

RAINMAN

Integrated heavy rain management



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Rainman | VUV T.G.M. |

- <https://www.interreg-central.eu/Content.Node/RAINMAN.html>
- Goals of the project: Reduction of risks related to floods caused by heavy rain events (pluvial floods).
- Stakeholders: Municipalities, regions,



PROJECT PARTNERS

PROJECT PARTNER 1 - SAXON STATE OFFICE FOR ENVIRONMENT,
AGRICULTURE AND GEOLOGY - GERMANY

PROJECT PARTNER 2 - SAXON STATE MINISTRY OF THE INTERIOR - GERMANY

PROJECT PARTNER 3 - ENVIRONMENT AGENCY AUSTRIA - AUSTRIA

PROJECT PARTNER 4 - OFFICE OF THE STYRIAN GOVERNMENT - AUSTRIA

PROJECT PARTNER 5 - T. G. MASARYK WATER RESEARCH INSTITUTE, P.R.I. -
CZECH REPUBLIC

PROJECT PARTNER 6 - REGION OF SOUTH BOHEMIA - CZECH REPUBLIC

PROJECT PARTNER 7 - CROATIAN WATERS - CROATIA

PROJECT PARTNER 8 - MIDDLE TISZA DISTRICT WATER DIRECTORATE -
HUNGARY

PROJECT PARTNER 9 - INSTITUTE OF METEOROLOGY AND WATER
MANAGEMENT - NATIONAL RESEARCH INSTITUTE - POLAND

PROJECT PARTNER 10 - LEIBNIZ INSTITUTE OF ECOLOGICAL URBAN AND
REGIONAL DEVELOPMENT - GERMANY

PROJECT PARTNERS

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LANDESAMT FÜR UMWELT,
LANDWIRTSCHAFT
UND GEOLOGIE



Freistaat
SACHSEN



WORK PACKAGES

WORK PACKAGE 1

MAPPING RISKS

In a first step, the partnership will develop methods to assess heavy rain risks under different categorized physical conditions and land uses of areas in Central Europe.

[Read more...](#)



WORK PACKAGE 2

REDUCE RISKS

The partners will jointly create a tool and a strategy to reduce the risks of heavy rain events.

[Read more...](#)



WORK PACKAGE 3

PILOT ACTIONS

Pilot activities in all participating partner regions are implemented to test the developed joint methods and tools and to prove their feasibility and applicability.

[Read more...](#)



WORK PACKAGE 4

RAINMAN-TOOLBOX

The partners develop jointly a transferable toolbox with five tools to reduce heavy rain risks and to support the integrated environmental risk management of regional and local administrations.

[Read more...](#)



- Scoping study
- - Design precipitation

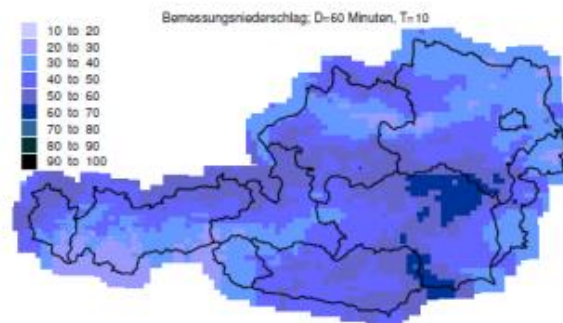


Figure 4: Design precipitation (in mm) for 10 year probability and 1 h duration (Source: Bundesministerium für Nachhaltigkeit und Tourismus, 2018a:7)

