EU4Environment in Eastern Partner Countries:
Water Resources and Environmental Data (ENI/2021/425-550)

GROUNDWATER STATUS ASSESSMENT

Training Report – Moldova

Funded by
the European Union

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ABOUT THIS REPORT

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ABOUT EU4ENVIRONMENT – WATER RESOURCES AND ENVIRONMENTAL DATA

This Programme aims at improving people's wellbeing in EU's Eastern Partner Countries and enabling their green transformation in line with the European Green Deal and the Sustainable Development Goals (SDGs). The programme's activities are clustered around two specific objectives: 1) support a more sustainable use of water resources and 2) improve the use of sound environmental data and their availability for policy-makers and citizens. It ensures continuity of the Shared Environmental Information System Phase II and the EU Water Initiative Plus for Eastern Partnership programmes.

The programme is implemented by five Partner organisations: Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OiEau) (France), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE). The programme is principally funded by the European Union and co-funded by the Austrian Development Cooperation and the French Artois-Picardie Water Agency based on a budget of EUR 12,75 million (EUR 12 million EU contribution). The implementation period is 2021-2024.

https://eu4waterdata.eu

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List of abbreviations

ADA ..... Austrian Development Agency

BQE ..... Biological Quality Elements

DoA ..... Description of Action

DG NEAR ..... Directorate-General for Neighbourhood and Enlargement Negotiations of the European Commission

EaP ..... Eastern Partners

EC ..... European Commission

EECCA ..... Eastern Europe, the Caucasus and Central Asia

EMBLAS ..... Environmental Monitoring in the Black Sea

EPIRB ..... Environmental Protection of International River Basins

ESCS ..... Ecological Status Classification Systems

EU ..... European Union

EUWI+ ..... European Union Water Initiative Plus

GEF ..... Global Environmental Fund

ICPDR ..... International Commission for the Protection of the Danube River

INBO ..... International Network of Basin Organisations

IOW/OIEau ..... International Office for Water, France

IWRM ..... Integrated Water Resources Management

NESB ..... National Executive Steering Board

NFP ..... National Focal Point

NGOs ..... Non-Governmental Organisations

NPD ..... National Policy Dialogue

OECD ..... Organisation for Economic Cooperation and Development

RBD ..... River Basin District

RBMP ..... River Basin Management Plan

Reps ..... Representatives (the local project staff in each country)

ROM ..... Result Oriented Monitoring

ToR ..... Terms of References

UBA ..... Umweltbundesamt GmbH, Environment Agency Austria

UNDP ..... United Nations Development Programme

UNECE ..... United Nations Economic Commission for Europe

WFD ..... Water Framework Directive

Country Specific Abbreviations Moldova

AAM ..... Agency "Apele Moldovei"

AGMR..... Agency for Geology and Mineral Resources

AMAC..... Association of Apacanals

ANRE ..... National Agency for Economic Regulation of the Energy Sector (also regulates WSS)

EAM ..... Environment Agency Moldova

MoAgri ..... Ministry of Agriculture (of the Republic of Moldova)

MoENV..... Ministry of Environment (of the Republic of Moldova)

Moldova..... Republic of Moldova

SHS..... State Hydrometeorological Service

1. Main results / outputs of the training

In the training workshop on 6 and 7 September 2023 the following aspects have been discussed and elaborated:

1. the WFD requirements for the assessment of GW quantitative and chemical status,
2. the discussion of possible approaches by demonstrating results based on MD monitoring data and discussion of experiences from EU Member States.

Within the workshop, the requirements of the WFD and GWD (groundwater directive), the GW monitoring situation and the legal framework in Moldova were presented. The needs of the Moldovan experts in terms of implementing the WFD requirements in the national legislation were discussed and the discussion of options was illustrated with implementation examples from Austrian.

It was finally recommended by all participants to continue this interdisciplinary discussion of experts from the different institutions. The setup of a national GW working group would be favourable, which meets regularly and discusses all open issues step by step. The participants were invited to further elaborate on the establishment of national methodologies and approaches for the assessment of GW chemical and quantitative status and include the specifications into national legislation. UBA offered support if needed.

1.1. Groundwater monitoring in Moldova

In Moldova, there are 2 governmental decisions established, one on monitoring (since 2013) and another one on GW quality requirements, incl. quality standards, status assessment and the requirements for GIS mapping of results. Monitoring happens in general once every 6 years and every year if a quality standard is exceeded. Natural background concentrations are identified when drilling the monitoring site.

Monitoring is performed according to available budget and not to GW management needs. A maximum of 30 GW monitoring points is monitored each year. Moldova has 183 GW monitoring points, 78 in Danube Prut RBD (9 with sensors) and 105 in Dnistra RBD (43 with sensors). The automatic sensors cover water level, el. conductivity and temperature. Few Barologgers. Every 3 months the sites are checked and manually measured (= reference) and the past automatic data are corrected respectively. Monitoring data for the last 4 years are available in Moldova.

The monitoring network in Moldova is in some regions to loose and in other regions too dense. It is recommended, before revising the network, to:

- establish a methodology for status assessment,
- assess the GW-body status,
- check whether the assessment results reflect the conceptual understanding of the GW-body,
- review the delineation of the GW-bodies, whether they are manageable and
- check whether the planned and implemented measures for improving the status of the GW-bodies are adequate.

