

Risk Assessment and Mapping to Climate Change Implemented by CENN/Mercy Corps

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CENN, in cooperation with Mercy Corps, has conducted the mapping and assessment of human and ecosystem climate change vulnerabilities and risks in the target Kura trans-boundary areas and communities.

The risk mapping and assessment to climate change was conducted using innovative and modern approaches, the first of their kind employed in the South Caucasus. Prior to the development of the risk maps, hazard and vulnerability maps were generated for 4 types of hazards (landslide, mudflow, flood and drought) and 4 types of vulnerabilities (social, physical, economic and environmental). The result of mapping and assessment shows communities' risk to climate change for the period of 2020-2050.

The main concept behind climate risk mapping is based on the risk equation $R=H*V$ (risk is a combination of hazard(s) and vulnerability), which was slightly reformulated to $CR=CH*PV$ (Climate risk is a combination of multi-hazards [including the climate extreme event parameters for the period of 2020-2050] and predicted vulnerabilities (although due to the lack of appropriate information, baseline, rather than predicted vulnerability was used in the current study)).

Thus, firstly, different types of hazards were mapped by the experts (hydrologist, geologist) within the GIS environment. Then, for each type of hazard, a respective climate extreme index was selected and the difference between baseline (1960-1990) and predicted (2020-2050) indices was calculated for selected meteorological stations. This difference was interpolated in the open-source statistical "R" software. Afterwards, climate extreme event maps for 2020-2050 years were combined with hazard maps to obtain the final multi hazard map including climate change parameters. The multi hazard map was then integrated into an overall vulnerability map (including social, economic, physical and environmental vulnerabilities). Ultimately, the final risk maps to climate change were produced.

The necessary data on hazards, climate extreme events, and vulnerabilities were gathered on community level from various sources and then integrated, analyzed and presented using modern software such as ArcGIS, ILWIS and "R". The principal method applied in this research was Spatial Multi Criteria Evaluation (SMCE) used for the weighing, standardization and integration of various data used in the analysis. The SMCE was also employed in the development of the Atlas of Natural Hazards and Risks of Georgia, produced by CENN in early 2012.

Two other approaches were utilized to assist in the identification of the most vulnerable communities in the target municipalities of Georgia: a baseline survey, Local trends and dynamics of natural disasters and climate change and analysis of their environmental, social, and economic impacts in the target Kura trans-boundary areas, and local round-tables with the participation of a multi-stakeholder Local Working Group.

Despite the data limitations, it is expected that the output of this analysis, in combination with the baseline survey and the results of the round-tables, will be useful for decision-makers in better targeting financial resources towards adaptation measures to be undertaken in the target areas.

The maps were developed within the framework of the project Enhancing Local Capacity and Regional Cooperation for Climate Change Adaptation and Biodiversity Conservation in Georgia and the South Caucasus implemented by CENN and Mercy Corps and financially supported by EU. The project entails

the implementation of 12 pilot projects in 12 communities most vulnerable to climate change and natural disasters in Georgia . The project aims to increase local capacity and regional cooperation for the identification and mitigation of risks likely to be exacerbated by climate change, through the lens of Disaster Risk Reduction (DRR), Climate Change Adaptation (CCA) and biodiversity conservation and is implemented in 7 municipalities in Georgia (Dmanisi, Bolnisi, Marneuli, Sagarejo, Sighnaghi, Dedoplistskaro and Ninotsminda), 1 Marz in Armenia (Lori), and 4 rayons in Azerbaijan (Agstafa, Tovuz, Shamkir and Samukh).