

TRB report on monitoring results evaluation

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Chapter 1 – Background

Introduction

Data presented in this report summarize relevant information for Tisza River Basin (TRB) for groundwater bodies. Tisza countries reported templates that follow approach applied for development of the First Integrated Tisza River Basin Management Plan (1st ITRBMP) and other studies and background documents relevant for Tisza River Basin within the scope of International Commission for the Protection of the Danube River (ICPDR) Tisza Group and other ICPDR expert groups. Within this Annex Tisza river countries reported national methodologies for groundwater status assessment.

Deliverable 4.2.3: TRB Report on monitoring results evaluation GWB's presents one of the base documents for developing part of Second Integrated Tisza River Basin Management Plan (2nd ITRBMP) concerning groundwater issues.

In order to successfully develop 2nd ITRBMP some basic documents had to be taken into account. As roof document WFD has been considered, as well as daughter directive – Groundwater directive. As main starting point the 1st ITRBMP plan was used. Brief description of mentioned documents will be given in following chapters.

Water Framework directive

Water Framework directive (Directive 2000/60/EC), as roof document, has purpose to establish a framework for the protection of inland surface waters, transitional waters, coastal waters and groundwater, and prevent their further deterioration.

Monitoring of surface water status, groundwater status and protected areas is defined within Article 8 of WFD. In Article 8 is defined, inter alia, that:

Member states shall ensure the establishment of programmes for the monitoring of water status in order to establish a coherent and comprehensive overview of water status within each river basin district:

- For groundwaters such programmes shall cover monitoring of chemical and quantitative status

Within Annex V of WFD detailed description of groundwater monitoring has been given. Groundwater monitoring is divided to monitoring of quantitative status and monitoring of chemical status. Chemical monitoring is further divided to surveillance and operational monitoring. Within this annex detailed instruction for performing of mentioned types of groundwater monitoring has been given.

Groundwater directive

In order to further institutionalize and organize protection of groundwater bodies, Groundwater directive has been adopted in 2006 (Directive 2006/118/EC). This Directive defines procedures for

assessing groundwater chemical status, identification of significant and sustained upward trends and definition of starting points for trend reversal and measures to prevent or limit inputs of pollutants into groundwater. All mentioned activities cannot be performed without results of groundwater monitoring, so that monitoring represents the basic „tool“ for all further activities on protection of groundwaters.

Introduction – 1st TRBM, and other background studies

The 1st Integrated Tisza River Basin Management Plan (ITRBMP) was adopted in 2011. Plan was based on data provided by Tisza countries (Ukraine, Slovakia, Romania, Hungary and Serbia). The reference year was 2007 (The first Tisza Analyses Report – TAR was developed).

The development of a river basin management plan at the sub-basin scale (e.g., Tisza River Basin) added values in comparison with Danube River Basin Management Plan since it provides more details and assess water management issues at the more comprehensive scale. In comparison with the DRBM Plan, the ITRBM Plan includes rivers with catchment size larger than 1000 km² instead 4000 km², natural lakes >10 km² instead 100 km², main canals and groundwater bodies >1000 km² and of basin-wide importance.

This means that in compared to the 11 identified transboundary groundwater bodies or groups of groundwater bodies of the Danube Basin-wide importance (so called “Roof level”, presented in the DRBMPs), the Tisza countries have collected and evaluated information related to:

- 85 national and transboundary groundwater bodies of importance to the Tisza River Basin, according to agreed criteria for importance (all GW bodies >1,000 km² and those TB GW bodies <1,000 km² considered to be of basin-wide importance);
- The assessment of pressures on the quantity of the groundwater bodies of basin-wide importance showed:
 - That over-abstraction prevents the achievement of good quantitative status for twelve groundwater bodies;
 - For ten groundwater bodies, the most significant pressure on quantity is illegal abstractions and indirect abstractions, by drainage or gravel pits (in Hungary);
 - Other significant pressures include abstraction for agriculture, public water supply and industry.

Monitoring objects reported in 2010.

Within the scope of the first TAR and first ITRBMP development all Tisza countries reported on groundwater monitoring based on available data and information at the country level. Data and information are collected by uniform template and the great number of monitoring sites for quantitative and chemical monitoring is reported. Data and information submitted by Tisza Countries (Ukraine, Romania, Slovakia, Hungary and Serbia) on groundwater monitoring stations are summarized in Table IV.1.

