

# The Tisza–Túr reservoir: restoring habitats to help farmers adapt to floods and drought



Photo: Béla Habarics

Hungary is located in the deepest part of the Carpathian Basin. This makes the country susceptible to sudden flooding caused by the melting of glacial snow, ice and heavy rain. Unsurprisingly, having effective measures in place to properly manage the risk of flooding is vitally important.

Due to climate change, extreme floods now occur every 25 to 30 years. While rare, these flash floods, which are too forceful for the dams to contain, still remain a huge threat. At the other extreme, sinking groundwater levels and resulting drought are becoming more and more common.

For centuries, people have had to drain excess rain and flood-water from agricultural areas as quickly as possible to be able to grow more crops. On the other hand, with the diminishing summer rains, making sure that water is retained is just as important. To ensure the region is properly prepared for these threats, a change of approach to water management in the region is currently underway.

## Managing the flow: a two-pronged approach to water management

The Tisza is the second biggest river in Hungary. The Túr, its tributary, joins the Tisza close to the Hungarian–Ukrainian border in north-east Hungary. The Tisza–Túr flood reservoir,<sup>1</sup> located close to the Túr estuary, was completed in October 2022. Using controlled flooding and draining methods, the reservoir serves the dual purpose of preventing floods and drought.

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<sup>1</sup> Project number: KEHOP-1.4.0-15-2016-00011.



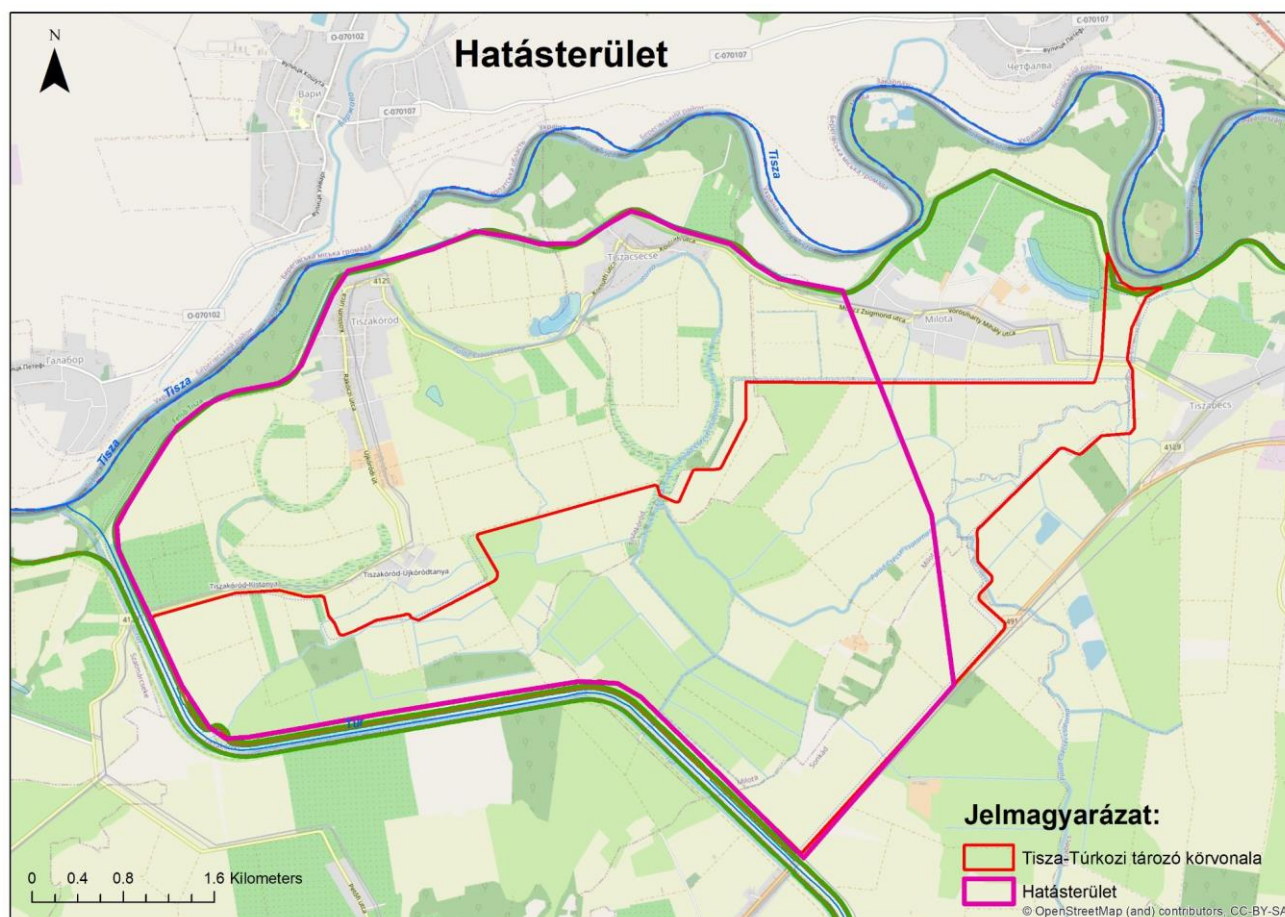
The red dot indicates the location of the project. Map source: Wikipedia