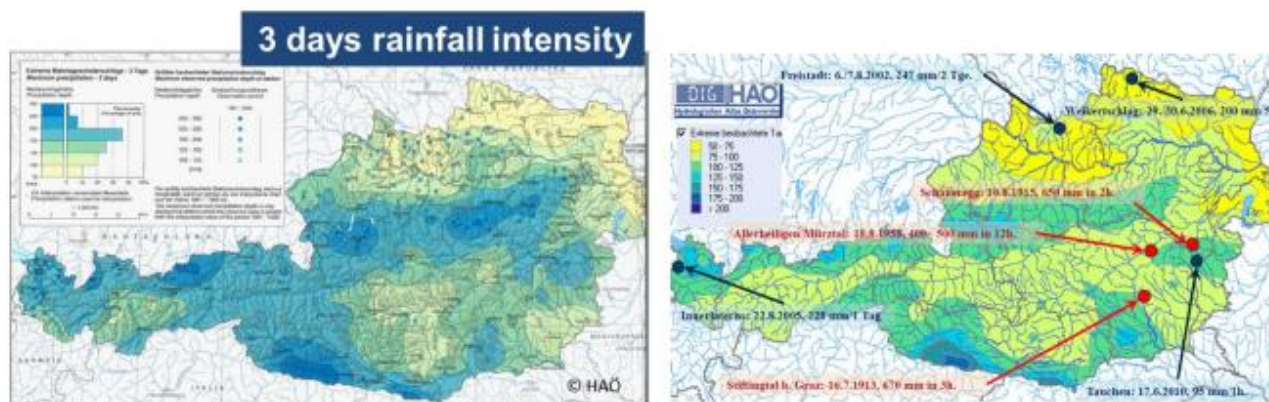


Figure 5: 3 days rainfall intensity pattern (left) and past heavy rain events (right) (Source both: Bundesministerium für Land- und Forstwirtschaft, Umwelt und Wasserwirtschaft (BMLFUW), Abteilung Wasserhaushalt, 2005)

- GIS based methods

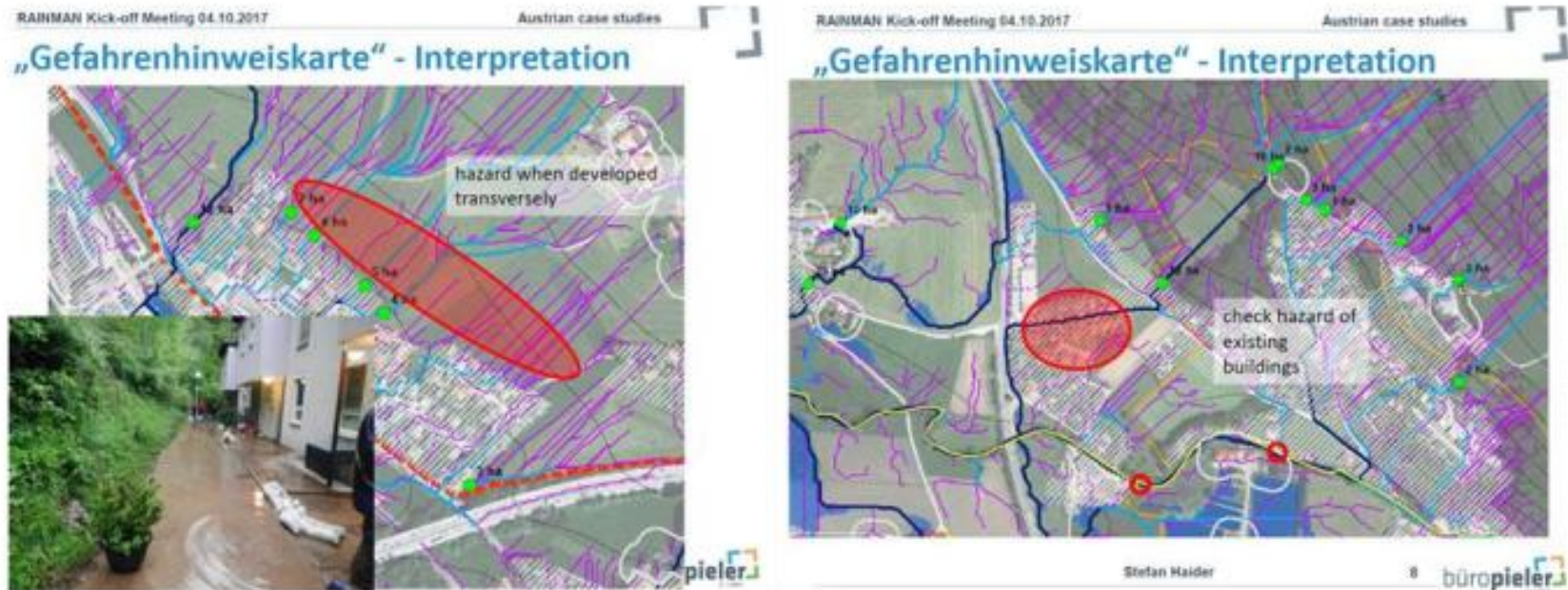


Figure 11: Interpretation of indicative hazard maps (Haider, 2017)