Table IV.1: Groundwater monitoring objects in Tisza basin

Country	No of quantitative monitoring	No of chemical monitoring	No of GWB covered with quantitative	No of GWB covered with chemical
---------	-------------------------------	---------------------------	-------------------------------------	---------------------------------

	sites	sites	monitoring sites	monitoring sites
Ukraine	-	-	-	-
Romania	411	514	7	7
Slovakia	133	33	2	2
Hungary	245	246	17	17
Serbia	29	15	6	6

As it is exhibited in table, there were no monitoring sites in Ukraine. The greatest number of monitoring sites was reported by Romania. In total 411 stations for quantitative and 514 stations for chemical monitoring was reported.

Number of groundwater bodies covered by monitoring stations

Total number of delineated groundwater bodies in Tisza river basin is 85. From that number 32 GWB were covered by quantitative monitoring. In total 818 stations for quantitative monitoring were operational in 2007 on 32 GWBs. In total only 38% of GWB were covered by quantitative monitoring (Figure IV.1).

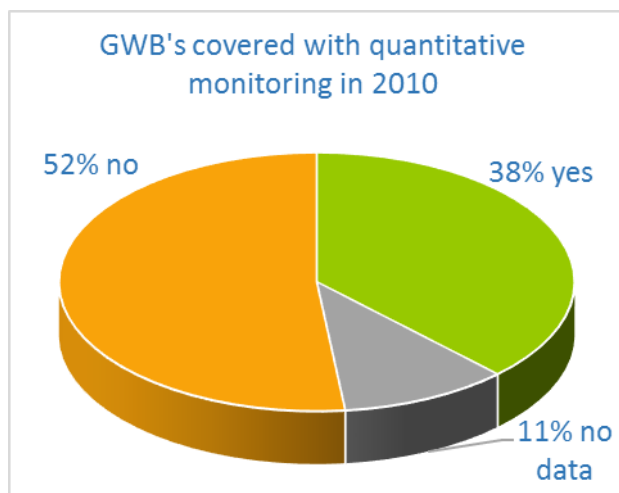


Figure IV.1: Percentage of GWB covered by quantitative monitoring in Tisza basin

Also 32 GWB were covered by chemical monitoring. In total 411 stations for operational chemical monitoring and 367 stations for surveillance chemical monitoring were operational in 2007 on 32 GWBs. In total 38% of GWB were covered by chemical monitoring (Figure IV.2).

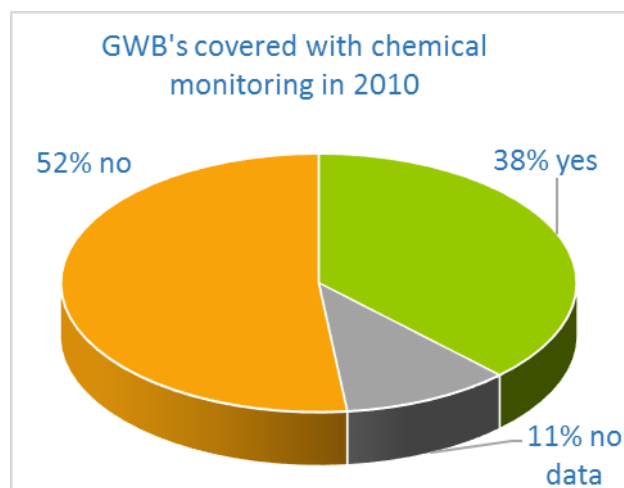


Figure IV.2: Percentage of GWB covered by chemical monitoring in Tisza basin

What data and information are expected to be reported?

The table *JOINTISZA template for GWB data collection Act.4.1.xls* need to be checked/updated and completed.

Please check, correct and complete all the fields and indicate in colour if pre-filled entries have been changed.

TRB Groundwater bodies' data collection template will provide:

- The overview table will be in the main part of the Summary Report;
- **For each country: Please indicate number of monitoring sites for quantitative and chemical monitoring of GWB**
- For each country: Please indicate the reasons and the parameters for the risk of failing good CHEMICAL/QUANTITATIVE status in 2021 for the national shares of TRB GW-bodies;
- For each national share: Please provide the further characterisation of the national shares of TRB GW-bodies. The descriptive text (characterisation, methodology etc.) of the 2004 Article 5 report (Annex 12 of the Roof Report) might need to be updated as size, pressures and characteristics of GWB might have changed;
- For each national share: Please indicate the most important significant pressures on the national shares of TRB GW-bodies posing risk of failing good status in 2021.

