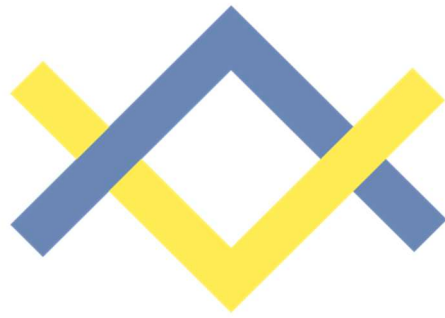




The HuT

Street flooding in Vilnius: common knowledge - common hut in climate extremes

‘The HuT for Me and You’
Narrative

DEMONSTRATOR 4
Vilnius
(Lithuania)

AUTHORS

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Intro

Vilnius, the capital of the Lithuanian Republic, is situated in the valley of river Neris. Its medieval Historic centre, a UNESCO World Heritage Site, is one of the largest and best preserved Old towns in Eastern Europe. In 2015-2022 the city centre was increasingly prone to pluvial flooding, which has become more severe due both to the extreme precipitation and the outdated drainage system. As part of the Horizon Europe project The Human-Tech Nexus: Building a Safe Haven to Cope with Climate Extremes (The HuT), researchers from the Vilnius University (VU), cooperating with Lithuanian hydro-meteorological Survey (LHMS), DEM4, are working to increase awareness and preparedness to climate extremes.

Their goals are:

- to increase awareness about urban pluvial flooding caused by heavy rains in Vilnius and preparedness to extreme flooding situations;
- to support the climate-proofing design of drainage networks, urban surface water management and promote NBS in urban planning.

Location

Vilnius, the capital of Lithuanian Republic (>600,000 inhabitants, 2025) is located on the Lithuanian eastern part, in the deep valley of river Neris, moraine terrain, where altitude differences seek 153 m. Vilnius territory (400,47 km²) contains up to 41% of forests and green areas, in average impermeable coatings cover 12% (the 30-60% in the Historic and Modern City centre).

Most of the population lives in the large spread multi-storey housing areas, constructed in 1965-1990. Since then, the automobilisation rate has risen dramatically, as well as the need for paved areas. Now the majority of housing areas and the drainage system need renovation.

The presence of world heritage as well as population concentration make this area vulnerable to climate extremes

Characters

Climate researcher at VU

Associated Professor at the Vilnius University, Institute of Geosciences, the Head of the Department of Hydrology and Climatology, he focuses on reliability weather and climate prediction, analysis of the development of large and regional scale weather anomalies and urban climate. He believes that the city of such size like Vilnius need to elaborate specialized ultra-short-range and "nowcasting" type forecasts, designed to predict rapidly developing extreme weather events. And, of course, appropriate (specialized for the urban area only) warnings of severe (extreme) weather phenomena should be issued. In his view, one of Vilnius' main climate adaptation challenges lies in the preparedness to understand the main climate change scenario's reliability for both the near future (next few decades) and the far future (end of the century) periods. He also advocates for the preservation of green areas in the central part of the city (the area of green space in a city is usually calculated based on the total area of the city, which also includes part of the forests surrounding the city, and thus does not reflect the actual situation), which help to retain moisture during dry periods and absorb some of the flood waters during rapidly developing pluvial floods.



Urban planning researcher at VU

Associate Professor at the Vilnius University, Institute of Geosciences, the Department of Geography and Spatial planning, focuses on spatial planning, landscape, sustainability and urban green areas, ecological network (nationally elaborated concept of Nature frame (Geoecological network)) and public participation in decision making. In his view, one of Vilnius' main climate adaptation challenges lies in the insufficient understanding of complexity of urban flooding problem, quick growth of impermeable surfaces and complete construction of underground space blocking natural absorption. He emphasizes the lack of collaboration between institutions and slow changes of legislation concerning the adaptation to climate extremes. "Streets flooding in Vilnius happens because urban areas lack permeability. Neighborhoods can't absorb intense rainfall, and the drainage pipes have a limited capacity." He sees multifunctional landscapes as key to reducing vulnerability to extreme flooding, urban heat while also enhancing biodiversity, identity of place and community well-being. He believes cross-sectoral collaboration and long-term vision are fundamental to mainstreaming adaptation into city strategies and advocates for a planning approach that prioritizes permeability, development of Nature frame and nature-based solutions to improve resilience to heavy rainfall.