- GIS based methods -Critical points

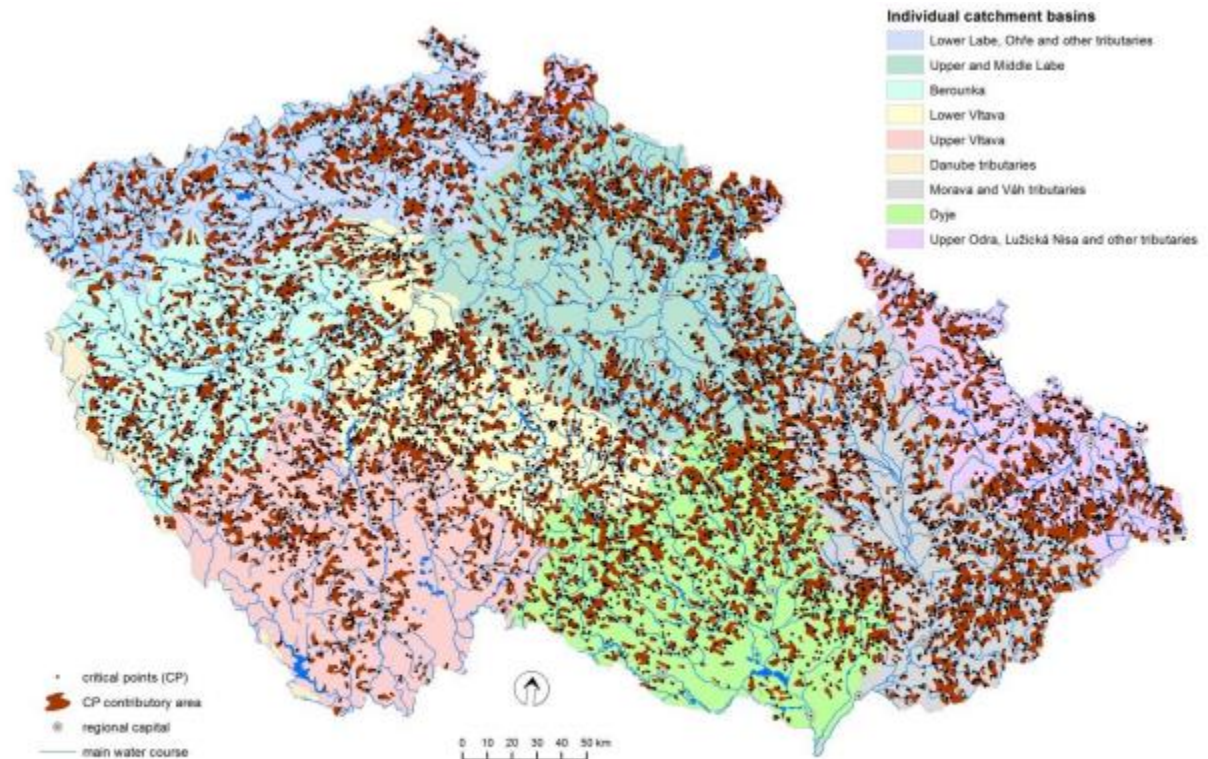
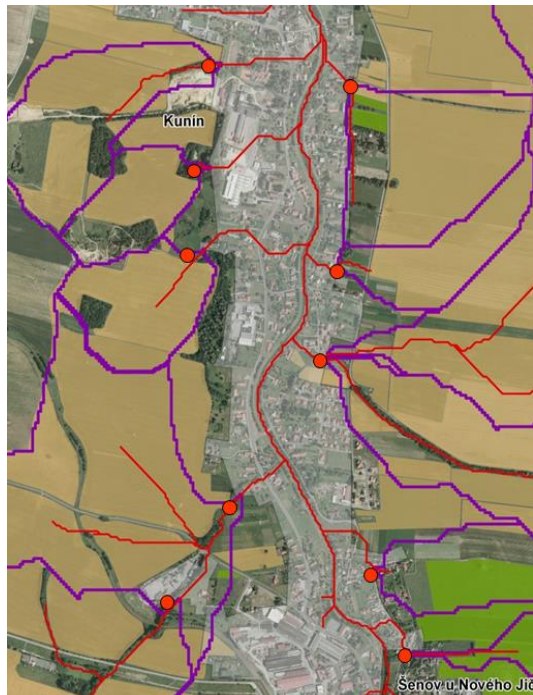


Figure 17: Identified critical points and their contributory areas within CZ
(Source: Povodňový informační systém)

- - Modelling



Figure 14: 2D hydrodynamic simulation results
(left source: Büro Pieler ZT GmbH and hydrosim consulting, 2014 cited in Haider 2017) (right source:
Gamerith et al., 2017)