For missing data/information please insert NA (not available).

Please provide short overview on data collection, underline any relevant for GWBs in this template and/or insert figures maximum 10 pages.

GIS Data

It is necessary to update and verify the GIS data (shape files) on the DanubeGIS for the GW-bodies and monitoring stations, please consider the following:

- GIS data should be uploaded in the DanubeGIS in the WGS84/ETRS89 reference system or at least provide information about:
 - Name of Reference System;
 - Projection;
 - Ellipsoid must be added.
- For point features provide position information in coordinates not in decimal notation (latitude and longitude).

Please attach exported GIS maps (in digital formats such as .JPG or .TIFF).

Chapter 2- Information and data sets reported in 2017

Data and information presented in this synthesis report on monitoring results are based on TRB countries reports.

Country reports

Ukraine

As stated in Ukrainian JOINTISZA Report for GWBs data collection Country Report in the last 7 years no monitoring of GWB's was conducted.

Romania

Based on reported data in 2010, Romania had 411 monitoring sites for quantitative monitoring and 514 stations for chemical monitoring within the TRB for groundwater bodies. With this monitoring network setup 7 GWB's were covered with quantitative as well as chemical monitoring.

Based on data reported in 2017, Romania increased number of monitoring sites for quantitative monitoring, but decreased number of stations for chemical monitoring. In 2017, 509 stations for quantitative monitoring were operational, and 218 for chemical monitoring. Comparison of GWB monitoring sites and GWBs within the TRB covered by monitoring sites in Romania is presented in Table IV.3, Figure IV.5 and Figure IV.5.

Table IV.3: Groundwater monitoring in Romania 2010. – 2017.

Country	N° of quantitative monitoring sites	N° of chemical monitoring sites	N° of GWB covered with quantitative monitoring sites	N° of GWB covered with chemical monitoring sites
Romania 2010	411	514	7	7
Romania 2017	509	218	11	11

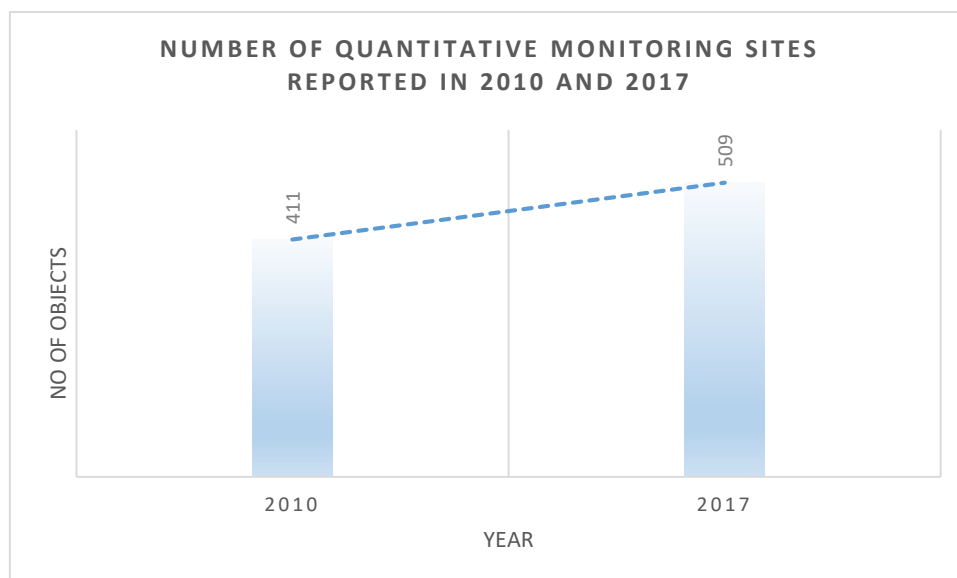


Figure IV.5: Number of quantitative monitoring sites in Romania reported in 2010 and 2017.