The project covers a total area of 2,686 hectares. The main elements of the infrastructure include a massive floodgate, reservoir dams, pumps, sluices and channels. The reservoir, spanning roughly 1,600 hectares of agricultural and natural land, is surrounded by dams. Despite its name, the reservoir does not contain water in order to accommodate agricultural activities. However, in the event of flooding, water can be released into this area from the riverbed, reducing pressure on the river's dams.

The reservoir area is highly diverse, containing crop-land, meadows, pastures, orchards, creeks, channels, fishponds and several backwater lakes. To protect this rich landscape, it was important that the infrastructure be capable of mitigating drought. For this purpose, two pumps were installed, with a total capacity of 1.1 cubic metres (m<sup>3</sup>) per second. These pumps contribute significantly to supplying these areas with much-needed water during dry periods. Solar panels have been installed in proximity to the pumps, which operate solely on solar energy.

The project manager for the reservoir is the Upper Tisza Region Water Directorate, the water administration authority for the region, while the project developer is Viziterv Environ, a water planning company. Other stakeholders include residents, farmers, local non-governmental organisations and municipalities.





This map shows the impact area of the project. The red line indicates the dams surrounding the reservoir. The pink line indicates the border of the impact area. Source: Viziterv Environ

## A sustainable water management system with farmers in mind

The development of the Tisza-Túr reservoir was entirely financed by EU cohesion policy funds through the Environment and Energy Efficiency Operational Programme.<sup>2</sup> The project was implemented by a consortium led by the General Directorate of Water Management and the Upper Tisza Region Water Directorate. The total cost of the project was HUF 35 billion (approximately EUR 94 million).

