



AUDIT REPORT

2020

QUALITY OF MONITORING OF GROUND DRINKING WATER SOURCES

Supreme Audit Office of the Slovak Republic
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LIST OF ABBREVIATIONS

ABBREVIATIONS	meaning
ČOV	Wastewater treatment plant
DPSIR	DPSIR principle (Drivers/Pressures/State/Impact/Response)
Nitrate Directive	Council Directive 91/676/EEC on the protection of waters against pollution caused by nitrates from agricultural sources
EU	European Union
EC	European Commission
Ez	Environmental burden within the meaning of Section 2 of the Environmental Burdens Act
Geological legislation	Act No. 569/2007 Coll. on geological works, as amended Act No. 409/2011 Coll. on environmental burdens and on amendments to certain acts Directive MoE SR No. 1/2015-7 for the development of a risk analysis of polluted territory
IMZZ	Integrated monitoring of pollution sources
IS EEE	Information environmental burden system
Ministry of Environment of the Slovak Republic , MoE	Ministry of Environment of the Slovak Republic
SAO SR	Supreme Audit Office of the Slovak Republic
OU	District Office
POR	Plant protection products
Water Framework Directive, WFD	Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water management
Framework monitoring programme	Framework Programme for Monitoring of Slovak Waters 2016-2021
SAŽP	Slovak Environment Agency
SHMÚ	Slovak Hydrometeorological Institute
SIZP	Slovak Environmental Inspection
Groundwater Protection Directive	Directive 2006/118/EC of the European Parliament and of the Council on the protection of groundwater against pollution and deterioration
ŠGÚDŠ	State Geological Institute of Dionysus Štúr
UKSUP	The Central Agricultural Inspection and Testing Institute
Water Act	Act no. 364/2004 of the National Council of the Slovak Republic on waters and on amendments to the Act of the Slovak National Council No. 372/1990 On offences as amended (Water Act)
- groundwater body	Defined amount of groundwater of hydrogeological collector or hydrogeological collectors (body of temporarily or permanently concentrated groundwater)
VPS	Water plan of Slovakia
VÚVH	Water Management Research Institute
ACT ON THE SAO SR	Act no. 39/1993 of the National Council of the Slovak Republic on the Supreme Audit Office of the Slovak Republic, as amended

LIST OF FIGURES AND CHARTS

Annex 1: Relationship between different components of the DPSIR System

Figure 1: Groundwater monitoring system

Chart 1: DPSIR System

Chart 2: Groundwater protection system

SIGNIFICANT FINDINGS AND RECOMMENDATIONS

Slovakia is a country that is extremely rich in supplies of quality drinking water. Most of these reserves, up to 80 percent, are groundwater sources. Groundwater drinking water sources in Slovakia have long been threatened by various sources of pollution in connection with human activity. Hazardous substances from industrial and agricultural activities, municipal waste dumps or illegal landfills penetrate into drinking water sources. They are also threatened by the extraction of gravel in water-protected areas, as well as by the uncontrolled urban development of towns and villages.

As cases of threats and pollution of groundwater drinking water sources increase the importance of their consistent protection, monitoring of water quality and timely preventive interventions that can prevent large and often costly damage grows. Ensuring an effective system for the protection of groundwater drinking water sources is strategically one of the most important tasks of the state administration in the field of the environment. **The SAO SR focused on the auditing of this system with emphasis on the effectiveness of the system of monitoring of groundwater drinking water sources, which is intended to act as an early warning tool against the threats to water by pollutants.** The audit was carried out at the Ministry of Environment of the Slovak Republic, which is responsible for the protection of waters and in its three subordinate organizations - the Water Management Research Institute, the Slovak Hydrometeorological Institute, the State Geological Institute of Dionysus Štúr - which perform specific tasks for the Ministry in the field. At the same time, the Central Agricultural Inspection and Testing Institute was also audited, which also performs several tasks in the water protection system.

Protecting drinking water supplies is not only a matter for Slovakia, it is an international task. The protection of waters in our country is based on the legal framework created by the European Union (Water Framework Directive), which has been transposed into the legal order of the Slovak Republic in the form of the Act of the National Council of the Slovak Republic No. 364/2004 On Waters, which contains a binding procedure for the elimination of all types of pollution. **In this context, the SAO SR points to the interference of geological legislation in the protection system (in particular the Act on Geological Works and the Act on Environmental Burdens), which introduced the term "environmental burdens" for contaminated areas that occurred prior to 2007. To eliminate them, a specific procedure is laid down that is incompatible with the Framework Directive or the Water Act.** In practice, this means that other procedures are used to eliminate polluted area - before and after 2007, which in practice raises a number of problems and undermines the possibility of applying a single system for protecting drinking water supplies.

The protection of drinking water resources requires not only the application of its principles as set out in the Framework Directive; it is essential that the protection is also of a planable nature. **River basin management plans**, which are updated every six years, are an administrative tool for enforcing groundwater protection measures. Within this six-year planning cycle, three follow-up steps are required – **from the assessment of the chemical status of groundwater bodies (there are 102 such groundwater bodies temporarily or permanently concentrating water in Slovakia) and sources of pollution, through the introduction of monitoring programmes, to the development and implementation of programmes of measures.** Each of these steps must be documented, as it becomes the starting point for the next step.