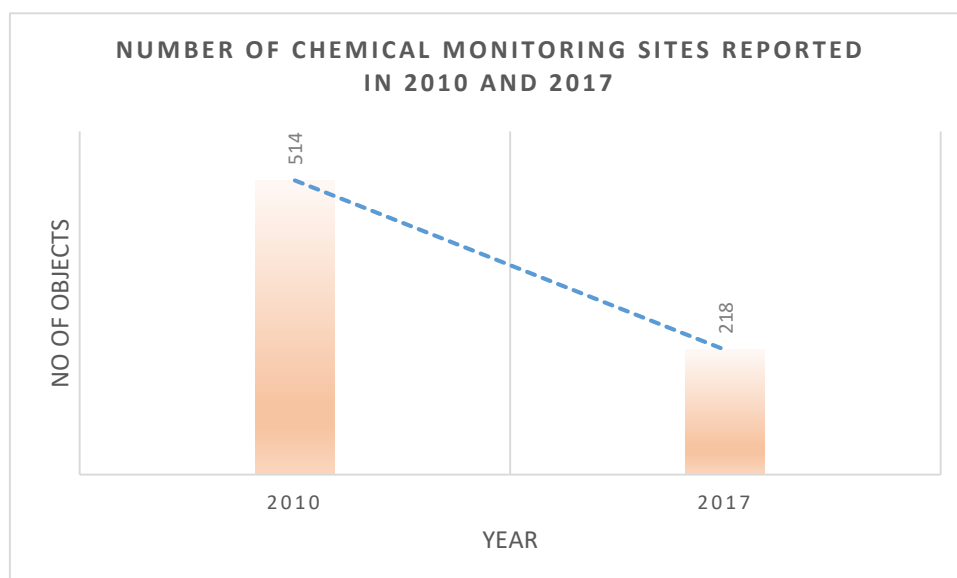


Figure IV.6: Number of chemical monitoring sites in Romania reported in 2010 and 2017.

As it can be seen from presented data, number of monitoring points for quantitative monitoring has been increased, and number of monitoring sites for chemical monitoring has been decreased more than double. Although number of chemical monitoring sites has been decreased, by optimisation of monitoring network, all 11 GWB's are covered with quantitative and chemical monitoring.

Slovakia

Based on reported data in 2010, Slovakia had 133 monitoring sites for quantitative monitoring and 33 stations for chemical monitoring. With this monitoring network setup, in total 2 GWB's were covered with quantitative and chemical monitoring. According to data and information reported in 2017, Slovakia increased number of monitoring sites for quantitative monitoring, as well as for chemical monitoring. In 2017, 176 stations for quantitative monitoring were operational, and 72 for chemical monitoring. But only 124 monitoring sites for quantitative monitoring and 35 for chemical monitoring in 2 same transboundary GWB as data reported in 2010. The rest of data are from

national groundwater bodies. Comparison of GWB monitoring sites and GWBs covered by monitoring sites within the TRB in Slovakia is presented in Table IV.4, Figure IV.7 and Figure IV.8.

Table IV.4: Groundwater monitoring in Slovakia 2010. – 2017.

Country	N° of quantitative monitoring sites	N° of chemical monitoring sites	N° of GWB covered with quantitative monitoring sites	N° of GWB covered with chemical monitoring sites
Slovakia 2010	133	33	2	2
Slovakia 2017	176	72	8	8