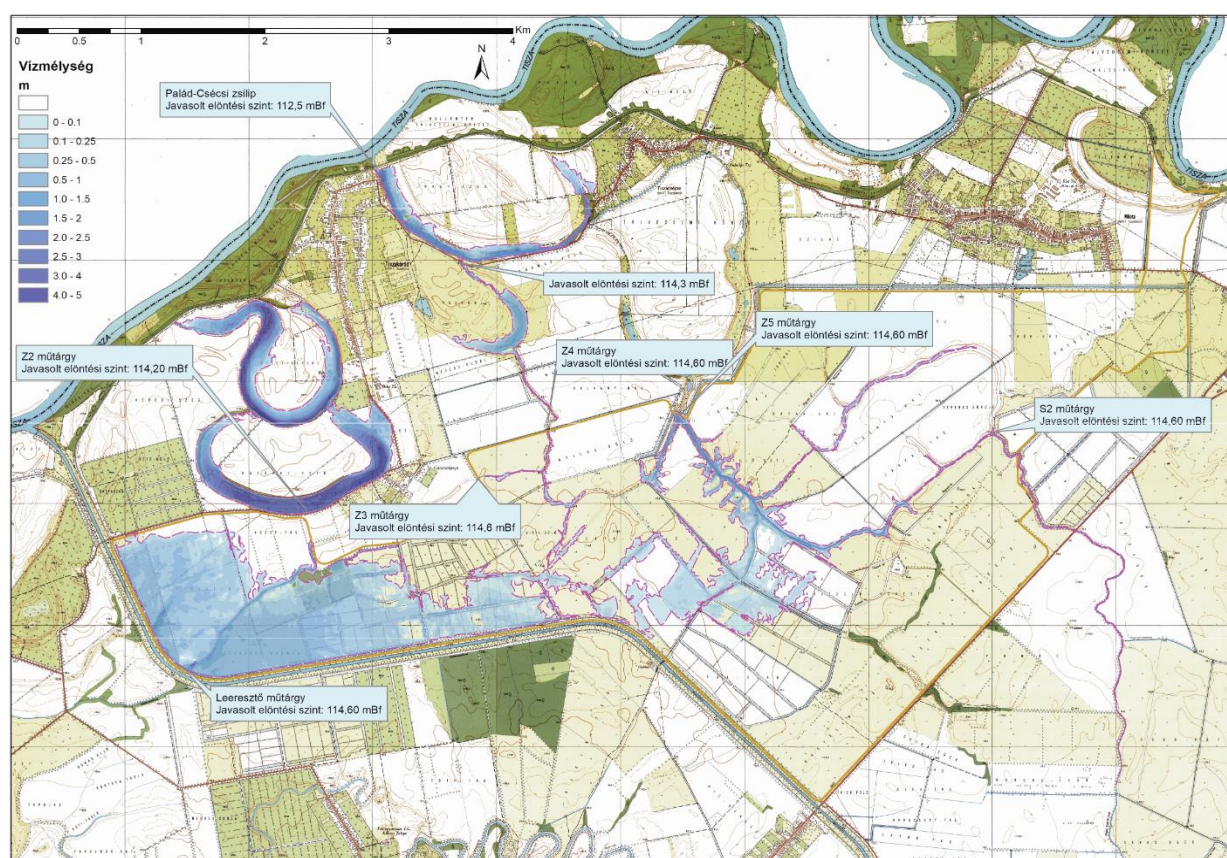
Planning started in 2014, with construction finishing in October 2022. Financed through the operational programme, this phase involved the planning, construction and renovation of the water management infrastructure. The second phase, which began in 2023, aims to properly utilise this infrastructure and implement a sustainable landscape management strategy to ensure that the fields have enough space to accommodate the inflow of water. However, the success of these endeavours will depend on the active involvement, consensus, and cooperation of the farmers in the region.

Adopting this bottom-up approach requires specific professional and soft skills, sensitive communication, respect, empathy and, of course, time. Thanks to the efforts of a local organisation, the E-misszió Nature and Environment Protection Association, this participatory approach to sustainable development is

<sup>2</sup> Upper Tisza Region Water Management Directorate, [Tisza-Túr tározó](#), Upper Tisza Region Water Management Directorate, accessed 12 December 2023.

starting to bear fruit. The association holds regular meetings with farmers to foster collaboration and help them make joint decisions on important actions, such as when to flood their fields and to what depth. As part of a pilot project rolled out in 2023, bone-dry backwaters were revitalised with water for the first time in over 30 years. The first controlled floodings are planned for 2024.

However, this collaborative process is not without its challenges. Water tolerance can vary depending on how the land is used and no two farmers have the same interests. For example, maize and young trees cannot survive waterlogged soil for more than a couple of days, whereas pastures or older trees can thrive, even when flooded, for several weeks. While crop-land can be easily converted into pasture, forests require more extensive planning as they are intended to last for decades.



