FACTSHEET RISK REDUCTION MEASURES

Findings for a future application of the emergency response tool in Zagreb

Where was it implemented?

Zagreb, Croatia

Fields of action

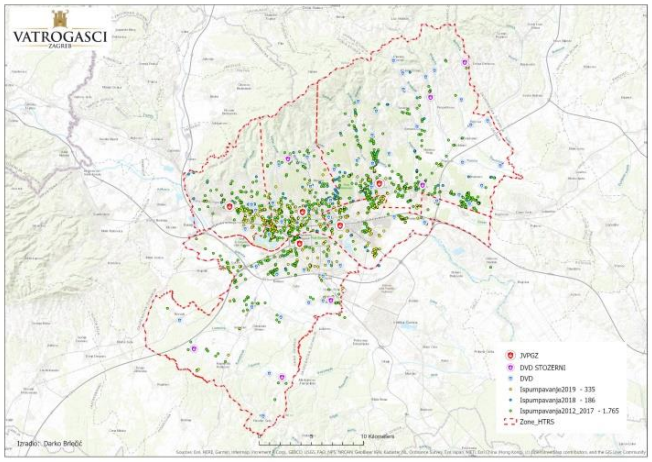
- Emergency response

Related to measure from the catalogue of measures

- Considering of pluvial flooding as disaster for precautionary measures of civil protection and whole crisis management system

Area characterisation

- **Area type:** urban
- **Landscape type:** hilly



Fire brigades interventions in the City of Zagreb on water pumping after heavy rain (2012-2019 year)
Source: Darko Brlečić, Fire brigades in the City of Zagreb

Problem

Zagreb is the capital of the Republic of Croatia and its largest city in terms of population. According to the 2011 Census, it has 790,017 inhabitants. As the capital and the largest city, Zagreb is Croatia's cultural, scientific, economic and administrative centre. Througout the City's history, the streams on the southern Medvednica slopes have with their torrential behaviour relatively frequently affected downstream settlements, causing heavy damage and human casualties. A warning and emergency response system for floods is in operation. There is a problem that in a large number of interventions the water has already receded, with firefighters then only inspecting the site or concluding that the water cannot be pumped out because of a low level. A plan of emergency interventions is not pre-defined.

Description and aim

Within the RAINMAN project it was analysed how the heavy rain emergency response system in Zagreb is working at present and findings from past experiences gained were derived. With the help of this information, further steps in the improvement of civil protection can be identified, also with regard to the application of the RAINMAN emergency response toolkit.

As part of its daily operations related to receiving reports and intervening, the public fire brigade of the City of Zagreb in its Communications Centre among other things collects data about all the interventions due to heavy rainfall (out in the open and inside buildings) in the Zagreb area. All the fire brigades in the City of Zagreb act in accordance with the Firefighting Act and the supporting legislation.

Information about the forecasted bad weather comes through the ŽC 112 Zagreb Centre and from DHMZ through fax or e-mail. After that, if needed, an SMSProfi web application sends a message to particular voluntary fire brigades (or all if needed) specifying the hazard and how they are supposed to act (be on standby or come to the fire stations and be ready to respond).

For each situation related to the forecasted bad weather and possible heavy rain and floods, a certain number of voluntary fire brigades (or if needed all voluntary fire brigades) disposing of the equipment for pumping out water is put on standby, whereas the public fire brigade of the City of Zagreb is on duty round the clock. During a heavy storm, as many voluntary fire brigades as necessary to respond to the maximum possible number of interventions are called in.

Effect of measure	
Identified opportunities for improving the heavy rain emergency response system in Zagreb	
Description of implementation	
Effect horizon: short	**Involved stakeholders:** Public Fire Brigade of the City of Zagreb City of Zagreb, City Office for Strategic City Planning and Development, Sector for Strategic Information and Research Faculty of Civil Engineering
Implementation: October 2019 / June 2020	**Initiator / responsible** Croatian Waters, Water Management Institute, Department of Development
Lessons-learned	
Main success factor: Definition of procedures and activities (defining who and when assumes which duty / responsibility)	**Main challenge:** Establishing a timely and spatially limited warning
Synergies / beneficial aspects: Strengthening the cooperation between Croatian Waters and emergency response units	**Conflicts / constraints:** Croatian Waters is not the responsible entity for emergency response
Key message to others starting with a similar task	
“Since a heavy rainfall event is a highly dynamic process that varies both temporally and locally, the efficiency of individual measures needs to be regularly checked, adapted and improved.” “It might make sense to implement the measures even at a time when not specified by the action plan.” “Document replacement measures or non-established measures in each case to help monitor the event or revise the plans after the event.” “It is important to make regular checks to make sure that all the measures have been properly finalized.” “Continuous and systematized collection of flood reports from the public and voluntary fire brigades and other competent institutions is recommended, with clearly defined data to be collected, based on which a database will be created and managed in order to develop tools for taking timely action.” “A correlation needs to be established between the measured meteorological indicators, topographic site conditions and the resulting flood events, with it serving as the basis for model calibration and risk analysis.” “Once a model is established and verified, the model needs to be maintained, with each new project and the development and implementation of the spatial plans evaluated through the establisthed model.”	
Contact	
Croatian Waters: voda@voda.hr	