The SAO SR identified a number of weaknesses in all three steps of the six-year cycle of preparation of river basin management plans. The protection of groundwater sources of drinking water depends mainly on the quality of the elaboration of the first step, which is to assess the impacts on the state of the waters. **The shortcomings identified in the first step were reflected in the elaboration of the following two steps (monitoring of the chemical status of groundwater bodies and elaboration of a programme of measure).**

Since the system protection of groundwater drinking water sources begins at the source of pollution, the SAO SR examined the mapping of sources of pollution, comprehensiveness and interconnectedness of individual databases. It found that a **comprehensive register of point-source and diffuse sources of pollution had not been established. Individual databases are not linked**, not all existing data on water pollution were used and

data from databases were not sufficiently processed. None of the databases produces data broken down by type of pollution and its significance – the risk level of sources of pollution. **Not all data on known potential sources of pollution were recorded in the existing databases.** Data from an overwhelming number of databases were not a sufficient basis for drawing up river basin management plans because the **summarized data were not complete, consistent, interconnected and evaluated in relation to each other. Not all stakeholders had access to existing databases.**

The monitoring network has not been designed to provide a comprehensive and summary overview of the chemical status of groundwater in each river basin and to allow identifying the presence of long-term upward trends in human-induced concentrations of pollutants. Data from individual monitoring systems are not linked.

Trends in development of pollutant content should have been evaluated from the results of the monitoring. **Trends in groundwater pollutants were only partially processed** and their evaluation was not systematic and carried out according to EU directives. The estimation of the amount of pollutants brought into groundwater, which can be determined on the basis of the concentration of the pollutants in the groundwater and the extent of pollution, has not been established (only the pollutant content of groundwater has been monitored).

The assessment of the chemical status of groundwater bodies was based on data that were not comprehensive, either in terms of their number or in terms of their processing methodology. The chemical status of groundwater bodies has not been assessed according to the requirements of the Water Framework Directive and was based on incomplete data. Of the 75 groundwater bodies assessed, 11 were in poor chemical condition in 2015 and increased to 13 in 2020. There are two more groundwater bodies that are at risk of worsening their chemical status by 2027.

The SAO SR's audit identified a lack of information sharing between stakeholders. The division of competences and the assignment of tasks was coordinated by the **MoEnv SR, which, however, did not sufficiently ensure the whole process of transmission and sharing of information** at the time of preparation of river basin management plans so that individual stakeholders had all the necessary information.

The audit also showed that not all existing data on water pollution - held by state water authorities or other entities belonging to the Environment Ministry - **were used to protect groundwater sources. The MoEnv SR also did not have an early warning system in place, through which serious information would be forwarded to the stakeholders for timely decision-making.**

On the basis of the deficiencies identified, it can be concluded **that the monitoring system for groundwater drinking water sources and the results of monitoring are not set up and managed in such a way as to prevent current and future threats to the quality of groundwater drinking water sources and to eliminate the associated potential health risks to the population.**

In view of the above findings, the SAO SR recommends the Committee of the National Council of the Slovak Republic for Agriculture and Environment **to oblige the MoEnv SR:**

- **To submit a comprehensive groundwater monitoring solution within a period of six months.**

AUDIT

1. AUDIT OBJECTIVE

With increasing cases of threats of pollution and pollution of groundwater drinking water sources, the importance of their consistent protection, monitoring of water quality and timely preventive interventions that can prevent large and often costly damage, is growing.

Setting environmental targets under the Water Framework Directive is intended to ensure that water is in good condition and prevent it from deteriorating at Community level. Ensuring good groundwater status by 2015 or at the latest by 2027 requires, in addition to taking corrective measures, long-term planning of timely preventive measures.

The SAO SR's audit focused mainly **on evaluating the effectiveness of the system of monitoring of groundwater drinking water sources, which should also act as an "early warning" tool against the risk of hazards to water originating from various types of pollution.** The correct setting of monitoring system is a prerequisite for taking effective measures. In order to assess the effectiveness of the system of monitoring of groundwater drinking water sources, it was necessary for the SAO SR to examine other areas within the whole groundwater protection system. The audit therefore sought answers to the question of **whether the groundwater protection system and its monitors were well set up and were able to detect not only current risks, but also future threats to the quality of groundwater drinking water sources.** It also focused on verifying whether the results of the monitoring system have been managed effectively, whether the relevant stakeholders are receiving the right information and the responsible authorities are taking timely and correct decisions and effective measures; that was also subject to audit.

The objective of the audit was to assess whether the system for protecting and monitoring groundwater drinking water sources was effective. **The SAO SR identified weaknesses in this system and pointed out at deficiencies that need to be eliminated,** thus fulfilling its objective. **Based on the identified deficiencies, the SAO SR also formulated recommendations** for improving the system of protection and monitoring of groundwater drinking water sources.

2. AUDIT FRAMEWORK

2.1. BASIC CHARACTERISTICS

The audit was carried out in five audited entities, namely the **Ministry of Environment of the Slovak Republic**, which is the guarantor of water protection in Slovakia, and its three subordinate organizations - the Research Institute of Water Management, the Slovak Hydrometeorological Institute and the State Geological Institute of Dionysus Štúr, which perform the tasks of the Ministry in this area.

The Research Institute of Water Management, as a state contributory organization managed by the Ministry of Environment of the Slovak Republic, mainly prepares conceptual and planning documents in the field of water management and coordinates the implementation of the Water Framework Directive.

The Slovak Hydrometeorological Institute is a contributory organization of the MoE SR, which, among other activities, performs monitoring of groundwater quality and sets trends in groundwater quality development.

The State Geological Institute of Dionysus Štúr is a contributory organization that provides, among other things, geological exploration of environmental burdens and participates in the evaluation of the chemical status of groundwater.

At the same time, an audit of the **Central Agricultural Inspection and Testing Institute**, which is the budgetary organisation of the Ministry of Agriculture and Regional Development of SR, and carries out, inter alia, official control of all plant protection products and auxiliary products used on agricultural and forestry land.

The audited period was 2015-2020 and related periods.

2.2. AUDIT PERFORMANCE

The audit was designed and Swedish experts also participated in its design within the framework of the national project "Building and development of professional capacities in order to improve the quality of control activities of the SAO SR".

A number of risks have been identified in the process of designing the audit, which were also confirmed by the audit.