1.2. Groundwater chemical status

Currently, the assessment of monitoring data is done by comparing each individual value with the respective quality standard. Only exceedances have to be reported to the MoE.

WFD status assessment is not only comparing monitoring values with standards but in addition, it is considering all environmental objectives of the WFD (ecosystem needs and legitimated uses). In Moldova, there is no examination of GW & SW interactions yet.

The following aspects need to be considered in the elaboration of a method for GW chemical status assessment:

1. EU-wide quality standards for nitrates (50 mg/l) and pesticides (0.1 µg/l for individual substances and 0.5 µg/l for the sum of pesticides);
2. GW threshold values derived for relevant pollutants (causing risk) and derived from the needs of relevant receptors (legitimate uses, ecosystems, …);
3. Consideration of natural (geogenic) background levels, either in the establishment of threshold values or in the status assessment method;
4. Aggregation of monitoring values at site level (e.g. arithmetic mean of annual average mean values per site over a fixed period – e.g. 3 years, 4 years,…);
5. Aggregation of aggregated site values at GWB level (e.g. number of sites exceeding a standard compared to the total number of sites)
6. What is an acceptable pollution in the GWB and the GWB is still of good status? 20% / 25% … of sites exceeding a standard?
7. Status assessment comprises the passing of different tests (see EU CIS guidance No 18, Status and trend assessment) considering the achievement of all WFD environmental objectives;

Different methods from Austria and further Danube River Basin countries were presented. Also EU CIS guidance No 18 (Status and trend assessment) was recommended to be consulted.

Before the workshop, monitoring data from different GW-bodies and for a variety of parameters were provided by Moldova. The data were restructured in an Excel file (Pivot table) and used for quickly demonstrating the consequences of different aggregation periods or threshold values for individual GW-bodies and selected parameters.

Finally, in addition to the status assessment also trend assessment (significant and sustained upward trend in pollutant concentrations) is needed – a statistical method is needed as well as a time series of at least 8 values or at least 6 years.

It is finally recommended to include the detailed methodologies rather in ordinances than in laws as they are easier to change.

1.3. Groundwater quantitative status

The WFD GW quantity status assessment also considers different status tests to be performed and approved (see also EU CIS guidance No 18 - Status and trend assessment). The WFD requires a balance between GW abstraction and GW recharge, no damage to ecosystems and no (saline) intrusions due to changes in GW levels or flow directions. Monitoring is needed for each individual GW-body as well as the definition of the available GW resource.

GW quantity monitoring has a much longer tradition in Moldova than chemical monitoring. Automatic data are collected on a daily basis; manual measurements are done every 3 days. There are 3 types of wells: with observators, with automatic sensors (daily data, monthly aggregated) and measured by experts.

Current data assessment (Soviet method) consists of a comparison of GW levels per GWB and per site. The monthly mean GW levels and the annual mean GW levels are compared with the respective mean values of last year, of 10 years ago and since the 1970s. Also the highest and the lowest levels are identified and compared and the %-change calculated.

Regions are distinguished into “exploited” and “normal” regions. Exploited regions are those with fluctuating GW levels due to abstractions and hence, the monitoring frequency is every 3 days. The normal regions show almost stable GW levels and monitoring frequency is reduced to monthly.

A recharge coefficient is calculated and shown in maps. The coefficient <0.3 means over-abstraction, > 0.7 means GW recharge. This coefficient is used for forecasts. The calculations/comparisons are done for one year only, which can lead to misleading conclusions. It would be better to compare multiannual averages.

Challenges:

- A method for the assessment of deep GWB is needed.
- A methodology for interpreting isolines would be needed, to identify critical GW levels for each GWB and taking into consideration impacts on ecosystems and legitimate uses.
- It is highly recommended to include other institutions in the discussions in order to have a broad commitment on the method and on the results within the groundwater community.

- The annual results are too misleading, and it would be better to aggregate the results of 5 or 6 years to be used as a basis for the status assessment.
- The abstraction of GW for irrigation purposes was prohibited until 2 years ago which will raise the demands on GW resources. Unfortunately, the calculation of the available water resources is based on data from the 1970s.

The following aspects were recommended to be addressed by the national method, discussed by national experts and laid down in a legal document:

- How to make the water balance test
  - with the GW levels? / pressure heads?
  - With the water balance assessment?
  - How to deal with artesian GWBs
- Agreement on method for estimation of available GW resource
- Abstraction data
  - Reliability of abstraction data
  - Outlook and further development of abstraction quantities
- Criteria for risk and good status

1.4. Conclusions

For shallow GWBs a methodology and data are available which are a good basis for the further development of a WFD compliant methodology for status assessment, this methodology shall consider a longer time period but shall not replace MD's current methodology on assessing annual data.

For deep GWBs the GW level and the pressure head is monitored. A special methodology to be elaborated by identifying critical GW levels first for each monitoring point and then for the whole GWB. Not only annual data comparisons but also multiannual data should be considered, otherwise problems might be overestimated although there are none.

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