



2012

MONITOR II: Continuous Situation Awareness.
Evaluation report





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1. Scenarios and maps for the CSA

Theoretical proposal of the CSA for the Varbitsa watershed is based on different flood scenarios, by detailed hydraulic models of high wave in the river and detailed risk flood maps.

Scenarios make it possible to assess the flood risk in various situations and to develop guidelines to limit the risk. If there are more developed flood scenarios in the database of the system, the assessment of the risk will be more accurate in a real situation and thus acts to limit the damage and protection of the population will be more effective.

Currently a barrier to the development of flood scenarios Varbitsa river is mostly is the lack of 3D model of the terrain with high accuracy (LIDAR data). Another obstacle may be unadjusted access to data such as:

- Hydrological data
- GIS data

The current restrictions on access to data and the accuracy of the available data do not permit the development of detailed flood scenarios and risk maps.

In the preparation of maps for the project is used the maximum water discharge ($Q = 2.640 \text{ m}^3/\text{s}$) and raster model of terrain $100 \times 100 \text{ m}$. The accuracy of the cards depends on the quality of the digital terrain model, as in the design case that model impaired this accuracy.

In the produced maps the water depth is presented for five areas which were identified at risk.

The prepared maps can serve to identify the hazard and flood risk only with the parameters of the water discharge ($Q = 2.640 \text{ m}^3/\text{s}$).

The use of the maps in the CSA shall not permit an assessment in a case of flood with water discharge different from indicated one. This will limit the possibilities of system response in different situations, which may lead to incorrect solutions for limiting the risk.

1.1 Recommendations

- **The state and municipal administration must invest resources for LIDAR data necessary for the preparation of additional flood scenarios.**
- **To start close cooperation with all public service owners of data needed for the development of different and more detailed flood scenarios.**

2. Available technical resources

For effective operation of CSA we need contemporary monitoring system, database for past events, system software, alarming system for population and construction of the Center for the management and control of the CSA.

Available technical resources suitable for CSA working are

- Tree precipitation measurement station
- Two river hydrometric measurement stations
- Alarming system for population in case of flood
- Hydrological data for past floods

At this moment compatible technical resources with CSA are the precipitation measurement stations and the system for alarming of the public. From river hydrometric stations only one station is equipped with suitable instruments for transmission of data (Q and H of river). Parts of hydrological data for past floods are on a paper and need to convert it. Also access to data is very expensive and unadjusted.

There is no contemporary monitoring system, which will cover the main tributary river, forming the water discharge in Vrbica river. Insufficient monitoring points along the river

At that time the only data in advance for potential high wave in Vrbica river comes from meteorological forecasts of rainfall, and from teams on the river hot(flood) spot. This approach helps in cases of progressive increase of level in the River, where the public has time to take preventive measures.

In the case of intensive snowmelting, a sudden torrents or destroying of risk flood facility has no monitoring system for advance forecast about the size of the expected high wave.

We came to conclusion that the operation of the CSA described in the theoretical development, will be difficult and not sufficiently effective. Incoming data to the system will not provide information required for the actual situation, which will impede the risk assessment.

2.1 Recommendations

- **Construction of additional monitoring river spots, on the entire watershed.**

The equipment in the stations must be able to transmit data in real time to the Centre of CSA for the situation assessment.

- **Mounting of sensors, which will take into account the distortions in the structure of the flood protection facilities.**

At the moment there are no similar devices. It is necessary the installation of such at-large flood protection facilities and river dykes.

Devices must be able to transmit data for deformations in real or near real time to CSA for the situation assessment.

- **In developing of the CSA control centre is necessary to borrow of best European practices, which are optimised, tested, developed and improved on the basis of many years of research and practical. For Bulgarian similar systems may be developed for each basin department or for the biggest watersheds.**