Climate Data analyst at National Hydro-meteorological Survey

We collaborated creating Vilnius extreme situation plan, which was approved by City's Council in 2025, but still the pluvial flooding problem is not recognized as priority. The different climate extreme warning systems had several tests but not all municipalities facing the extreme situations know what data, analyses and other support can be provided by LHMS, also we lacking better information exchange and communication among the civil institutions during the extreme events. The second point, he stresses, the lack of meteo-data at the city level. At the moment,

Vilnius has only two official meteorological stations recording precipitation and this is far from sufficient.

A citywide precipitation monitoring network is needed. Over the next few years, the Lithuanian Hydrometeorological Service plans to install an urban meteorological observation network not only in Vilnius, but also in several other major Lithuanian cities. This should contribute to the management of information on extreme rainfall events, especially for institutions such as Grinda and others. Also, it is important to improve the exchange of precipitation data between the institutions managing the situation. Large and essential infrastructure projects significantly reduced street flooding in Vilnius, but they are very expensive and require systematic planning. Systematic planning consists of both data and a systematic approach to the problem, as well as inter-institutional cooperation.

Project "Neutral Vilnius" Strategist

Educated as climatologist and working within the Project "Neutral Vilnius" he recognizes that most focus speaking about climate change still goes to the mitigation, but not much to the Climate adaptation or resilience of City. "Preparing the Vilnius Green action plan can help, but still closer institutional collaboration is needed as well as a shift in urban planning keeping water at the place it appears" he says. He argues: "As Vilnius is lucky to evade crucial meteorological situations in last years due to the recent geopolitical situation and threat of aggression from Russia, also the threat of atomic accident in the neighborhood Belarus, the climate issues are not at the high position in the Vilnius extreme situation plan - that situation could change very quickly.

Specialist at Vilnius municipality company Grinda (responsible for eliminating the consequences of extreme events)

Reacting to the pluvial urban flooding of 2014–2018, Vilnius implemented several Surface water treatment reconstruction projects in 2019–2023: 10 new centralized treatment plants were installed,



new networks were reconstructed or laid using EU structural funds. That solved the most urgent problems. Also, we started a project for Surface water collectors data digitization, using the *ArcGISUtilityNetwork* we're testing urban 3D modeling, hydraulic modeling using *Bentley Civil Storm* software and other innovations. The Šeškinė surface water treatment plant, installed in 2023, is a multi-functional facility, serving both the storage of heavy rain discharge and the recreation, using some NBS.

Long-term goal: Vilnius climate resilient and adaptive city

The long-term vision for Vilnius within The HuT project is to co-create space, where different institutions and organizations can collaboratively act seeking to create a safe future for society and a sustainable city to overcome challenges of an extreme precipitation and general climate change.

This involves strengthening hydro-meteorological data collection and analysis, continuing discussions and changing legislation on criteria of heavy rain, protection and development of the multifunctional Nature frame - network of green spaces and ecological corridors that absorb heavy rainfall, mitigate urban heat, keep the identity of place and support biodiversity. At the same time, the project seeks to identify the thresholds of social acceptance of possible flooding in order to find effective and financially reasonable technical solutions and innovative, climate proofing urban design to build a more climate-resilient Vilnius.

Needs: From awareness to action

One urgent need is the awareness raising about the possible scale of heavy rain in Vilnius seeking to widen perspective of complexity of urban flooding problem. We need to regulate urbanization intensity, reduce impermeable surfaces and introduce control of underground space development that blocks natural absorption.

Equally pressing is the need to raise public awareness about sustainable water management. All interest groups and stakeholders are still lacking information - what city areas are vulnerable in case of pluvial flooding and what measures and actions everyone could take personally and institutionally.

Finally, Vilnius needs to institutionalize urban design recommendations, particularly those concerning water management on the areas where rainfall appears, sustainable drainage, based on Nature-based Solutions, as part of its planning regulations.

Our support: Translating knowledge

We focus on building a strong, trust-based dialogue with the City Council, Vilnius university and Lithuanian hydro-meteorological survey. Our contribution lies in providing scientific knowledge and support to improve decision-making and Climate knowledge guided urban planning. Through this collaboration, we aim to bridge the gap between research and policy by translating data into actionable strategic input.



