Interreg
CENTRAL EUROPE
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DEEPWATER-CE

DEEPWATER-CE

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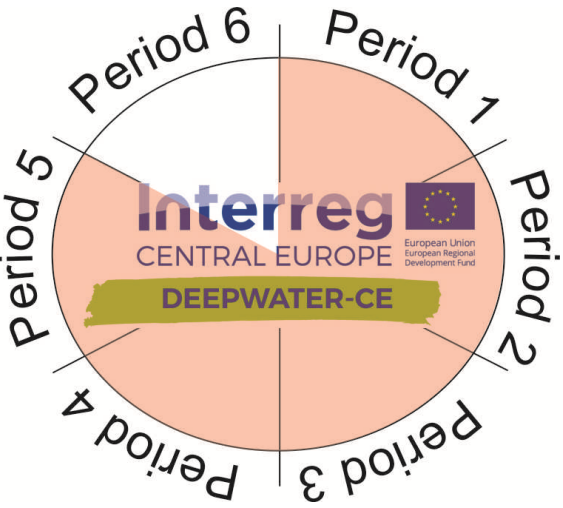
https://www.interreg-central.eu/Content.Node/DEEPWATER-CE.html

Introduction

DEEPWATER-CE partners are joining forces to develop the integrated environmental management capabilities of the relevant public agents with a view to developing a comprehensive transnational approach to managing water resources as well as a set of **MANAGED AQUIFER RECHARGE (MAR)** solutions designed to resolve problems caused by climate change in Central European countries, including water scarcity, and decrease conflicts of use with other social and economic sectors!

In this edition, you will find:

- information about our managed aquifer recharge training series with access to training materials and recordings; we particularly recommend viewing the 3rd training session held this autumn,
- the results of our intensive fieldwork, particularly risk analysis as well as cost and benefit analysis for implementing MAR with access to our summary reports,
- a description of our work progress in the pilot areas: Hungary, Poland, Slovakia and Croatia,
- a summary of actions on our 4th work package: *Development of policy recommendations and national action plans,*
- brief reports on our other project activities, i.e. community meetings and conferences.



DEEPWATER-CE

Developing an integrated implementation framework for **Managed Aquifer Recharge** solutions to facilitate the **protection of Central European water resources** endangered by climate change and user conflict

01.05.2019

30.04.2022

WORK PACKAGE 1
On trainings

Development of a transnational knowledge base on the applicability of MAR in CE

TRAINING SESSIONS

advertised through national fora were carried out via sets of webinars or personal meetings in the local language and tailored to local requirements.
Three training sessions organized as part of the DEEPWATER-CE project were addressed to stakeholders from different sectors, with a view to raising awareness of MAR solutions and their environmental and economic benefits.

The purpose of the training:

All training sessions are intended for relevant stakeholders listed in national Cross-Sectoral Stakeholders' Groups (CSSG). The groups are being continuously updated by newcomers due to new emerging issues. The content of the invitations to attend each training session was varied for each specific section of the target audience.
The main purpose of the training is to raise awareness of the basic principles of the MAR schemes, practical information on their usage, reasons why they are necessary in the future due to climate change impacts, technical information on their installation and benefits followed by practical examples of installation. Additionally, specific information was presented on the national pilot site, including planned investigation activities of a project partner.

1st training

- **MAR principles and collection of good practices and benchmark analysis (D.T1.3.2.)**

The training provided information on how a toolbox can assist in the decision making process for selecting the sites are appropriate for the location of MAR schemes in Central Europe. As part of the assessment process summarized in the toolbox, both general and specific criteria are considered, e.g. geological and hydrological conditions, climatic models and scenarios as well as MAR schemes' sensitivity to extreme climates

2nd training

- **Toolbox, selection criteria and checklist for MAR location (D.T1.3.3.)**

The training provided information on how a toolbox can assist in the decision making process for selecting the sites are appropriate for the location of MAR schemes in Central Europe. As part of the assessment process summarized in the toolbox, both general and specific criteria are considered, e.g. geological and hydrological conditions, climatic models and scenarios as well as MAR schemes' sensitivity to extreme climates.

What is included in Training 3?

• **1st block** • Introduction of feasibility study structure and desktop study of the pilot site	• **2nd block** • Site • characterization
• **3rd block** • Risk management	• **4th block** • Cost-benefit analysis
• **5th block** • Comparison of alternative solutions and policy recommendations	• 6th block • Environmental impact assessment

- **Pilot feasibility studies to prepare policy recommendations (D.T1.3.4.)**

As part of project implementation, 4 pilot sites were selected with a view to applying the MAR methodologies developed in the project.
The training presented the selection process for the specific pilot sites using a toolbox, related checklists and selection criteria for carrying out feasibility studies based on common methodology (specific guidelines for assessing water supply and demand, guidelines for risk management and technical solutions, guidelines for cost-benefit analysis, regulatory and legal framework). Policy recommendations for incorporating MAR solutions into water management will be prepared on the basis of the results of feasibility studies, policy recommendations for incorporation of MAR solutions into water management will be prepared.