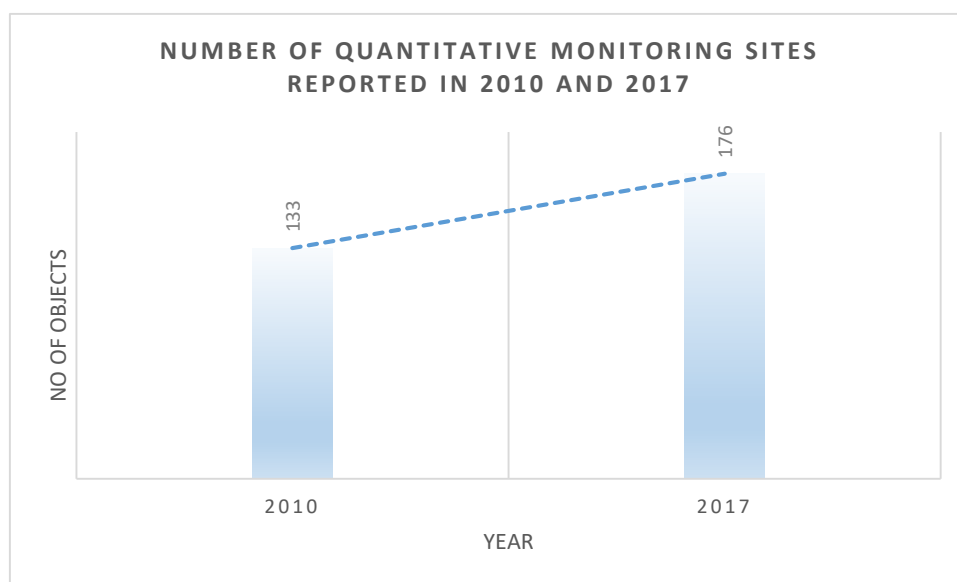


Figure IV.7: Number of quantitative monitoring sites in Slovakia reported in 2010 and 2017.

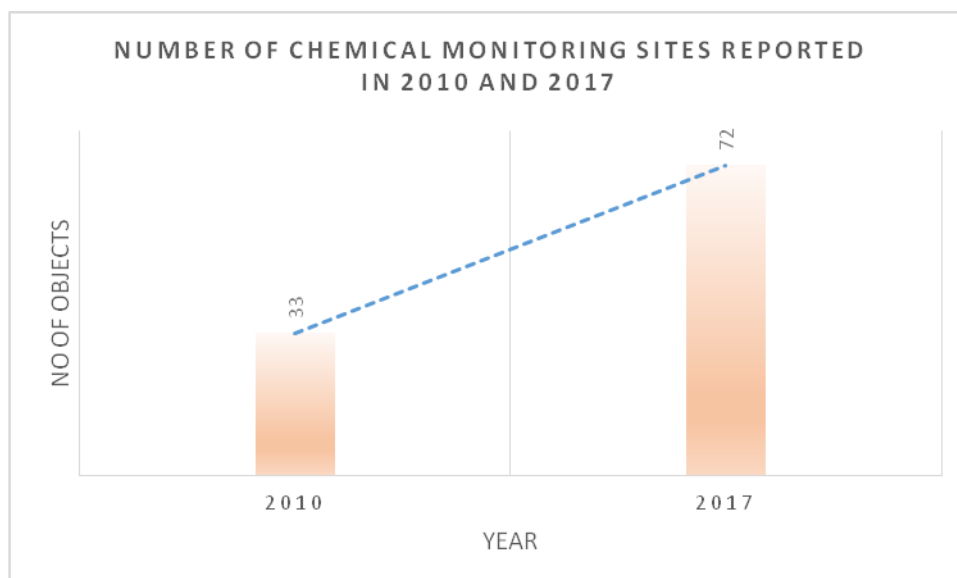


Figure IV.8: Number of chemical monitoring sites in Slovakia reported in 2010 and 2017.

As it can be seen from presented data, significant improvement has been made in setting up of monitoring network in Slovakia. As result of an increase of number of monitoring objects, all 8 groundwater bodies have been covered with quantitative and chemical monitoring.

Hungary

Based on reported data in 2010, Hungary had 245 monitoring sites for GWBs quantitative monitoring and 246 stations for GWBs chemical monitoring. With this monitoring network setup, in total 17 GWB's were covered with quantitative and chemical monitoring.

Based on data reported in 2017, number of monitoring sites increased significantly in Hungary for quantitative, as well as for chemical monitoring. In 2017, 835 stations for quantitative monitoring were operational, and 889 for chemical monitoring. Comparison of GWB monitoring sites and GWBs covered by monitoring sites within the TRB in Hungary is presented in Table IV.2, Figure IV.3 and Figure IV.4.

Table IV.2: Groundwater monitoring in Hungary 2010. – 2017.

