazard and risk mapping, calculation and evaluation of hydraulic performance and capacity of bridges, tunnels and piped sections, evaluation of changes in catchment and climate change effects) on other rivers and streams within Tbilisi (other tributaries of the Kura River)

Expected benefits *(up to half a page):*

Knowledge–based measures for extreme flood adaptation, including climate change effects, should be put in place in order to mitigate flood risk, reduce flood damages and level of threat for human lives. To be able to achieve this, the requested assistance is needed.

- In short term, the results of assistance will enable appropriate contingency planning for extreme flood events, based on actual flood risk maps
- In close future, measures for extreme flood adaptation could be planned in detail and put in place
- In long term, proper spatial and land development planning, based on flooding maps, should mitigate flood risk
- Transferred technology (modelling software) and modelling technique skills of trained personnel will enable in future effective management of flood risk and modelling of various flood scenarios and land development scenarios

Post-technical assistance plans *(up to half a page):*

After the assistance, it is expected that the results of modelling of extreme flood scenarios will help responsible institutions and bodies to demonstrate present flood risk in vulnerable areas and hence to raise awareness of responsible decision makers, stakeholders and public.

Contingency plans for vulnerable areas of the Tsavkisiskhevi River catchment will be prepared.
Priorities of recommended flood mitigation measures will be defined and consequently the measures

will be put in place accordingly.

The assistance carried out in the Tsavkisiskhevi River catchment will be used as a model for other catchments vulnerable to similar flood risk problems.

Trained personnel will use the transferred flood modelling technology for simulation of possible additional flood scenarios in the Tsavkisiskhevi River catchment and in other river a stream catchments with similar conditions and problems.

Key stakeholders:

In the implementation of the project, coordination and consultations with relevant institutions and stakeholders will be important. Below is the table of stakeholders and their contributions according to their role to support the implementation of the assistance and to whom the result of these activities would be useful and given as beneficiaries.

Stakeholder	**Role to support the implementation of the assistance**
The National Security Council of Georgia	The Council is a main coordination body in case of national-level emergency situation for any kind of disaster prevention and response activities.
Ministry of Internal Affairs of Georgia	Their role as a major Early Warning System player is particularly significant for information dissemination and communication activities, as well as for response capability.
Ministry of Environmental and Natural Resources Protection of Georgia	The overall supervisor and coordination to link water management issues and planning activities.
National Environmental Agency	NEA is responsible for both hydrological and meteorological monitoring programmes (gathering the observational data and its processing), create the hydrological and meteorological forecasts and in case expecting the disastrous phenomena to issue the Early Warnings and furthermore dissemination of information on hazards related to weather and water (flood forecasting).
Tbilisi Municipality	Their role is in the response capabilities.

Alignment with national priorities *(up to half a page):*

In the National Environmental Action Plan 2012 - 2016 (NEAP) is clearly prioritized the Climate Change issues especially the measures for the adaptation to the adverse impacts of the modern climate change. (see NEAP pp.77 - 83) From another hand due to the modern climate change the intensity and frequency of the disasters related to the water, weather and climate had increased significantly. The study of relevant values showed the intensity increased twice and the frequency almost 4 times.

The disasters risk assessment, creation of corresponding disasters risks reduction (DRR) and installation of relevant, modern early warning system (EWS) is necessary measures for strengthening *NEA's capability in readiness towards the disasters. The importance of it is stressed in NEAP (pp. 63-71).*

{Please demonstrate here that the technical assistance requested is consistent with documented national priorities (examples of relevant national priorities include: national development plans, poverty reduction plans, technology needs assessments (TNAs), LEDS, NAMAs, TAPs, NAPs, sectorial strategies and plans, etc.). For each document mentioned, please indicate where the priorities specifically relevant to this request can be found (chapter, page number, etc.).}

Development of the request *(up to half a page):*

Due to the the most recent and most significant catastrophe that took place in Vere River on 13th June 2015 with disastrous consequences was important to study the small rivers that are in frames of Tbilisi.

NEA is responsible for both hydrological monitoring programmes, creation the hydrological forecasts and in case expecting the disastrous phenomena to issue the Early Warnings and dissemination of information on hazards related to weather and water (flood forecasting).