Table 6: Summary of available methods

Method	Data requirements	Implementation effort	Application scale	Usage	Countries
Previous events	Low	Low	Regional, national	Regional, national	PL
Rolling ball (D8)	Low	Low	Regional	National	AT
Critical points	Medium	Low	National	National	CZ
RISA flood hazard assessment	Low-medium	Low-medium	Regional	Urban environments	DE
Static volume assessment	Low-medium	Low-medium	Regional		DE
Street transect method	Medium	Low-medium	Regional	Urban environments	DE
Sewer system modelling	Medium	Medium	Local	Urban environments	DE
Hydraulic modelling (surface)	High	High	Local	Regional, national	UK, DE, HU
Geostatistical kriging	Medium	Medium	National	National	HU
Coupled modelling	High	High	Local	Urban environments	Pilot areas

- Collection and development of Risk Reduction Measures
- Legislation concerning pluvial floods
- Catalogues and projects of risk reduction measures
- PP project experiences



Catalogues and projects of risk reduction measures

Table 1: Summary of existing catalogues of risk reduction measures in the participating project countries

Country	Catalogue of measures	Accessibility	Notes
Austria	Federal level, categorization: <ul style="list-style-type: none"> • Prevention • Protection • Awareness Raising • Preparedness • After-Care Upper Austria, categorization: <ul style="list-style-type: none"> • Prevention • Protection 	Unknown	Federal republic, catalogue only used in the state of Upper Austria
Croatia	Not available		
Czech Republic	Katalog přírodě blízkých opatření pro zadržení vody v krajině (engl. Catalogue of green water retention measures in the environment) (Výzkumný ústav vodohospodářský T. G. Masaryka.v.v.i., 2018) as part of Projekt Sucho (engl. drought project)	Public, website: http://www.suchovkrajine.cz/vystupy/katalog-opatreni	Only available in Czech Only structural measures
Germany	Not available		
Hungary	Not available		
Poland	Not available		

Categorization of risk reduction measures

Categorization developed by the working group flood of the European Commission (2012)

Aspects of flood risk management	Description
No Action	No measure is proposed to reduce the flood risk in the APSFR
Prevention	Preventing damage caused by floods: <ul style="list-style-type: none"> • by avoiding construction of houses and industries in present and future flood-prone areas • by adapting existing receptors to the risk of flooding; and ensure that future developments take flood risk into account • by promoting appropriate land-use
Protection	Taking measures, both structural and non-structural, to reduce the likelihood of floods in a specific location
Preparedness	Informing the population about flood risks and what to do in the event of a flood; including emergency response: developing emergency response plans in the case of a flood
Recovery and Review/Lessons learn	Returning to normal conditions as soon as possible and mitigating both the social and economic impacts on the affected population
Other	Other type of measure