Country	N° of quantitative monitoring sites	N° of chemical monitoring sites	N° of GWB covered with quantitative monitoring sites	N° of GWB covered with chemical monitoring sites
Hungary 2010	245	246	17	17
Hungary 2017	835	889	51	51

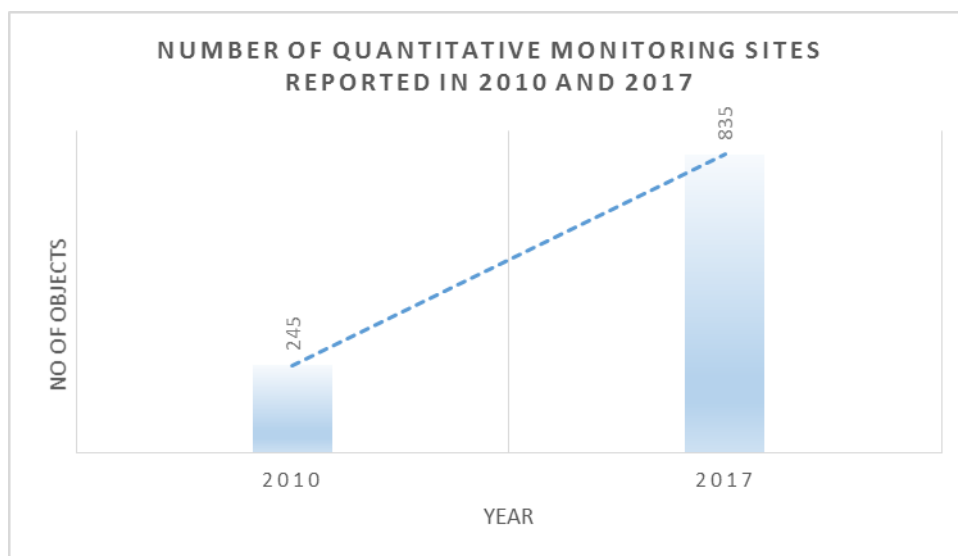


Figure IV.3: Number of quantitative monitoring sites in Hungary reported in 2010 and 2017.

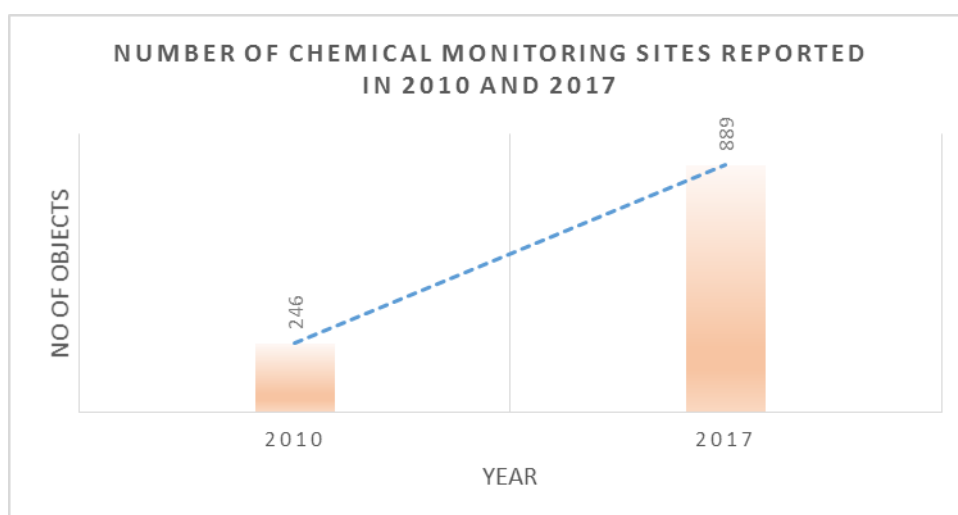


Figure IV.4: Number of chemical monitoring sites in Hungary reported in 2010 and 2017.

As it can be seen from presented data, significant improvement has been made in setting up of monitoring network in Hungary. As result of an increase of number of monitoring objects, all 51 groundwater bodies have been covered with quantitative and chemical monitoring.

Serbia

Based on reported data in 2010, Serbia had 29 monitoring sites for quantitative monitoring and 15 stations for chemical monitoring. With this monitoring network setup, in total 6 GWB's were covered with quantitative and chemical monitoring. According to data and information reported in 2017, Serbia increased number of monitoring sites for quantitative monitoring, as well as for chemical monitoring. In 2017, 72 stations for quantitative monitoring were operational, and 21 for chemical monitoring. With this monitoring network setup in total 10 GWBs are covered with chemical and 11 GWBs with quantitative monitoring. It is important to emphasize that from mentioned 72 monitoring stations 8 monitoring objects for quantitative monitoring and 8 for chemical monitoring are from groundwater users network (waterworks) and they are in procedure of introduction to state monitoring network. Comparison of GWB monitoring sites and GWBs

covered by monitoring sites within the TRB in Serbia is presented in Table IV.5, Figure IV.9 and Figure IV.10.