2.3. SPECIFIC AREAS

Water protection is a current topic not only in individual EU countries, but also throughout the European Community. At EU level, the basic principles of water protection have been adopted, enshrined in particular in the **Water Framework Directive**, which is a binding document for all EU Member States. Individual Member States have transposed the Water Framework Directive into their national legislation and the Slovak Republic has also done so. In 2001, the EU Member States signed a document "Common strategy for the implementation of the Water Framework Directive" to harmonise the common approach to its enforcement. The common strategy, implemented in cooperation with the EC, resulted in methodological guidelines detailing the progress of the implementation of the Water Framework Directive.

The Water Framework Directive is transposed in the Water Act and its implementing regulations. It establishes a binding procedure for the elimination of all types of pollution, regardless of whether it is present or is a historically contaminated area. In addition to the Water Act of the Slovak Republic, it adopted geological legislation laying down a special procedure for dealing with historically contaminated areas, which is not compatible with the Water Framework Directive and the Water Act. At the same time, geological legislation does not take into account the environmental objectives of the Water Framework Directive and is not procedurally or terminologically aligned with it. That inconsistency in water and geological legislation has undermined the consistency of systemic groundwater protection.

Despite the fact that the Slovak Republic has transposed European legislation into its legislation, it fails to meet its objectives and effectively protect its natural assets.

3. RESULTS OF THE AUDIT

3.1. SETTING UP A SYSTEM FOR MONITORING GROUNDWATER DRINKING WATER SOURCES

The Water Framework Directive defines the basic principles of systemic groundwater protection, which are:

- **groundwater protection is based on the principle of integrated water management** (groundwater, surface, protected areas) within river basins and sub-basins,
- **systemic protection of groundwater is based on the so-called DPSIR system** (momentum, pressures, impact, condition, measure),
- **groundwater protection begins at source of pollution,**
- **integrated monitoring of the chemical status (quality) of groundwater** requires the interconnection of local monitoring of sources of pollution, monitoring of groundwater bodies and monitoring in water protection zones,
- **the basic assessment unit is a groundwater body,**
- **groundwater protection measures must be targeted and focused** - aimed at achieving environmental objectives.

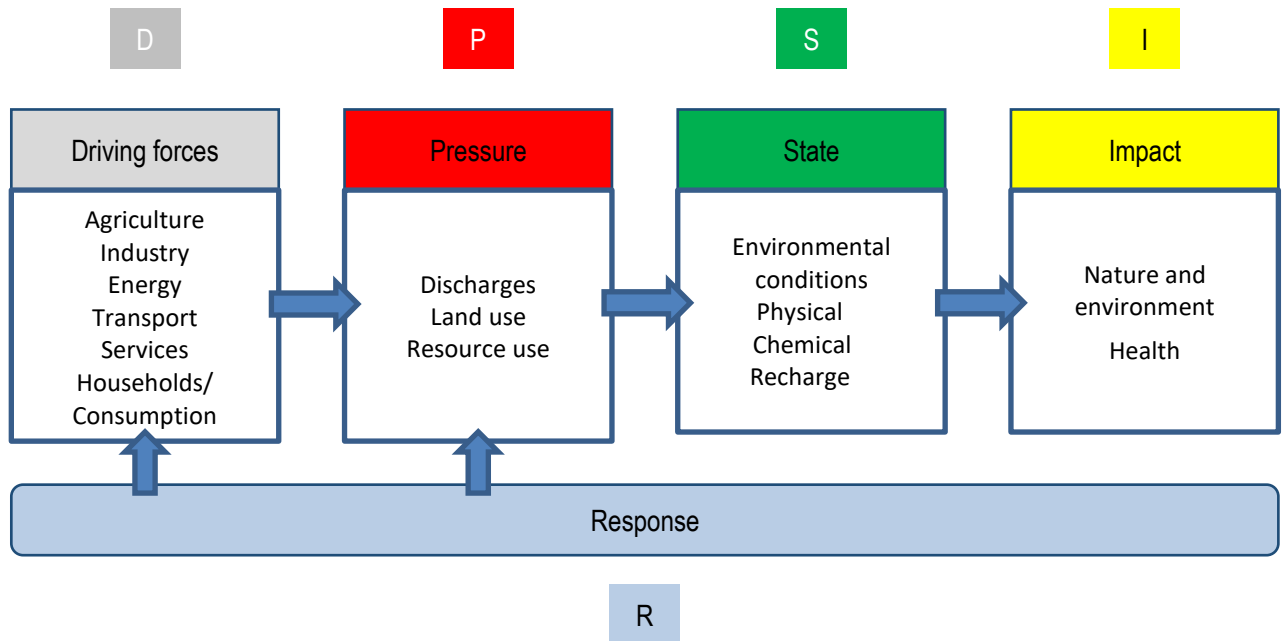
The SAO SR verified whether the MoE SR had prepared, in accordance with the EC guidelines, **a risk analysis of the groundwater protection system to ensure the consistency of the DPSIR system**, or an internal management act for its development. This analysis should be associated with the identification of **weaknesses of**

the system. Ensuring a consistent groundwater protection system consisting in monitoring pollution from its source to the user of water is an essential precondition for developing an effective programme of water protection measures to achieve environmental objectives.

The SAO SR found that the Ministry of Environment of the Slovak Republic did not prepare a risk analysis of the entire groundwater protection system to ensure the consistency of the DPSIR system - from the collection of data on pollution sources through their monitoring to the processing into the program of measures, and recommended that the Ministry prepare such a risk analysis. The MoE SR produced only partial analyses that did not cover the whole system. At the same time, the procedure for elaboration of risk analysis was not laid down in the internal regulations of the MoE of SR.

The DPSIR system is schematically framed in the following Chart 1 and also in Annex 1.