In this semester we have completed the 3rd training session! Welcome to our news overview!

HUNGARY
Online webinars via Zoom
3rd training session 14/10/2021

11
PARTICIPANTS

The third training session in Hungary was organised successfully online via Zoom by GeoGold Kárpátia Ltd. and the Mining and Geological Survey of Hungary (MGSH). The webinar was aired from the premises of the LP (1143 Budapest, Stefánia Str. 14.).

The aim was to provide comprehensive information about the results of investigations carried out in our pilot area as well as future tasks of the project.

The webinar involved six presentations. The participants were allowed and encouraged to ask questions in written form, which were answered by the presenters during the final part of the webinars.

GERMANY
Online webinars via Zoom
3rd training session 29/09/2021

45
PARTICIPANTS

The third training session was hosted by MARSoluT and DEEPWATER-CE project. It was held via the online platform ZOOM. The training group was dominated by participants from educational and research institutions.

Questions and comments after the respective presentations showed the interest in the topics covered as well as potential for interdisciplinary exchange. Discussions about national regulations for the implementation of MAR schemes and the potential of a cost-effectiveness analysis arose. Furthermore, there was great interest in future work in this field and possible future collaborations.

Fig.1. HUNGARY - Third training session.

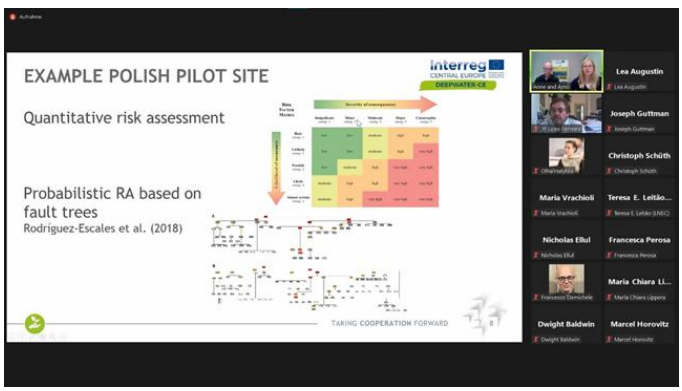


Fig.2. GERMANY - Third training session.

In this semester we have completed the 3rd training session! Welcome to our news overview!

POLAND
Hybrid form as a in-person meeting & online meeting via MS Teams
3rd training session 19/10/2021

69
PARTICIPANTS

The training was organized by University of Silesia in Katowice and supported by Tarnów Waterworks Ltd. and a representative of the project team boDEREC-CE, with whom we have co-operated in organising the key topics of our event.
The meeting was divided into two parts.:
the first part was focused on our DEEPWATER-CE project training, with a total of 4 different presenters giving seven thematic presentations,
the second part of the meeting was related to the boDEREC-CE project and its key objectives, topics and results.

Seven presentations were held :

Introduction to the 3rd DEEPWATER-CE Training - MAR Feasibility Study,
Characteristics of the "Świerczków" well field in Tarnów",
Preliminary results of the field works carried out in the Tarnów pilot site,
Risk analysis for the Tarnów pilot site
■*Cost-Benefit Analysis for the Tarnów pilot site*
■*Review of current legislation with respect to Managed Aquifer Recharge*
■*Preliminary Environmental Impact Assessment.*

The meeting was recorded using the MS Teams platform. A recording is available here:
https://www.youtube.com/watch?v=EVBurMYEQp4

Fig.3. POLAND - Third training session.

SLOVAKIA
Online webinars via
3 rd training session 20/10/2021

21
PARTICIPANTS

As part of the 3rd training session, 21 participants from higher education and research, business support organizations, regional public authority and large enterprises were provided with information on a fieldwork update with a view to preparing pilot scheme feasibility studies. The presentations introduced a desktop study of the pilot site, including identifying the pilot site and reviewing all hydraulic and hydrogeological research performed; risk management including identification of risks and suggestions for treatment them; output and methodology of cost-benefit analysis; comparison of alternative solutions and alegislative overview and, finally, national input into preliminary environmental impact assessment. Although there were no questions asked during the meeting, feedback received from questionnaires showed interest in using MAR system in other Slovak lowlands and how these systems can affect sources of drinking water available in the surrounding area.
A recording of the training is available here:
https://www.youtube.com/watch?v=btidL2nWYcM

