



Making Space for Water in the Bodrog River Basin

Flood Protection in the Bodrog River Basin



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FLOOD PROTECTION IN THE BODROG RIVER BASIN

Foreword

What does flood mean?

The Bodrog River Basin

1. Causes of flood situations
2. Approaches in flood protection
3. Technical approaches to flood protection
4. Alternative approaches to flood protection
5. Who should be involved in flood protection?
6. Why should stakeholders be involved?
7. How competent authorities can motivate stakeholders?
8. Case Studies





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FOREWORD

Since April 2009 Global Water Partnership Slovakia started implementation of the project “*Making Space for Water in Bodrog River Basin*” under the auspices of ICPDR and with of support Global Environmental Facility.

The main project objective is to mitigate consequences of floods through achieving consistent and holistic management of flood risk in Bodrog River Basin countries (Slovakia-Hungary-Ukraine) by creating partnerships between cross-border, national and local levels through the development of corporate “Strategy for mitigation of floods for Bodrog River Basin countries” and implementation of practical and sustainable solutions for flood prevention.

Project activities are implemented in cooperation with Slovak, Hungarian and Ukrainian partners. Where possible, project considers the maintenance and/or restoration of floodplains by creating “space” for water during flood events, as well as measures to prevent and reduce damage to human health, the environment, cultural heritage and economic activity. The involvement of municipalities, river basin organizations, NGOs, farmers, spatial and urban planning authorities is crucial. Therefore project activities are focusing also on establishment of the close cooperation with these stakeholders.

The goal of this brochure is to inform relevant stakeholders who live and act within the Bodrog River Basin countries about possibilities for floods prevention and for their mitigation. It is not possible to give an exhaustive explanation, but by presenting practical examples to support the long term of sustainable solutions for flood prevention.

WHAT DOES FLOOD MEAN?

Flood means the temporary covering of land by water which is not covered by water under normal condition.

Floods are natural phenomena which cannot be prevented. However, some human activities (such as expanding human settlements and economic assets in floodplains and the reduction of the natural water retention by land use) and climate change contribute to an increase in the likelihood and adverse impacts of flood events.

THE BODROG RIVER BASIN

The Bodrog River Basin represents a complex river system, consisting of



4 main sub-river basins: Latorica, Laborec, Uh and Ondava. There is no real spring of the Bodrog River itself, as it is originated by the confluence of Latorica and Ondava Rivers on the Slovak territory.

The Bodrog River Basin with the area of 11 552 km² is a part of the Tisza River Basin, which belongs to the international catchment area of the Danube River. The Bodrog River Basin is practically shared by four countries: Ukraine, Slovakia and Hungary, as only 0, 3 km² is located in Poland.

1. CAUSES OF FLOOD SITUATIONS

Why floods occur in the Bodrog Basin?

- **Natural conditions** - geology of the upper basin is formed particularly from impermeable flysch rocks, natural processes of erosion and clogging rivers basin, the occurrence of intense storm rainfall and the nature of other consequences of climate change.
- **Human activities in the river basin** which reduce the natural ability for water retention - deforestation, the application of incorrect procedures in agricultural and in forestry practices, settlements and sealing of natural floodplains, the impact of water works in the Bo-



drog Basin, creating large paved areas in cities and towns without natural drainage of rainfall and consequent increase in surface runoff from the urbanized environment.

- **Economic impacts** - e.g. lack of financial resources to implement preventive measures - the maintenance of watercourses.
- **Coordination** - lack of cooperation among stakeholders and com-





petent authorities in preventing floods.

When floods occur in the Bodrog Basin?

- The accumulation of water from melting snow, or as a result of intense summer rainfall.
- Flooding areas by inland waters. It is a condition in which water accumulated in the dyke protected territory and cannot drain naturally, because of the increased state of water in the river, which diverts water from the territory.
- Due to the movement of ice, ice roadblocks, ice jams or other obstacles in rivers.
- Due to malfunction or breach of the dyke, dam or levee.

Major floods events in recent years:

- August, November 1998, March 2001– flooding of Mukachevo city and a number of nearby villages by Latorica River, flooding of Uzhgorod city by Uzh River in Ukraine
- January 2007 –flooding of Perechin city and near-by villages by Uzh River in Ukraine
- July 2004 - flooding due to breakage of Left-bank dyke of the Ondava River in Slovakia
- July 2008 - a critical flood situation in the upper Topla River Basin the characteristics of floods and the alarm levels at the Hungarian section of Bodrog River

2. APPROACHES IN FLOOD PROTECTION

The flood protection includes two parallel approaches:

- **Technical approach** - is the result of efforts to adapt to nature and hence the natural water regime of people's needs (land settlement, agricultural use, etc...).