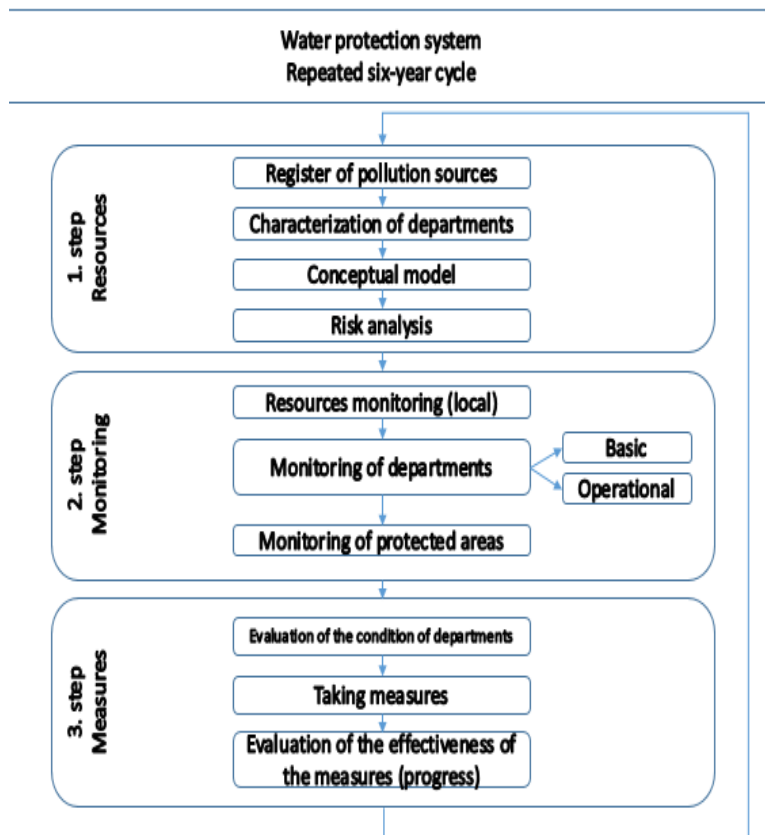
Chart 1



River basin management plans, which are updated over six-year cycles, are an administrative tool for the enforcement of the groundwater protection system.

For audit purposes, in Chart 2, we show this planning cycle in three successive steps:

Step 1 - evaluation of impacts on the chemical status of groundwater bodies. This stage consists of the following, follow-up sub-steps – characterisation of groundwater bodies (initial and further description of water bodies, risk analysis of non-achievement of environmental objectives - risk analysis of groundwater bodies), development of conceptual models of groundwater bodies and evaluation of impacts on groundwater status,



• **Step 2** – implementation of monitoring programmes - monitoring of the chemical status of water bodies,

• **Step 3** - the development and implementation of a programme of measures as part of the Danube river basin management plans and the Vistula basin -common name Water Plan of Slovakia.

Chart 2: Groundwater protection system

The protection of groundwater drinking water sources depends mainly on the quality of the first step in the groundwater protection system. Each of the three steps must be documented and form the starting point for the next step. The poor quality of the first step is transferred

to other documents and reflected in the final step, which is the programme of measures. As a result, there is a risk of ineffective measures being taken to protect groundwater drinking water sources.

3.1.1 First step – Evaluation of impacts on the status of groundwater bodies

Mapping of pollution sources is not comprehensive

The protection of groundwater drinking water sources begins at the source of pollution. Sources of pollution are broken down to point pollution (in particular pollution from industrial installations – active and historical, agricultural buildings, landfills and waste, etc.) and **diffuse pollution** (in particular agricultural pollution and agglomerations without sewers). **Mapping of pollution sources is the starting point for evaluating impacts on groundwater status, designing a groundwater monitoring programme and subsequently developing a programme of measures to achieve environmental objectives.** A basic prerequisite for ensuring effective protection of groundwater is a comprehensive mapping of pollution sources and their systematic processing in the registers of point and diffuse sources of pollution, in accordance with the Water Framework Directive. The output from the mapping of pollution sources should be a comprehensive, systematically processed database of pollution sources and a database of significant sources of pollution. These are the baseline data on which the reliability of water planning depends on.

The SAO SR points out that the database of sources of pollution is to be processed systematically - according to the uniform coding system that is in place within the EU (breakdown of pollution sources by type of impact – point sources from industrial plants, landfills, mining waters, cancelled operations, historical pollution and others).

Information systems, databases and registers, which are the source of data and information for further processing, are an essential tool for summarizing data on pollution sources. During the audit, several pollution source databases were identified and data from some databases were not used.

In the framework of the audits carried out, the SAO SR identified a number of weaknesses, in particular:

- **not all existing data on water pollution available to environmental stakeholders** (e.g. quantities of pollution from domestic sewage treatment plants and oil separators) were used to map pollution sources;
- **with summary data on POR consumption on agricultural land have been summarised by districts and not by groundwater body so that they can be used in the development of a risk analysis of groundwater bodies; the number of diffusion sources of pollution has not been determined by the area of agricultural land.** Data on pesticides and nitrogen fertilisers used for non-agricultural purposes (sports grounds, private forests, railways, etc.) have not been summarised.
The data thus processed distort the assessment of the significance of the impacts of diffy sources of pollution and the assessment of their impacts on the condition of groundwater. Official controls of the PPAs were carried out by the DSP only by administrative procedures;
- **a comprehensive register of point and diffy sources of pollution has not been established;**
- **and from none of the databases, it was possible to obtain relevant data** broken down by type of pollution and materiality - the risk of sources of pollution.

The SAO SR found that the sources of pollution were not comprehensively mapped. Data on all known potential and potential sources of pollution were not recorded in the existing databases. The summarized data from the databases were not complete, consistent, sufficiently interconnected and evaluated in relation to each other. Not all stakeholders had access to the existing databases.

