

Water Quality Data Collection And Sharing Between Hungary And Neighboring Countries

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Abstract

Hungary is a typical downstream country within the Danube basin. The major part of its surface water resources originate outside its borders. Hungary's national boundaries are crossed by 90 water courses. Consequently, Hungary has a great, on-going interest in water quality monitoring of the transboundary rivers. Bilateral agreements with the neighboring countries ensure the legal basis for regular joint water quality investigations, water quality evaluation of transboundary rivers, and water quality data sharing across national boundaries. The recently implemented *Trans-national Monitoring Network (TNMN)* and *Danube Accident Emergency Warning System (DAEWS)* which were developed within the Danube Environmental Program provide coordinated, up-to-date water quality monitoring and warning methods for the Danube countries.

Key Words: DAEWS, Danube, data, environment, monitoring, network, pollution, sampling, TNMN, transboundary, water quality

1.0 Introduction

Hungary, the greatest part of whose 93,000 km² of territory is covered with plains, is situated in the deepest part of the Carpathian basin. The whole of the country belongs to the Danube River system. Because of its geography, the waters rushing down from the surrounding higher elevations of the Carpathian basin converge in Hungary. All of the major streams that flow through Hungary originate beyond the country's borders, including 94% of surface water sources. One third of the national boundaries themselves are constituted by streams and rivers over a length of 600 km. These borders are traversed by 90 water courses of varying size.

2.0 Surface Water Quality Monitoring in Hungary

National water quality observations began several decades ago. In practice, monitoring, which is regulated by statute (the National Standard MSZ 12749), occurs nominally at bi-weekly intervals, but in the key hydrological cross-sections samples are gathered each week. The total number of sampling sites is 150. The samples are analyzed for the main cations, anions, nutrients, trace elements, organic

micropollutants, radiological components, bacteriological and hydrobiological parameters.

The monitoring network, which is operated by the environmental and public health authorities, is required to perform the following functions:

- provide data needed for the general assessment of the quality of surface waters,
- to build up a database suited to monitoring any changes in the quality of surface waters
- detect and identify pollution impacts originating from natural sources, production, and consumer activities in Hungary and abroad
- produce the data series needed for international water quality assessments and negotiations on boundary streams,
- produce data series for research and planning purposes.

The standard sampling stations for the monitoring of surface water quality are situated

- in the boundary cross-sections of streams entering or leaving the country
- upstream and downstream of discharges affecting water quality in streams
- in cross sections of special importance (e.g. water intakes)

Other important considerations in selecting the sampling sites were coincidence with a station of the hydrological observation network, or if this were not feasible, then where there was a possibility of establishing valid correlation with the nearest gauging station, and, accessibility. The sampling points are, by and large, located in the stream centerline or in the line of the main current.

The factors involved in deciding upon the frequency of sampling have been the data demand of statistical processing, the variability of water quality in time, the importance of the sampling site, and the capacity of the analytical laboratory facilities involved.

The samples are analyzed in the laboratories of the 12 District Environmental Inspectorates for most of the chemical and hydrobiological components that might be or are present in the water. However, these district laboratories do not have the technical proficiency to analyze all the monitored micropollutants. Therefore, specific organic micropollutants are analyzed in appropriately instrumented central laboratories.

Microbiological parameters are measured by the Public Health Laboratories of the nation's 20 counties. Since these laboratory analyses are part of the water quality monitoring process, the analytical methods employed are also regulated by the MSZ 12749 Standard. Special attention is paid to the quality assurance of the analytical work of the laboratories by running an intercalibration program.

The measured data are sent from the laboratories on diskettes at monthly intervals to the Institute for Environmental Management (KGI). The collected data are then checked and stored in the national database. A special software, called VM, was developed to process the database. VM can provide statistical evaluations of the data in accordance with the classification system MSZ 12749.