- **An alternative approach** - the result of conscious efforts to adapt the behaviour of human to nature and hence the natural regime of surface water

3. TECHNICAL APPROACHES TO FLOOD PROTECTION

The technical approaches for implementing the flood protection measures to prevent flooding are following:

- modifications of watercourses and building of flood defences
- increasing of ability to retain water in the territory by construction of the reservoirs and polders
- measures to reduce erosion and sediment transport (construction of locks and weirs)
- maintenance of watercourses and removal of obstacles in the bed of watercourses
- application of recent scientific results in the area of technical solutions and management approaches

To ensure truly effective flood protection it is necessary to apply these approaches as far as these can be balanced.



4. ALTERNATIVE APPROACHES TO FLOOD PROTECTION

Conservation of natural floodplains of the rivers and creating new ones.

Conservation of the natural floodplains (inundation), water flow has



a significant effect on flattening the flood wave and flood alleviation.

Protecting and restoring wetlands

Wetlands are among other important functions and the ability to retain water in the country and thus contribute to river flood protection.

Connection of flood protection with land use and landscape planning

It is based on the principle of integrated water management, thus involving



all stakeholders in this field. The land use is essential to apply proper procedures to alleviate the risk of flooding:



- Good Agricultural Practice (contour farming technology, mulching, manure disposal management, maintenance of grass, grazing control, etc.).
- Governing forestry practices.
- Good practices for urban planning (addressing surface runoff from urbanized areas, accepting the definition of floodplains in land-use plans and increasing the built area municipalities, etc.).

5. WHO SHOULD BE INVOLVED IN FLOOD PROTECTION?

Those affected by floods:

- Residents of towns and villages
- Operators manage and using land in the basin - farms, subsistence farmers, forest owners, the organization managing the forest and employed in the forests, industrial
- Owners, managers and users of buildings on water flow and flooding area
- Administrators of and drainage channels
- Administrators water supplies and sewerage
- Administrators lines crossing water streams (oil, gas, hot water)
- Regional Road Administration

Those who have a duty to protect citizens against flood:

Their activity in the river basin helps to prevent flooding, mitigating their effects and eliminate their consequences - flood forecasting and early warning of the population, the introduction of preventive measures to protect against floods - the maintenance of watercourses, construction of polders, rescue and security works.



- Government authorities for protection against floods: Ministry of Environment (ENV), Regional offices of the guidelines, district offices Outsourcing
- Administrators of watercourses
- Hydrometeorological Institute
- Local authorities - municipalities
- Ministries of Environment, Agriculture, Interior...
- Regional Directorate Fire and Rescue Service
- District Directorate Fire and Rescue Service
- Flood Commissions

6. WHY SHOULD STAKEHOLDERS BE INVOLVED?

All groups of stakeholders, i.e. those affected as well as those with duties have common goals why to eliminate the risk of flood situation:

- Protecting lives and property from floods.
- Preservation of soil fertility for future generations.

More specifically, landowners have the greatest power for the practical application of measures for flood protection because improper activities carried out in the river basin may increase the risk of flooding and increase the danger of flood damages (e.g.):

- construction of houses in the flood plains,
- placement of landfills in the flooded areas,
- construction of temporary benches on rivers, or creeks,
- incorrect practices in agriculture and forestry management,
- a disproportionate increase in hardened surfaces which increases surface runoff in urban and municipalities.

7. HOW COMPETENT AUTHORITIES CAN MOTIVATE STAKEHOLDERS?

- By showing practical examples of the good flood protection practic-

es - field trips to the places where changes of the river basin management have lead to flood mitigation.

- By involving unemployed into practical action to mitigate risks of floods - e.g. cleaning of water courses flows and explanation of the benefits of these activities.
- By providing financial or tax incentives for farmers who are using good practice in terms of flood protection.
- By providing the financial or tax incentives for the retention of surface runoff in urbanized areas and urban communities.
- By providing online and concise information on flood protection.
- By educating young generation on flood protection issues, i.e. in school education.
- By conducting training sessions in communities, schools and on flood protection techniques.
- By presenting the issue of floods in the media (radio, television, daily newspapers, Internet) to wider public.
- By conducting exercises for the public to simulate flood events.