On the basis of the above mentioned findings, the SAO SR recommended to the Ministry to subject the existing databases of sources of pollution to analysis in terms of their filling, content and data processing. On this basis, create a comprehensive database system of sources of pollution in terms of interconnection of individual databases and usability of collected data for all organizations and bodies of state water management cooperating in the development of river basin management plans.

Characterisation of groundwater bodies is incomplete

Water planning also applies to the groundwater bodies. In the characterisation of bodies, **an introductory description shall be drawn up for all groundwater bodies, a risk analysis of groundwater bodies and a further description for those bodies identified as at risk on the basis of a risk analysis.** Those documents must be drawn up according to the requirements of the Water Framework Directive and the EC guidelines.

The results of the comprehensive characterisation of groundwater bodies should be used as a starting point for the design of monitoring of the chemical status of groundwater bodies.

The SAO SR audit found that the initial description of the defined groundwater bodies was elaborated only partially because it did not contain all the particulars according to the requirements of the Water Framework Directive. No further description for groundwater bodies at risk has been developed at all.

The risk analysis of groundwater bodies prepared by the Water Management Research Institute is considered insufficient by the SAO SR. This is mainly due to the fact that a methodology has been used in its development which does not allow adequate measures to be proposed to achieve environmental objectives that are unlikely to be met. At the same time, the risk analysis of groundwater bodies did not include the identification of uncertainties, in particular due to the lack of input data.

The SAO SR audit found that the risk analysis of groundwater bodies did not contain a list of specific environmental objectives for individual risk bodies that are unlikely to be met, nor a list of sources of pollution to which the risks of non-compliance are associated. A methodology that is not based on the Water Framework Directive, was used for risk assessment.

The SAO SR notes that the results of the risk analysis were not sufficiently plausible input data in the next two follow-up steps (design of monitoring of the chemical status of water bodies and programme of measures).

The work of developing conceptual models of groundwater bodies is insufficient.

Conceptual models are a simplified visual display of the flow ratios in the groundwater body. This is one of the inputs for risk analysis of groundwater bodies, an assessment of groundwater chemical status and a starting point for **designing the correct location of monitoring objects** in groundwater bodies so that the monitoring system is able to capture the pollution and identify the sources from which the pollution originates.

How conceptual models are developed is set out in the EC Methodological Guideline. Conceptual models show three basic elements of the system:

- **source** (places from which pollutants can enter groundwater drinking water sources, which are significant point and diffuse sources of pollution),
- **the route** (the direction of groundwater flow through which the pollution progresses or can progress — this is any contaminated site, which consists of contaminated soil and a contaminating cloud),
- **receptor** (objects affected by pollution such as water sources, including protection zones, surface water bodies or groundwater-dependent terrestrial ecosystems).

By examining conceptual models, the SAO SR found that they contain a lot of detailed data that make them confusing and difficult to understand. They are processed without identifying significant sources of pollution, demonstrating the direction of spread of pollution and identifying endangered water sources. **They do not provide a simplistic visual image for understanding the source-path-receptor system.** They reflect and accumulate shortcomings in the processing of inputs - insufficient characterisation of groundwater bodies, absence of complete databases of point and diffuse sources of pollution, identification of significant sources of pollution and absence of data on the extent of contaminating clouds in the groundwater bodies.

The SAO SR notes that the conceptual models of groundwater bodies were not a sufficient starting point for the development of risk analysis of groundwater bodies and the subsequent setting of monitoring of the chemical status of groundwater bodies and the development of a programme of measures of river basin management plans.

There is no estimate of the amount of pollutants.

On the basis of the requirements of the European Directives, the quantities of substances brought into groundwater should have been estimated.

The SAO SR audit found that the estimation of the amount of pollutants brought into groundwater was not determined (only the content of pollutants in groundwater was monitored).

The SAO SR recommended to the Ministry to ensure the collection of existing data on water pollution and to determine the estimation of the amount of individual pollutants brought into groundwater bodies from sources of pollution, broken down into hazardous substances and those that are not considered hazardous. Use the results to design a programme of measures of the third river basin management plans in accordance with the requirements of the Water Framework Directive.

The assessment of sources of pollution and their impacts on the status of groundwater bodies, is insufficient.

The evaluation of sources of pollution and their impacts on groundwater status shall result in:

- **a list of those significant sources of pollution in groundwater bodies** from which pollutants have been or are currently leaking into groundwater,
- **the extent of the contaminating clouds** of individual pollutants within groundwater bodies, with an estimate of their quantity in groundwater, assessed in conjunction with sources of pollution,
- **a list of point sources of pollution** having increasing trend in the content of pollutants in groundwater which have an impact on the chemical status of groundwater bodies.

The SAO SR found by examination that the assessment of impacts was insufficient for several reasons. The first is **a non-comprehensive database of sources of pollution and an inadequate identification of significant sources of pollution.** This has an associated risk that many significant sources of pollution have not been included in the impact assessment and will therefore not be included in the programme of measures.

Another reason is **the procedure used for assessing impacts according to geological legislation**, which is not compatible with the Water Framework Directive. Instead of assessing the impacts (extent) of pollution, only the potential risk of the source of pollution was assessed for point sources of pollution in the environmental burdens databases and the IMZZ database.

The partial impact of the confirmed environmental burdens for which a risk analysis was carried out, was assessed after the geological methodology and geological criteria. The extent of contamination of pollutants has been established with an estimate of their quantity. The audit found that **the trend in groundwater pollutants and the impact on the chemical status of ground water bodies has not been evaluated.** Usable data from risk analysis according to geological legislation were not included in the impact assessment under the Water Framework Directive.

The SAO SR notes that the assessment of impacts of point sources of pollution/contaminated sites from the environmental burdens database and the IMZZ database is an evidence of non-compliance with the Water Framework Directive and of differences in assessment according to water legislation and geological legislation.