Due to the above mentioned the idea is to establish the creative, STI programme for the runoff hydrological modelling of Tsavkisiskhevi River catchment.

In short term, the results of assistance will enable appropriate contingency planning for extreme flood events, based on actual flood risk maps. Transferred technology (modelling software) and modelling technique skills of trained personnel will enable in future effective management of flood risk and modelling of various flood scenarios and land development scenarios. These plans and project proposal was familiarized at the national level with the related departments (water and DRR management) in Ministry of Environmental and Natural Resources Protection of Georgia.

The process was initiated by the Hydrometeorological Department of NEA. The project proposal was initiated based on the needs for creation of the effective EWS in Tsavkisistskali river. The opinion of the NDE Doctor Lazriev was taken into consideration as well. Based on the expert's judgment the created project proposal is useful and necessary.

{Please explain here how the request was developed at the national level and the process used by the NDE to approve the request before submitting it (who initiated the process, who were the stakeholders involved and what were their roles, and describe any consultations or other meetings that took place to develop and select this request, etc.)}

Expected timeframe:

The project is expected to be carried out within 1 year with time schedule as follows

No	Activities	Time (months)											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Initial meeting and establishment of cooperation with relevant local institutions												
2	Field visit and inspection of local conditions												
3	Definition of needed data, data availability review, data collection and analyses; topographical and hydrometric measurements in the Tsavkisiskhevi River catchment for purposes of the modelling.												
4	Hydrological rainfall-runoff modelling in Tsavkisiskhevi River catchments												
5	Evaluation of possible climate change impact on extreme flood regime in Tsavkisiskhevi River catchment												
6	Hydrodynamic modelling of extreme flood scenarios, evaluation of flow												

	capacity and hydraulic performance of hydraulic structures												
7	Development of flood hazard and flood risk maps												
8	Proposal of preventive measures to prevent or mitigate further flood disasters on Tsavkisiskhevi River, taking into account climate change effects												
9	Training and technology transfer to relevant Georgian institution personnel												
10	Reporting, presentation of results, final workshop												

Background documents:

The National Environmental Action Plan (NEAP-2) presented on the WEB of Ministry of environment (moe.gov.ge). The issues having relation to the project proposals are:

CHAPTER 10. DISASTERS (p.63) and Chapter 12. Climate Change (p.77) where all interested and needed information is overviewed.

EuropeAid Project „Programme for the Prevention, Preparedness and Response to man-made and natural disasters in the ENPI East Region (PPRD-East)". Final Report 2014.

Slovak AID project „Support of the implementation process of the EU Directive on assessment of the flood risks into the legislation in Georgia", Final Report 2014;

NATO, 2008. Project SfP 977991 "South Caucasus River Monitoring". Progress Report, Tbilisi;

Tacis Project „Joint River Management Programme - Kura Basin". Final Report, 2004;

UNDP/GEF "Reducing Transboundary Degradation in Kura-Aras Basin". Main Deposits, Useful Storage and Current Condition of Groundwater in the Republic of Armenia. Report, Yerevan, 2006;

USAID South Caucasus Water Programme, Strengthen the Capacity of National Water Resources Management Agencies. Deliverables Report, 2006;

USAID South Caucasus Water Programme, Strategic Water Monitoring Plan for Transboundary Rivers. Review Report, 2007;

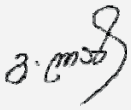
Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy, Brussels, 2000.

Monitoring and impact of the assistance:

{Read carefully and tick the boxes below.}

☒ By signing this request, I affirm that processes are in place in the country to monitor and evaluate the assistance provided by the CTCN. I understand that these processes will be explicitly identified in the Response Plan in collaboration with the CTC, and that they will be used in the country to monitor the implementation of the CTCN assistance.

☒ I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:	
NDE name:	Grigol Lazriev, Head of the Climate Change Service; Ministry of Environment and Natural Resources Protection
Date:	8 June 2016
Signature:	

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

Need help? The CTCN team is available to answer questions and guide you through the process of submitting a request. The CTCN team welcomes suggestions to improve this form.

>>> Contact the CTCN team at ctcn@unep.org