Table IV.5: Groundwater monitoring in Serbia 2010. – 2017.

Country	N° of quantitative monitoring sites	N° of chemical monitoring sites	N° of GWB covered with quantitative monitoring sites	N° of GWB covered with chemical monitoring sites
Serbia 2010	29	15	6	6
Serbia 2017	72	21	11	10

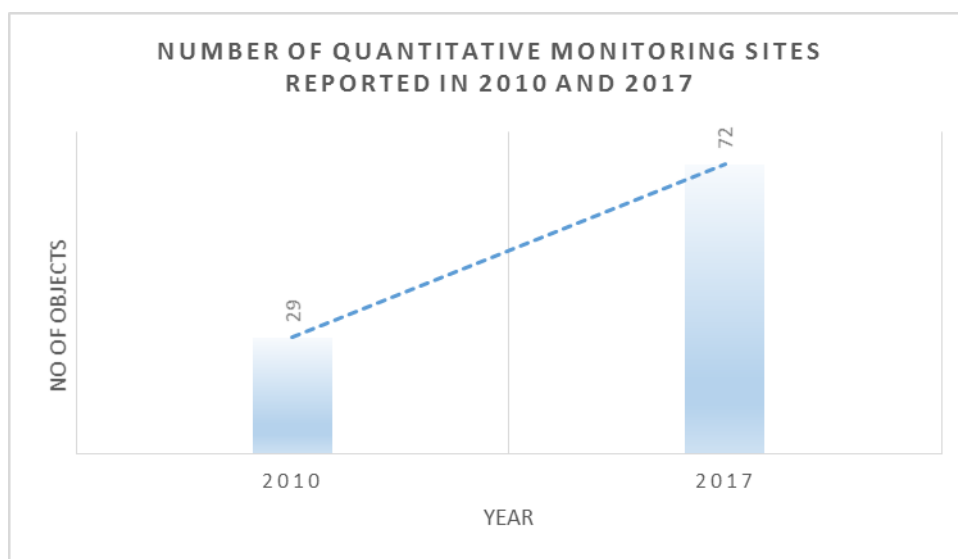


Figure IV.9: Number of quantitative monitoring sites in Serbia reported in 2010 and 2017

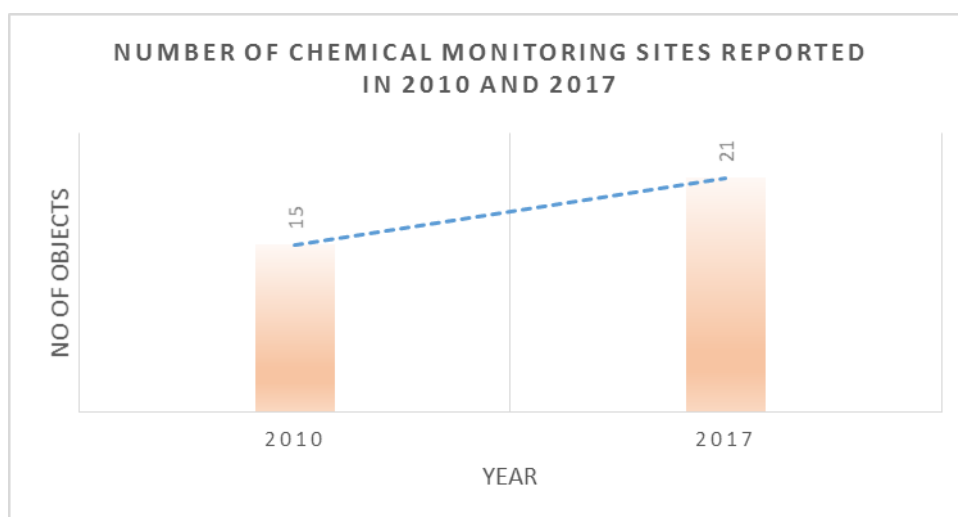


Figure IV.10: Number of chemical monitoring sites in Serbia reported in 2010 and 2017.

As it can be seen from presented data, significant improvement has been made in setting up of monitoring network in Serbia. As result of an increase of number of monitoring objects, 11 of 14

groundwater bodies have been covered with quantitative monitoring and 10 of 14 GWBs with chemical monitoring.