The SAO SR found that the evaluation of the impacts of diffuse sources of pollution from agricultural activities, **data were provided by the UKSUP on the average quantities of applied plant protection products and nitrogen fertilisers for districts, and not according to groundwater bodies and agricultural land areas.** This distorted the assessment of the impacts of diffuse sources of pollution on groundwater status.

The SAO SR recommended to the Ministry to formalize the process of presentation of data according to groundwater bodies and agricultural land area for further processing in preparation of river basin management plans with relevant stakeholders.

Based on the findings, the SAO SR notes that the process of assessing the impacts on the status of groundwater bodies was not linked to the monitoring programme and the programme of measures.

3.1.2 Step 2 — Implementation of monitoring programmes - monitoring of the chemical status of water bodies

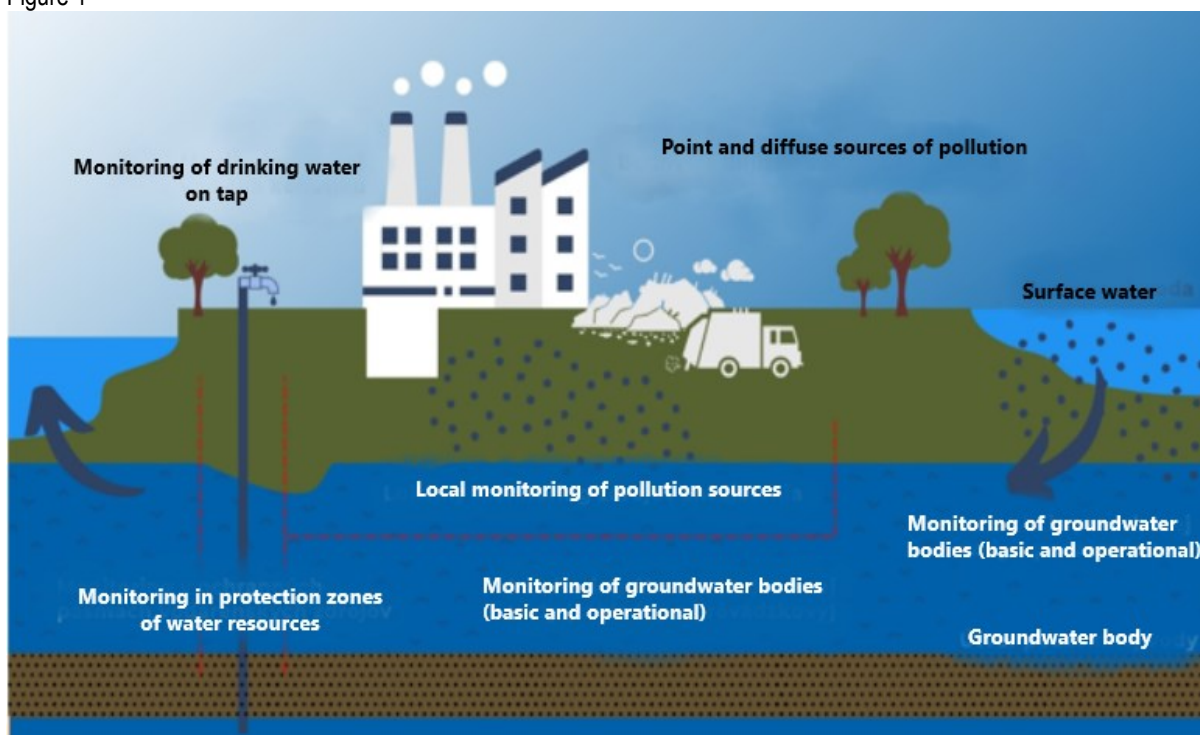
The aim of groundwater monitoring is to trace the movement and behaviour of pollutants from pollution sources from which they have leaked towards the water resources used. Monitoring all sources of pollution would be economically unsustainable. It is therefore necessary to identify, on the basis of criteria, significant sources of pollution posing a high risk to groundwater in terms of non-achievement of environmental objectives. These resources should be monitored. The SAO SR audit found that **the significance criteria for sources of pollution had not been established.**

In order to establish reliable monitoring, it is necessary to ensure:

- the **introduction of local monitoring** of all significant sources of pollution for the purpose of monitoring the entries of pollutants into groundwater,
- performing **monitoring of groundwater bodies (basic and operational)** according to the Water Framework Directive following an evaluation of the impacts on groundwater status,
- performing **monitoring of groundwater quality in the protection zones of water resources used** under the Water Framework Directive following the monitoring of groundwater bodies.

The groundwater monitoring system is shown in Figure 1.

Figure 1



The basic condition for reliable monitoring is the interconnection of all three monitoring systems into one continuous integrated groundwater monitoring.

The SAO SR examination identified a number of weaknesses within each monitoring system.

- **Local monitoring of pollution sources** are only carried out for selected environmental burdens and selected sites where hazardous substances are handled. Not all results of monitoring landfills and other sources of pollution sent by polluters to water management authorities are being utilised.
- **Basic and operational monitoring programmes for groundwater bodies** have not been designed in accordance with the WFD. Basic monitoring was not based on characterisation of groundwater bodies and evaluation of impacts on groundwater status. **Operational monitoring was not designed on the basis of basic monitoring.** The density and correctness of the distribution of monitoring objects has not been demonstrated by appropriate conceptual models. The scope and frequency of the parameters to be monitored in the Monitoring Framework Programme were not substantiated.
- **Monitoring in the protection zones of water resources** is carried out by their operators and owners. Monitoring results are not provided for the evaluation of the chemical status of groundwater bodies and trends in groundwater pollutant content.