8. CASE STUDIES

In scope of the project "Making space for water in the river Bodrog River Basin (Ukraine-Slovakia-Hungary)" following case studies were implanted:

Pilot area - Ukraine

Location:

Baranintsi community near Uzhgorod in 12 km from the border with Slovak Republic in the Bodrog river basin.

Objective:

To conduct preparatory works to restore the Latorica river polder system focusing on the Tova River to improve the water flow capacity of the riverbed for flood protection purposes.



Baseline situation:

- Tova riverbed is not visible - overgrown with plants and trees, polluted by garbage.
- Small water discharge capacity – even small flood causes damage.
- The Tova River as place for illegal discharges of waste waters.

Activities:

- Cleaning up of f the Tova riverbed (total length – 3 km) with the partnership with Baranintsi community as a first stage of its floodplain use as retention area
- Conduction for the first time public hearings and public involvement into riverbed restoration.

Results/effects of the intervention:

- Preparatory works for restoration and further use of Tova river floodplain as retention area are done
- Platform for new projects and further optimization of the use of the area for flood protection purposes.

Pilot area - Slovakia

Location:

Senné depression bisected by the Čierna Voda River a tributary of the Laborec River (entering close to the confluence with the Uh River).

Objective:

Restoration of the original floodplains affected by capital-intensive drainage sys-

tems and in the same time establishment of measures focusing on retention of water during flood events in the territory.



Baseline situation:

In the past, several measures were taken to protect this area from floods and draining inland waters which have had critically impaired the original floodplain ecosystem functions (e.g. flood attenuation, nutrient reduction, pollution control, groundwater recharge, and fish spawning areas). Only remains of the original ecosystems and refugee for migrating birds now occur along the fishponds at Iňačovce and Senné located in the middle of Senné depression (National Nature Reserve Sennianske ponds).

Activities:

- Reconstruction of existing floodgate in confluence of drying bypass channel with Žiarovnický stream.
- Updating of the floodgate operational manual aiming at supplying wetlands by water during flood events / or the dry period focusing on an improvement of the National Nature Reserve Sennianske ponds conditions.

Results/effects of the intervention:

Intervention will ensure to supply wetlands by water during the dry period and in case of flood events to facilitate the elimination of flood impact on this territory Thus will improve the National Nature Reserve Sennianske ponds conditions.

Pilot area – Hungary

Location:

In the lower Hungarian section of the Bodrog River at the outskirts of Olaszliszka, Viss and Sárzasadány settlements there is a horse-shoe shaped oxbow called Viss-Oxbow (Vissi Holtág) on the left-hand side flood plain of the river.



Objective:

To improve the water supply to Tokaj-Bodrog corner Landscape-protection District with improved living conditions of the protected plants and birds in the region. The site is the main flood-plain area with national protected area in its close vicinity.

Baseline situation:

The technical flood protection measures which were carried out during the last 150 years have significantly changed the hydromorphological status of the rivers:

- Bends were cut through shortening the river beds and increasing the water stream velocity.
- Flood protection levees separated significant portions of flood plain areas from the main rivers and the oxbows remained outside of the levees thus the transversal connections were blocked.
- The downstream mouth of the oxbow is not regulated and the flow

is blocked. The living conditions of plant groups and other living species of Viss-Oxbow and Tokaj-Bodrogcorner Landscape-protection District significantly deteriorate.

Activities:

- To ensure better quality of biotopes, there is a need to bring water during the floods into the oxbow and to retain the water there afterwards.
- Renovation of the trunk main and the existing sluice at the Bodrogcorner trunk conjunction., construction of a new sluice at the mouth of the oxbow

Results/effects of the intervention:

As the result of the intervention, water will be retained in the Viss Oxbow after floods, and the water supply of the Tokaj-Bodrogcorner Landscape-protection District will be ensured in dry periods.

The project "Making Space for Water in Bodrog River Basin" partners:

HUNGARY:

- North-Hungarian Environmental and Water Directorate (EKOVIZIG)
- Environmental Protection and Water Management Research Institute (VITUKI)
- GWP Hungary



SLOVAKIA:

- GWP Slovakia
- The Slovak Water Management Enterprise
- Slovak Hydrometeorological Institute
- Daphne



UKRAINE:

- Zakarpattya Oblast Organization of All-Ukrainian Ecological League
- Village council of Baranintsi





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