3.0 Water Quality Monitoring in Transboundary Waters

Bilateral agreements

Owing to Hungary's hydro-geographical situation, cooperation between Hungary and its immediate neighbors with whom it shares most of its waters, is of vital importance to the collection and sharing of water quality data among all the Danube's riparians. Cooperation in transboundary water management is regulated chiefly by bilateral agreements. Joint Commissions on Transboundary Waters, established for the purpose, are responsible for maintaining and carrying out the collaboration.

Joint efforts undertaken regularly, such as water quality investigations, quality evaluations, and cooperative measures against accidental pollution began in the 1960s and 1970s. At present, regular water quality investigations are carried out jointly with neighboring countries for the water quality parameters listed in Table 1. Some technical details of the bilateral transboundary monitoring practice are summarized in Table 2.

Table 1. Components Monitored in Transboundary Waters

***Tables 1 and 2 to be entered here. See hardcopy.

The Trans-National Monitoring Network (TNMN) of Danube Countries

In addition to the bilateral activities, considerable international water quality monitoring is carried out within the Danube Environmental Program. The Danube states jointly operate TNMN which includes 56 sampling sites along the Danube River and in its main tributaries. Water samples are taken each month and analyzed for physical, chemical, radiological, bacteriological and hydrobiological parameters. The analysis is extended to the suspended and bottom sediment as well.

For its part, Hungary operates nine sampling sites in TNMN at the following river sections:

- Danube, Gyözámoly (boundary section)
- Danube, Komárom (boundary section)
- Danube, Szob (boundary section)
- Danube, Dunaföldvár
- Danube, Hercegszántó (boundary section)
- Sió, Sióagárd
- Dráva, Drávaszabolcs (boundary section)
- Sajó, Sajópüspöki (boundary section)
- Tisza, Tiszasziget (boundary section)

As indicated, seven of the sites are boundary sections. The measured data are collected in standardized data file format and stored in the provisional TNMN information center in Bulgaria. The processed data and their evaluation will be published in yearbooks, starting with the year 1996.

The Danube Accident Emergency Warning System (DAEWS)

The Danube riparian states agreed to develop DAEWS as part of the Danube Environmental Programme. The general objectives of DAEWS are to increase public safety by protecting drinking water resources and other water uses if accidents occur in the Danube River or in its tributaries, and to protect the environment against the effects of such accidental pollutions.

The specific objectives of DAEWS are:

- prompt joint action on emergencies that may take place in the rivers and tributaries of the Danube River basin and timely exchange information for the purpose
- prompt joint action on unpredictable changes in the water levels that may occur in the rivers and tributaries of the Danube River basin and timely exchange of information for the purpose
- prompt reception, processing, and transmission of information on sudden, accidental incidents of pollution caused by dangerous substances which have entered surface waters and which would cause significant transboundary harm

When sudden pollution occurs, the system must have the capability of promptly warning the services responsible for handling such emergencies so that they can take quick action to contain the danger, ascertain the cause of the problem, rectify the damage, take steps to avoid the consequences, and find those responsible. Even when minor accidents are involved that might alarm the public, the system must be able to communicate quickly information which the public needs to know in order to evaluate the problem.

In the DAEWS information routing scheme warning messages are sent from upstream to downstream. Hungary's responsibility is to warn the following countries in the event of accidental pollution in the transboundary rivers listed below:

<u>Country</u>	<u>Transboundary River</u>
Slovakia	Danube, Ipoly/Ipel
Romania	Danube
Croatia	Danube, Mura, Dráva

Hungary, of course, would be given warnings by its upstream neighbors:

<u>Country</u>	<u>Transboundary River</u>
Austria	Rába/Raab

Slovakia	Danube, Ipoly/Ipel, Hernád/Hornád, Bodrog
Ukraine	Tisza
Romania	Szamos/Somes, Körös/Cris, Maros/Mures
Croatia	Mura, Dráva

4.0 Conclusions

Hungary, as a primarily downstream riparian, is highly interested in the cooperative monitoring of water quality of its transboundary rivers. The existing bilateral agreements constitute a good framework for water quality data sharing with neighboring countries. The recently instituted TNMN and DAEWS systems provide coordinated water quality monitoring and warning networks for all the Danube River countries.