The SAO SR audit revealed that the monitoring network was not designed to provide a comprehensive and summary overview of the chemical status of groundwater in each river basin and to allow to detect the presence of long-term increasing trends in concentrations of pollutants caused by human activity. The SAO SR recommended to the Ministry to update the Monitoring Framework Programme in accordance with the requirements of the Water Framework Directive.

At the same time, the SAO SR audit found that data from individual monitoring systems (local monitoring of sources of pollution, monitoring of groundwater bodies and monitoring of water protection zones) were not interconnected.

According to the Water Framework Directive, groundwater monitoring results are to be used to **evaluate trends in pollutant content** at individual monitoring points and **to evaluate the chemical status of groundwater bodies**. The results of both evaluations form **the basis for the design of a programme of measures** to achieve environmental objectives.

The SAO SR audit found that **the results of local monitoring are not used to evaluate trends in the content of pollutants in groundwater** according to the Directive on the protection of groundwater. No basis has been obtained for measures to prevent or limit the entry of pollutants into groundwater and to prevent their spread by groundwater.

Evaluation of trends from the results of basic and operational monitoring was not carried out from the current results of monitoring. The methodology used was not fully in line with the EC methodological guideline. On the basis of an incomplete or incorrect assessment, effective measures could not be taken to reverse a significant upward trend in the concentration of any pollutant. This may result in the failure to achieve good status of groundwater bodies.

Trends in pollutant content have also not been evaluated from the results of groundwater quality monitoring in water protection zones. There is a risk that comprehensive protection of drinking water taken from the water resources used is not ensured.

The SAO SR audit found that **trends in the content of pollutants in groundwater were only partially processed and their evaluation was not systematic and carried out according to EU directives.**

By analysing the data, the SAO SR found that the assessment of the chemical status of groundwater bodies was based on data that were not comprehensive, either in terms of their number or in terms of their processing methodology. The assessment of some pollutants did not include a comparison of the concentration of pollutants with limit values, nor information on the quantities and content of pollutants brought into groundwater bodies. Only one type of pollution source - environmental burdens - was taken into account when assessing impacts on the status of water bodies.

The assessment of the chemical status of groundwater bodies was not linked to nitrate detection monitoring in vulnerable areas under the Nitrate Directive. This deficiency has been brought to the attention of Slovakia also by the EC.

The chemical status of geothermal groundwater bodies has not been evaluated on the basis of monitoring of groundwater bodies. The audit found that the evaluation was carried out without the necessary input data, the use of legal criteria and methodological approaches for assessing the chemical status of geothermal groundwater bodies.

The SAO SR found that **the chemical status of groundwater bodies was not evaluated according to the requirements of the Water Framework Directive and was based on incomplete data. The results of the evaluation did not make it possible to draw up specific and targeted proposals for measures to achieve good water status. Based on the identified deficiencies, the SAO SR recommended the Ministry to reconsider the evaluation of the chemical status of groundwater bodies.**

The case of the accident of several water sources due to their contamination with pesticides (atrazine) medialized in 2017 only confirms **the violation of several provisions of the Water Framework Directive** (deterioration of the chemical status of groundwater bodies and deterioration of groundwater quality in water protection zones). The inclusion of the groundwater body concerned among the bodies of good condition was not supported by data on groundwater pollution and their impact on the water resources used.

The SAO SR found that the MoE SR did not have an early warning system in place, through which serious information would be forwarded to stakeholders for timely decision-making.

3.1.3 Step 3 - Drawing up and implementing a programme of measures as part of river basin management plans

The development of **an effective programme of water protection measures** is a prerequisite for achieving environmental objectives. Measures are the first line of defence and are the most effective mechanism of protection. The SAO SR audit showed that **the auditees under the competence of the MoE of SR did not take part in the programme of measures, were not involved in proposing it, nor were consulted.** Measures to improve the condition of groundwater were designed and adopted by the MoE SR.

The basic preconditions for an effective programme of measures are:

- The progress over the previous period has been evaluated,
- the link between the programme of measures and the assessment of the impacts of point and diffuse sources of pollution has been demonstrated,
- environmental objectives for the protection of groundwater quality are clearly defined and quantified where possible,
- measures to protect groundwater quality are specific, targeted and feasible.

The SAO SR considers the programme of measures to be insufficient due to the fact that the measures set were not specific, targeted and feasible. The measures were formal and did not allow an assessment of whether they met their objective. At the same time, the evaluation of the impacts of point and diffuse sources of pollution was not linked to the programme of measures.

The performance of tasks resulting from river basin management plans and the programme for measures aimed at achieving environmental objectives are coordinated by district authorities in the seat of the region. These were provided the SAO SR only with information on the implementation of measures related to the remediation of environmental burdens, on sewerage and on permit granting, but there was no information to which source of pollution the measures are related to, it was not stated - who monitors their implementation/fulfilment, who is responsible for fulfilling, what is the state of implementation/fulfilment of a specific measure, what the objectives, deadlines, measurable indicators for individual measures are, and their effectiveness has not been evaluated.

The progress report on the implementation of the programme of measures sent to the EC in 2018 did not contain a list of mandatory information, in particular the measures implemented to achieve the environmental objectives for groundwater, nor an evaluation of the progress made in implementing these measures.

The protection of groundwater drinking water sources depends mainly on the quality of the first step. The shortcomings identified in this step were also reflected in the elaboration of two further steps – monitoring the chemical status and introducing a programme of measures. On the basis of the deficiencies identified in all steps, it can be concluded that the monitoring system for groundwater drinking water sources is not set up correctly.

3.2. EVALUATION OF MONITORING RESULTS AND TRANSMISSION OF INFORMATION

The evaluation of monitoring results was processed in extensive reports on the quality of groundwater drinking water sources. The results of the groundwater quality assessment did not enter into an assessment of the chemical status of groundwater bodies, were not used in the planning process or in the drafting of measures to meet environmental objectives. The information provided by the selected district offices showed that they did not make use of these reports in their activities.