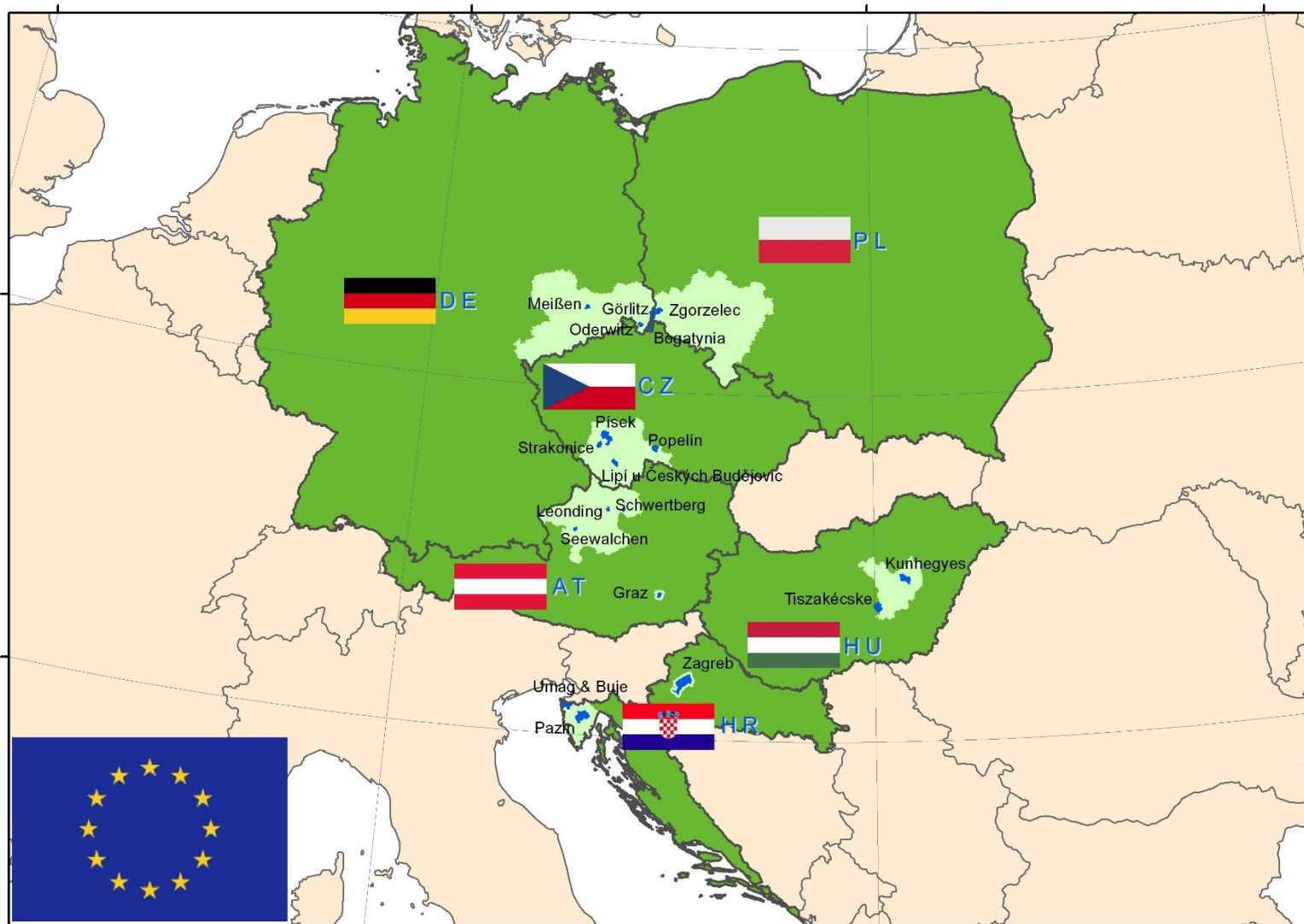
• Project experiences in PP countries



→ STABILIZATION OF PATHWAYS OF CONCENTRATED SURFACE RUNOFF				
Measure ID	002s			
Type	Biotechnical			
Name of measure	STABILIZATION OF PATHWAYS OF CONCENTRATED SURFACE RUNOFF			
Description	Pathways of concentrated surface runoff are usually stabilized by grassing. They can be reinforced by stones so that they are able to transfer the concentrated surface runoff without the occurrence of erosion on the pathway. The most common shape is a parabola with a low depth, which is most similar to that of the naturally created pathways.			
Technical parameters	<ul style="list-style-type: none"> •→ Shape cross-sectional profile – parabolic or trapezoidal, bottom reinforced by boulders. •→ Width of grass – defined based on mean flow velocity, designed peak flow, longitudinal slope of the valley. 			
Requirement of realization	Construction in case of ineffectiveness or inability to implement other measures (organizational and agrotechnical measures) or as a supplementary measure.			
Possible conflicts	The measure requires an occupation of agricultural land. Therefore, settlement of property rights relations is necessary.			
Interaction/synergy	The grassy thresholds can be accompanied by greenery and can serve as an element of the territorial system of landscape ecological stability. To increase its effect, a stabilized pathway of concentrated surface runoff can be supplemented by systems of aerial organizational, agrotechnical and/or linear biotechnical measures. A barrage can be built in the pathway of concentrated			
Cost analysis	The costs are significantly dependent on the 1. selected grass mix during the realization of the measure, and 2. on the extent of terrain works. The costs on grassing are approximately 6500 CZK (i.e., 255 €) per hectare.			
Temporal aspects	Preparation and realization	short-term	0-3 years	☑
		medium-term	4-6 years	
Effect speed		short-term	0-3 years	☑
		medium-term	4-6 years	
		long-term	7 and more years	

Field of Action	Measures	Short description	Effect/-Deficit	Type
PREVENTION	M01: Identifying risk areas	Identifying endangered areas via flow-path maps for pilot areas, such as the city of Graz	Indicative only	N
	M02: Considering pluvial flooding in spatial planning and building legislation		Hazard and risk maps need to be available	N
	M03: Developing catchment-based concepts and plans for improving the water and solid material budget			N
	M04: Establishing and considering of local and regional land-use planning			N
	M05: Establishing of framework conditions for implementation and maintenance of protection measures			N