This map shows one of the controlled flooding options currently being discussed. The different shades of blue indicate the relative depths of the water in the individual flooded areas. According to these plans, most areas would experience shallow flooding no more than 50 centimetres deep. Source: Viziterv Environ

## Balancing flood control with environmental impact

One of the primary tasks of the Upper Tisza Region Water Directorate is to oversee the infrastructure. This includes the floodgate, the largest structure, which can be opened to decrease extreme water levels during flooding.

From an environmental perspective, the smaller features of the infrastructure, namely the channels and sluices, have a more important role to play. Designed to maximise water retention within the reservoir area, these hydrological features are essential components of the water management system.



## Returning water to parched land

Decreasing groundwater levels and the resulting aridity are significant problems in the area, affecting nature and agriculture alike. In addition to retaining water, the sluices and channels are designed to distribute water across different ecosystems and maintain water levels above a set level. During dry periods, water can be pumped into the channels from the Tisza in a regulated manner.

Two hundred years ago, the river flooded the area. Today, however, the riverbed runs deeper, preventing water from reaching this area by gravitational flow. This ingenious system enables the soil to be replenished through controlled flooding, mimicking the natural ecological process and encouraging more sustainable farming practices.

## Once a dry lake-bed, now a thriving wetland

Separated from the Tisza, the backwater lake of Haláborszegi is a protected Natura 2000 site. The lake area is owned by the state, with the local National Park Directorate serving as the asset manager.

In recent years, the lake has been severely affected by the effects of climate change, so much so that the structure and composition of the biological community in the area has begun to change, a process known as ecological succession. As part of a combined restoration effort, the National Park Directorate and Viziterv Environ worked together to design a water supply system for the lake. In autumn 2022, water began flowing from the Tisza, welcoming back amphibians, reptiles, herons, egrets, kingfishers, and otters for their first feed in many a year.

## A new lease of life for endangered species

The reservoir area also boasts Natura 2000 grasslands, home to foxtail-grass species, which prefer a more humid climate. In another positive development, the National Park Directorate expects the endangered corncrake (*Crex crex*) to reappear as soon as the grass grows tall.

The reliable water supply is also likely to improve the ecological state of the hedgerows, which provide an important habitat for the *Eriogaster catax* moth, a designated Natura 2000 species.

Photo: Béla Habarics





Natura 2000 grasslands and a backwater lake are situated within the impact area. Map source: [Natura.2000.hu](https://natura.2000.hu)

## Restoring lands and livelihoods: the economic impact of water

While landscapes can be used in different ways, water remains essential for all kinds of agricultural activity. Effective water management leads to better agricultural practices and more reliable income for farmers. The agricultural landscape surrounding the reservoir is as rich as it is varied, featuring crop-land, meadows, and grazing areas for sheep and cows.

The county of Szabolcs–Szatmár–Bereg is famous for its walnut production. Several varieties, such as Milotai 10 and Tiszacsécsi 83, are named after the villages here. Interestingly, many of these varieties have unique characteristics; for example, the Milotai 10 walnut can be cracked by hand. Walnut trees also have a special symbolic importance for the people in the region, where it was once customary to plant two walnut trees for each family member: ‘One for the cradle and one for the coffin.’ The production of locally grown fruits and vegetables, notably apples and plums, is a vital part of the economy. Indeed, due to the high unemployment rate in the region, supplementary income from homesteading can make all the difference for farming families struggling to make ends meet.



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## Farming forward: a new dawn for Hungarian agriculture?

Many Hungarian villages, including the ones in Szabolcs–Szatmár–Bereg, are experiencing a decrease in population and waning interest in farming. Indeed, many farmers are calling it quits as the demands of the business become ever more stressful. Yet, amidst these challenges, providing farmers with a reliable water supply can mitigate at least one major risk, protecting their yields and giving them peace of mind.

Building on the early positive outcomes of this innovative project the stakeholders plan to advise the Hungarian Ministry of Agriculture on proposed amendments to the Common Agricultural Policy Strategic Plan, with the hope of ushering in a more integrated and holistic approach to landscape management. The farmers know that keeping their heads above water is not only up to them.



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