The results of individual tasks of subordinate organizations were processed in their output documents. **The SAO SR found that for an independent assessment of individual output documents a working group established by the Ministry of Environment of the Slovak Republic nor the Ministry provided for the preparation of opponent's opinions.**

The SAO SR audit also identified several weaknesses related to the sharing of information between individual special professional organizations. Not all stakeholders had access to the data in the pollution source databases and the information was not shared. The division of competences and the assignment of tasks was coordinated by the MoE SR, which did not ensure the whole process of transmission and sharing of information in the preparation of river basin management plans so that individual stakeholders had all the necessary information.

The audit found that the MoE SR, which is responsible for water protection in Slovakia, did not ensure the whole process of transmission, exchange and sharing of information in the process of preparing river basin management plans so that stakeholders have all the necessary information. The SAO SR recommended to the Ministry to formalize the procedures concerning the processing of results and the transmission of information between stakeholders. At the same time, the SAO SR recommended to the Ministry to modify the position of the working group in terms of the definition of competences and responsibilities and to secure an independent expert evaluation of individual output documents in the form of opponent's opinions.

The SAO SR notes that the results of the monitoring are not managed in such a way as to prevent current and future threats to the quality of groundwater drinking water sources and to eliminate the associated potential health risks for the population.

4. REACTION OF THE AUDITED ENTITY

The ÚKSÚP did not raise any objection to the veracity, completeness and demonstrability of the audit findings. The MoE SR, VÚVH, SHMÚ and ŠGDÚŠ objected to the veracity, completeness and demonstrability of the audit findings. The examination of the objections raised by the MoE SR, VÚVH and ŠGDÚŠ did not confirm their validity because they did not point against the veracity and demonstrability of the audit findings. Of the nine objections raised by the SHMÚ, four were accepted and three were accepted in part. An addendum has been drawn up to the report on the outcome of the SHMÚ audit.

In the Minutes of the discussion of the Protocol, the auditees undertook to take measures to remedy the detected deficiencies and to inform the SAO SR about this within the deadlines set in the Minutes of the discussion of the Protocol. The SAO SR will subsequently monitor the implementation of these measures.

5. CONTACT DETAILS

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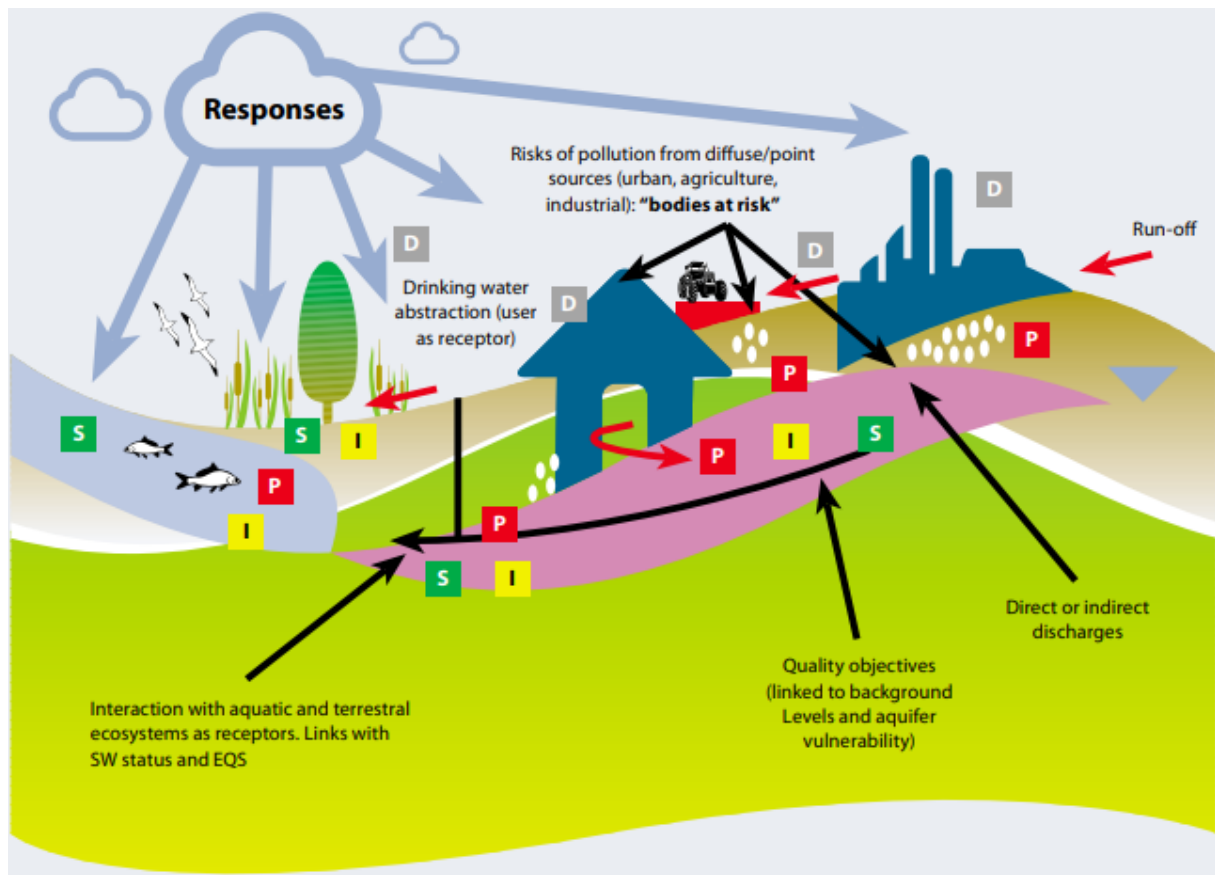
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Annex 1: Relationships between the different components of the DPSIR system



Source: Protection of Groundwater in Europe, EC