


FACTSHEET RISK REDUCTION MEASURES	
Flood protection measures Ledenice - furrow and bypass channel	
Where was it implemented?	
Ledenice (South Bohemia Region, Czech Republic)	
Fields of action	
<ul style="list-style-type: none"> • Farmland, settlement area 	
Related to measure from the catalogue of measures	
<ul style="list-style-type: none"> • Furrows • Drainage ditches • Preservation and creation of meadows and pastures • Linear protection measures - bypass channel • Strategic documents 	
Area characterisation	
<ul style="list-style-type: none"> • Area type: non-developed area • Landscape type: meadows (arable area in past) 	
Problem	
The village Ledenice, including its central part, was repeatedly flooded during heavy rain events (1885, 1900, 1925, 1926, 1997, 2000, 2002, 2005) despite the absence of a larger stream and its relatively favorable location.	
Description and aim	
<p>The subject of the project is the realization of a part of the measures which were defined in the Study of Flood Protection Ledenice, Ing. Daniel Vaclík, 1997. A comprehensive solution of flood protection of the area included the restoration of the Kačerovec pond, the construction of a safety spillway at the Slavíček pond, mud removal and repair of the Lazny pond dam, the safety spillway at the Parčáček pond and drainage on the square, watercourse treatment in Růžov, modification of the dam of the Dolní Hradský pond and construction of a bypass channel. The description of the other measures can be found on a separate factsheet.</p> <p>The bypass canal is built in sloping terrain (slope 4 - 5%) and is dimensioned for flood for 100-year floods. The bypass channel contains a furrow (length 1250 m) and a channel (length 243 m). The width of the furrow is 20 m. The slope of the bypass channel bottom is between 0.2 % and 2.8 %. The shore side of the bypass channel is exceeded by at least 0.1 m above the flood level during 100-year flood events. The first part of the bypass channel is a water collection site, which is located below the construction of the road from Ledenice to Borovany. It collects water from the ditches on both sides of the road. The drainage system in the form of small outflow objects flows continuously into the bypass channel. The furrow crosses the thalweg in two places. The furrow is reinforced at these crossings by a stone throw or reinforced concrete overflow threshold (southern crossing). The crossing was also set up for cattle migration. This crossing is reinforced by a stone throw. The banks of the channel are reinforced by stone aggregates. The channel flows into a watercourse which flows into Slavíček pond. Trees are planted around the bypass channel. Above the bypass channel the land use has been changed from arable land to meadows.</p>	
Effect of measure	
Protection of the endangered part of the village against floods of heavy rain events; field subdivision; reduction of erosion risk.	

Source: The Region of South Bohemia, The section of Territory Planning

Description of implementation	
Effect horizon: long-term	Involved stakeholders: municipality Ledenice, landowners, inhabitants of Ledenice
Implementation: 2 phases 2004 - 2005 and 2008 - 2009	Initiator / responsible Zemědělská vodohospodářská správa (organizational unit of the state)
Lessons-learned	
The bypass channel alleviated the flood in 2005; it was damaged by torrential rain in 2008 and it had to be repaired and drafted by quarry stone in several places. After a heavy rain event in 2009, the capacity was fully reached. The bypass channel was half filled during the flood in 2013.	
Main success factor: Comprehensive study of flood protection and implementation of other flood control measures. The purchase of the land went without problems, the municipality relied on the cooperating of the initiator.	Main challenge: Development of flood protection measures that are effective and acceptable to landowners.
Synergies / beneficial aspects: Protection of a large part of the municipality (including residential buildings) against recurrent flooding caused by heavy rain events. Complementation of the comprehensive flood protection of Ledenice. The bypass channel has already proven its effectiveness in 2009 and 2013.	Conflicts / Constraints: The realization of the second part of the bypass channel was delayed due to the postponement of the land consolidation.
Key message to others starting with a similar task	
The realization of the risk reduction measure was carried out according to a separate study. Construction of the bypass channel was started before the start of the land consolidation.	
Contact	
The Region of South Bohemia, The Section of Territorial Planning www.kraj-jihocesky.cz Contact list: https://www.kraj-jihocesky.cz/ku_tseznam/os?id_os=94	

During realization:



Source: Report on the condition of Water Management in the Czech Republic 2009

Channel filling durin heavy rain event in 2009:

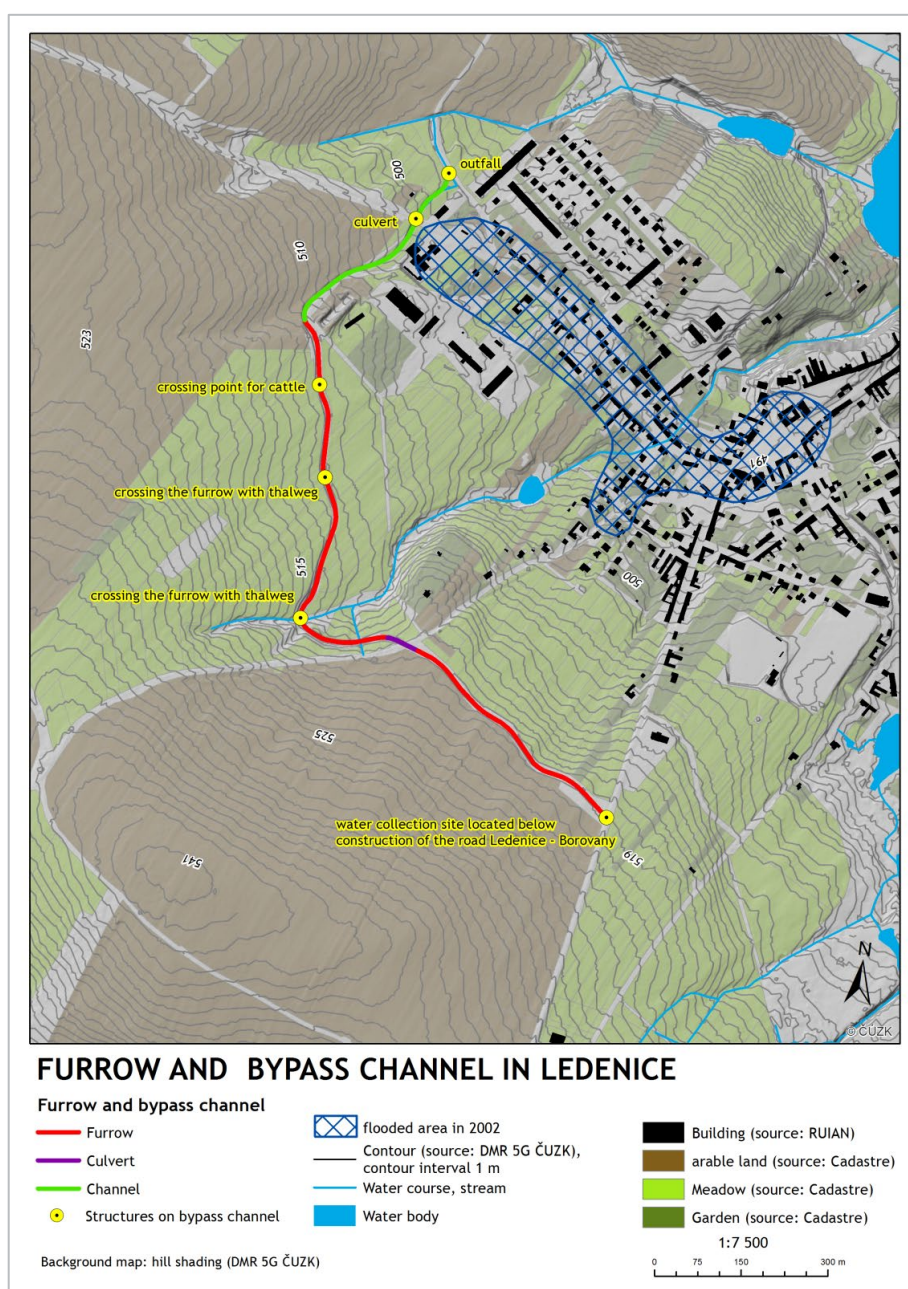


Source: Ledenický zpravodaj (municipality newsletter) 07/08 - 2009

After realization:



Source: The Region of South Bohemia, The section of Territory Planning



Source: The Region of South Bohemia, The section of Territory Planning