

GUIDANCE DOCUMENT DESCRIPTION OF DEMANDS FOR THE METHODS FOR ASSESSMENT AND MAPPING OF HEAVY RAIN RISKS

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Description of demands for the methods for assessment and mapping of heavy rain risks

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1. Context and goals of this document

1.1. Project context

Heavy rain events are a major environmental risk in Europe: they can hit any location with only very short warning time. Every year people die, thousands lose their homes, and environmental damages like water pollution occur. And the risks of heavy rain events are increasing all over Europe. In the project RAINMAN, partners from 6 countries have joined to develop and test innovative methods and tools for the integrated management of heavy rain risks by local, regional & national public authorities. These will be included in the RAINMAN-Toolbox, a set of five transferable tools and methods for municipalities and regional stakeholders.

One of these tools is the *Heavy Rain Risk Assessment and Mapping Tool*. For this, the partnership will develop methods to assess heavy rain risks under different categorized physical conditions and land uses of areas in Central Europe. Thus, e.g. adapted methods for urban and rural land uses in mountainous and low land will be specified.

1.2. Goals

This document draws conclusions from the *Scoping Study on Existing Methods for Assessment and Mapping of Risk Zones for Heavy Rain Events*. These conclusions set the agenda for the coming analytical framework development and for the joint basic methods for the assessment and mapping of risk areas with specifications for different conditions and levels of complexity.

2. Findings

2.1. General remark

The following limitation for pluvial flood hazard and risk shall be acknowledged: the actual local pluvial flood hazard risk and its phenomenological character are highly depending on the individual heavy rain event, on the actual and potentially also very local surface characteristics (e.g. small structures, initial conditions), and on the presence and vulnerability of possible risk receptors. Therefore, taking into account the variability of each of these factors, the assessment of heavy rain hazards and risks always includes a non-negligible amount of uncertainty and hence should be understood as indication.

2.2. Data

Data availability and quality (accuracy, spatial and temporal resolution) are the key issues for the possibility and quality for pluvial hazard and risk assessment methods.

Pluvial hazard and risk assessment can be based on one or more of the following data:

- Digital terrain data
- Precipitation statistics or past events
- Land use data (type of land use, degree of soil sealing)
- Soil data (moisture, permeability, water situation, soil type and kind, erosion, soil depth)
- Damage data / statistics for pluvial events

- Emergency management statistics for pluvial events

If little data is available, only simple methods are possible and the results will deliver rough indications. The more data is available, and the more different kinds of data of good quality data are available, the methods can be more superior and assessment results shall provide more and better indications in maybe higher spatial resolution.

2.3. Methods

In general, several approaches for hazard and risk assessment methods are possible, e.g.

- Event-based assessment,
- Methods based on statistical models
- Methods based on physically based models
- Methods based on empirical models / mixed methods

2.4. Mapping

In general, several approaches for hazard mapping are possible and are used for pluvial flooding, e.g.

- Mapping of catchment boundaries and flow paths,
- Mapping of flooded areas, water depths and e.g. velocities.

A hazard will lead to a risk, if a receptor vulnerable to flooding is present in the hazard area. The receptor vulnerable to flooding will suffer damage in case of flooding. So for risk assessment, the possible damage or adverse consequences have to be assessed, and the probability of the hazard event has to be taken into account in order to identify the possible risk.

As regards risk mapping, no applications for pluvial flooding were found, but several methods are available and used for fluvial flooding

- Qualitative display of possibly vulnerable receptors in flooded areas (like inhabitants, land use classes, critical infrastructure (e.g. hospitals) and protected areas (environment, culture))
- Monetary evaluation (total or p.a.) of direct and tangible possible damages, e.g. by means of depth-damage curves and display in classes according to land-use; with or without additional display of other risk receptors that cannot be monetarized by way of depth-damage curves

3. Conclusions

For the RAINMAN project, data availability and quality might differ very much in the different CE Member States, and the phenomenological characteristics of pluvial flooding might be just as manifold. Therefore, the approaches shall be suitable for the regionally available data and the regional specificities that have to be accounted for. Consequently, assessment methods shall be coordinated in RAINMAN rather than harmonized.

With regards to mapping, the same approach shall hold; the approach chosen shall be suitable to the special regional characteristics and to the assessment methods they are based on.

RAINMAN Key Facts

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RAINMAN website &
newsletter registration: www.interreg-central.eu/rainman



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