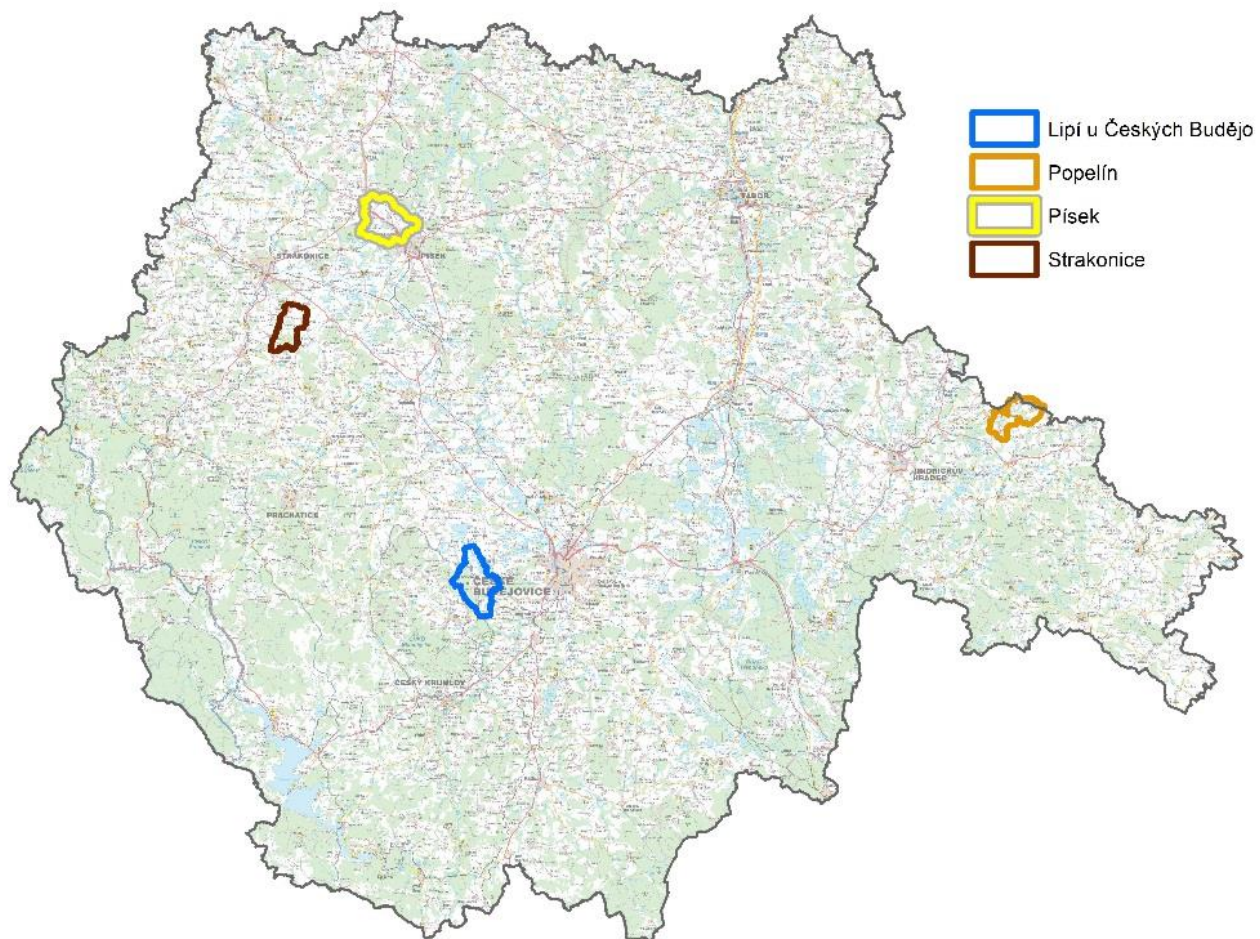
PILOT ACTIONS

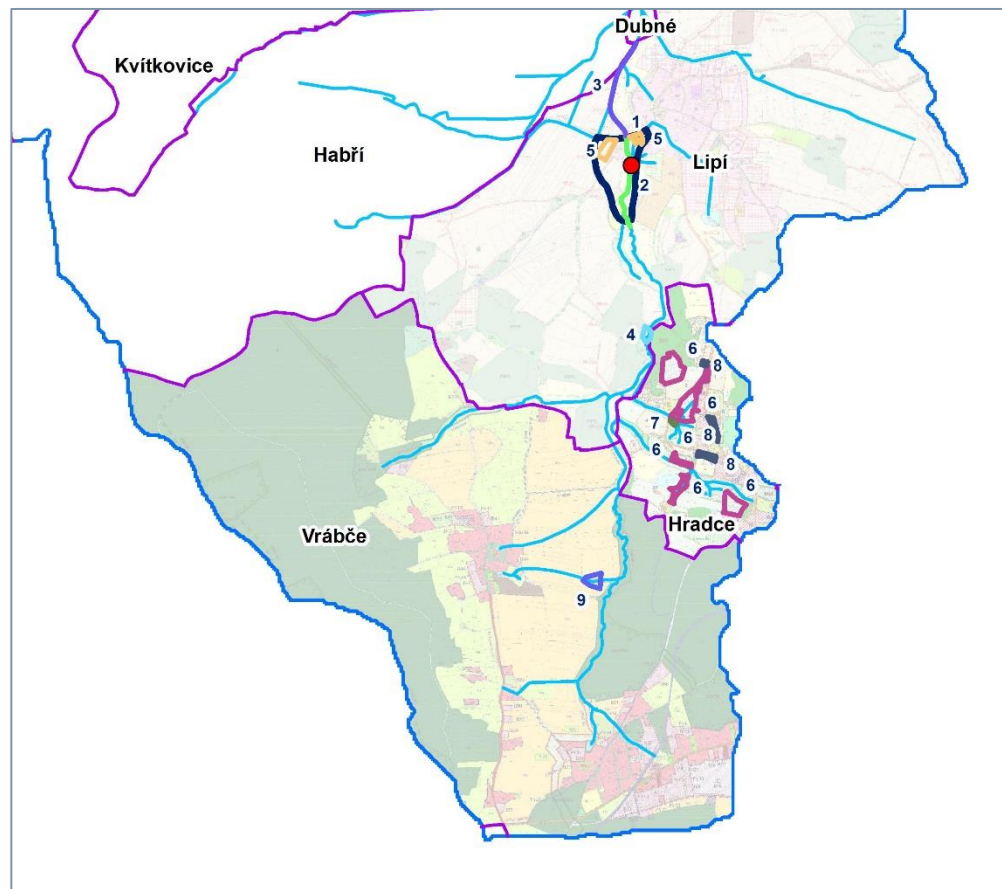


No. Activity	Partner	Pilot area	Set-Up				
			Pilot Type				
			urban	rural	semi-urban	agricultural	coastal
A.T3.1	LfULG, SMI, IÖR	PA1. Saxony	x	x	x		
A.T3.2	SoBoh/VUV	PA2. South Bohemia			x	x	
A.T3.3	Stm	PA3. City of Graz	x				
A.T3.4	MTDWD	PA4. City Tiszakécske, Kunhegyes	x	x			
A.T3.5	HRVode	PA5. Zagreb, Istria	x				x
A.T3.6	IMGW-PIB	PA6. Lower Silesia		x		x	
A.T3.7	UBA	PA7. Upper Austria		x			

Lokality:


- Lipí
- Strakonice
- Písek
- Popelín






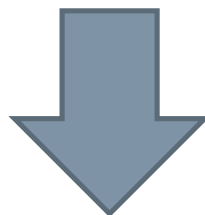
Legend of flood control measures:

- 1 - increasing the capacity of the culvert through the road
- 2 - regulation of the creek
- 3 - increasing the capacity of the creek
- 4 - water retention basin
- 5 - conditions for construction
- 6 - areas protected for only natural uses
- 7 - water retention basin
- 8 - securing green in public areas
- 9 - water retention basin