Events: Raising awareness through academia

The team of DEM4 performed several awareness raising events in 2023-2025



Trainings of employees (UAB "Grinda") on Extreme meteorological phenomena and their predictability



Lecturer and moderator dr. Gintautas Stankūnavičius, Vilnius, 2024

2023-2024 dr. Viktorija Mačiulytė took part in the preparation of "Emergency management plan of the Vilnius Municipality" as a member of Working group, representing Lithuanian Hydro-meteorological Service under the MoE mainly providing data and discussing the official criteria for the devastating rain rate in Lithuania. Plan was approved in 2025

Following the natural floods during the cold season of 2023/2024 Field visit to Kretinga municipality with Seminar on Climate change on 2nd February 2024 was organized.



MEMO-leaflet about LHMS data, expertise and other services on hydro-meteorological data for MUNICIPALITIES was produced, 2024



DEM4 group and 25 people from 17 institutions attended Climate change seminar in Kretinga.
<https://www.chgf.vu.lt/mokslas/projektai/tarptautiniai-mokslo-projektai/projektas-hut>
<https://www.facebook.com/groups/1242365602576081/permalink/3442979162514703/?rdid=qHw5fZef1AkNzcCd#>

Local DRR forum "Vilnius disasters risk reduction forum: extreme rainstorms and urban pluvial flooding - measures adapting to climate change" by the initiative of DEM4 group, was held in Vilnius 2025 03 12 at Vilnius municipality on the framework of Vilnius - Green capital of Europe 2025. The Forum aimed to strengthen collaboration among stakeholders (science, policy makers, engineers' practitioners, urban and landscape planners, specialists of cultural heritage, youth and communities) in order to gather, to share and to find out - to co-create commons, to cope with urban pluvial flooding in Vilnius.



<https://www.hkk.gf.vu.lt/2025/03/06/klimato-forumas-vilniaus-prisitaikymas-prie-klimato-kaitos-sukeltu-pavoju-ekstremalios-liutys-ir-miesto-tvindymas/>

Part of DRR forum Vilnius was dedicated to inclusive discussions and co-creation sessions.





<https://thehut-nexus.eu/event/vilniaus-prisitaikymas-prie-klimato-kaitos-sukeltu-pavoju-ekstremalios-liutys-ir-miesto-tvindymas/>
<https://thehut-nexus.eu/vilniaus-universiteto-mokslininkai-pakviete-diskusijai-apie-sostines-pasirengima-ekstremalioms-liutims/>
<https://zaliasvilnius.lt/vilniuje-ivyko-klimato-forumas-the-hut-kaip-miestas-gali-prisitaikyti-prie-ekstremaliu-liuciui/>

Strategic session on Preparedness for extreme meteorological phenomena was organized by LHMS on 22th of May, 2025.

Representatives from the Ministry of the Environment, the Fire Protection and Rescue Department, the State Border Guard Service, the State Data Agency, "Road Supervision", "Oro Navigacija", Vilnius University, the National Payment Agency, the Green Finance Institute, "Via Lietuva", the Lithuanian Banks Association and other institutions and organizations shared experiences, discussed opportunities for cooperation, data exchange, and coordination of actions to reduce potential risk, harm and losses to the population, the environment, and the economy.

Target audience

The target audience in Vilnius includes key institutional and academic partners.

Central stakeholders are the Vilnius City Council, Vilnius municipality project "Neutral Vilnius", Vilnius City enterprises responsible for flooding consequences liquidation and prevention VšĮ Grinda and "Vilniaus vandenys", Lithuanian Hydro-meteorological Survey.

Additional collaborators include Lithuanian Secretary of UNESCO, Vilnius municipality administration Civil Protection agency/its regional branch, Vilnius municipality Planning enterprise "Vilniaus planas", urban planning and landscape design enterprises.

References

- Climateurope2, 3rd Webstival, <https://www.youtube.com/watch?v=FfNDnBdLhEE>
- Climate Stories Project, <https://www.youtube.com/watch?v=ENozvBm1-pc>
- Welcome to 2050 Expo - Adapt or Succumb <https://youtu.be/1YBku-kv7Ao?si=2xk35FwL2BP790yk>
- REACHOUT, <https://reachout-cities.eu/climate-stories/>