Chapter 3 – Summary

In summary for all countries in Tisza river basin (excluding Ukraine) significantly more sites are reported in the national monitoring networks, and more importantly, comparing to data in 2010 much more GWB's are covered with these network (Table IV.6).

Table IV.6: Groundwater monitoring objects in Tisza basin in 2017

Country	No of quantitative monitoring sites	No of chemical monitoring sites	No of GWB covered with quantitative monitoring sites	No of GWB covered with chemical monitoring sites
Serbia	72	21	11	10
Hungary	835	889	51	51
Romania	509	218	11	11
Slovakia	133	33	8	8
Ukraine	-	-	-	-

Now in Tisza river basin 81 groundwater bodies (87%) are covered with the quantitative monitoring network. If we do not count 10% data that are missing from Ukraine, only 3 GWB's (3%) are not covered with quantitative monitoring (Figure IV.11).

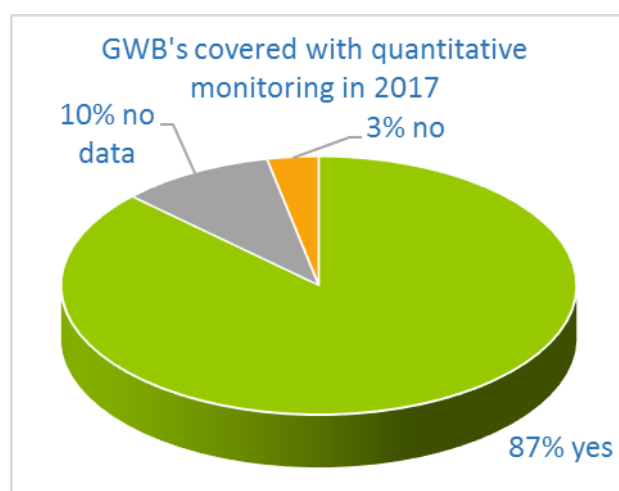


Figure IV.11: Percentage of GWB covered by quantitative monitoring in Tisza basin in 2017

Similar to the previous statistics, for the chemical monitoring in the Tisza river basin 80 groundwater bodies (86%) are covered with the quality monitoring network. If we do not count 10% data that are missing from Ukraine, only 4 GWB's (4%) are not covered with quality monitoring (Figure IV.12).

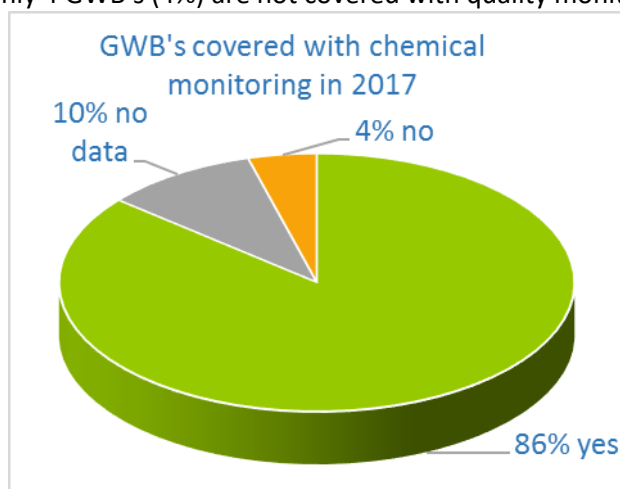


Figure IV.12: Percentage of GWB covered by chemical monitoring in Tisza basin in 2017

Abbreviations

ITRBMP	Integrated Tisza River Basin Management Plan
GWB	Groundwater Body
WFD	Water Framework Directive

References

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy:

http://ec.europa.eu/environment/water/water-framework/index_en.html

Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:372:0019:0031:EN:PDF>

Integrated Tisza River Basin Management Plan (ITRBM Plan) Data Collection -
Groundwater

Implementation of the Joint Tisza Programme of Measures in the groundwater sector 2010.

<https://www.icpdr.org/main/danube-basin/tisza-basin>

JOINTISZA – Report for GWBs data collection – Ukraine

JOINTISZA – Report for GWBs data collection – Romania

JOINTISZA – Report for GWBs data collection – Slovakia

JOINTISZA – Report for GWBs data collection – Hungary

JOINTISZA – Report for GWBs data collection – Serbia