 - area of the flood

 - borders of the municipalities

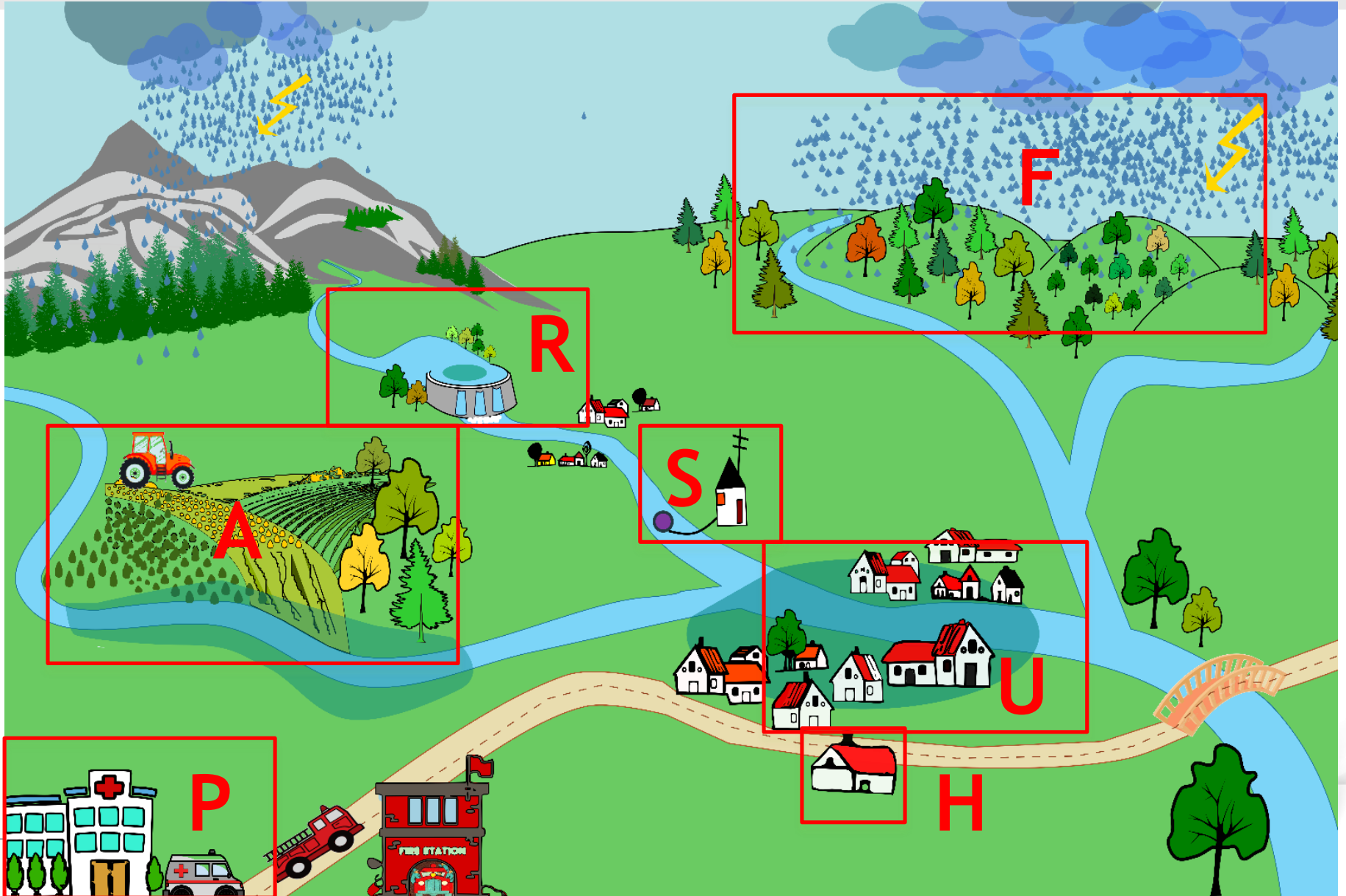
Catalogue of measures
The best practise (pilot actions)
Mapping methods



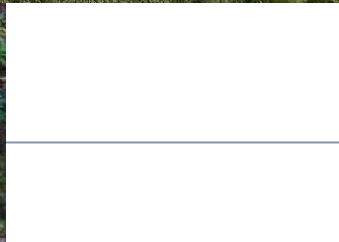
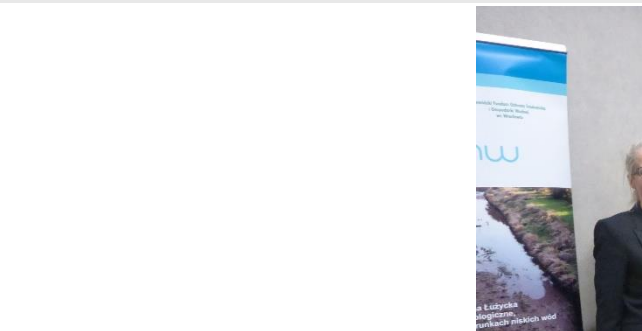
TOOL BOX



Catalogue of measures



MEETINGS



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