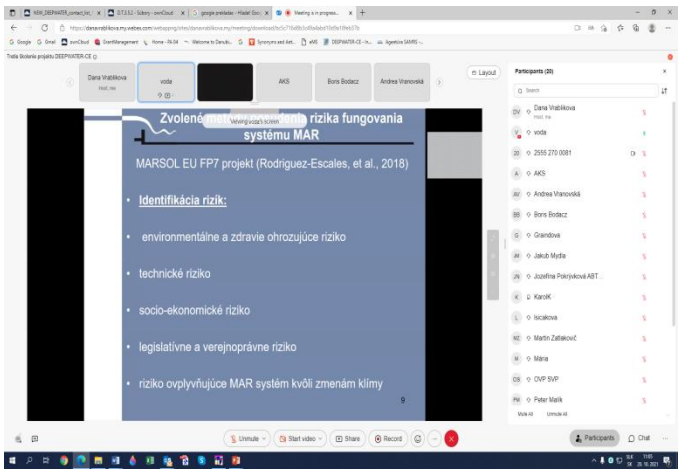


Fig.4. SLOVAKIA - Third training session.

In this semester we have completed the 3rd training session! Welcome to our news overview!

CROATIA
Hybrid form (Online on YouTube)
3rd training session 20/10/2021

15
PARTICIPANTS

The training was organized by Croatian Geological Survey and was conducted through a series of personal meetings with stakeholders from our pilot area - the island of Vis. Stakeholder composition was very diverse: local water supply employees, local professors and teachers, foreign researchers, and representatives of local NGOs. The aim of the 3rd training sessuion was to present the concept of the pilot feasibility study and all its components. We focused on explaining the geological and hydrogeological conditions which govern the island's aquifer and groundwater flow. Then, we elaborated field and laboratory methods utilized as well as MAR methods researched on the island of Vis (i.e., the infiltration pond and ASR system). Interestingly, the main topic that stakeholders wanted to discuss was the cost- benefit analyses. From the provisional aspect of water availability, a small desalination plant is surely a less expensive and less risky approach. However, implementing the MAR system to artificially recharge the main island's aquifer has several environmental benefits, one of which is the prevention of seawater intrusions in case of aquifer over-pumping during the dry summer season.

Fig.5. CROATIA - Third training session.

If you missed our training sessions we encourage you to play the recordings!

Training recordings and materials are available for download on our project website in the TRAINING section.

The language available are Croatian, English, Hungarian, Polish, and Slovakian.

MATERIALS:
https://www.interreg-central.eu/Content.Node/DEEPWATER-CE.html

Webinars are available on YouTube:
https://www.youtube.com/channel/UCh3Iw3sFH_lpSw_YSzZ4mXg

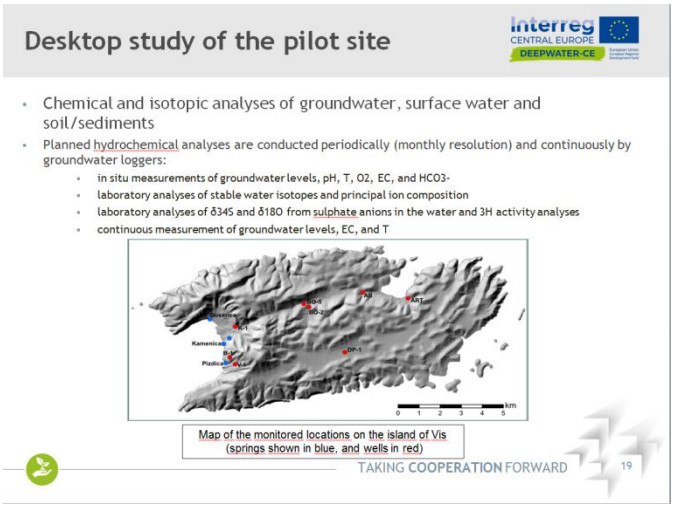


Fig.6. CROATIA- Third training session.

WORK PACKAGE 3

Development of a transnational assessment methodology for decision-making on MAR locations in CE - pilot feasibility studies carried out in 4 countries

At four pilot sites, different hydrological, hydrogeological and geophysical measurements were carried out.

The data collected were used to identify the technical and economical feasibility of the MAR scheme. Detailed information about the water quality was collected and possible sources of pollution were identified by the partners. Work included suggestions for risk treatment and monitoring as well as a cost-benefit analysis.

The results of the pilot feasibility studies will be used to prepare policy recommendations with a view to channeling MAR solutions into national river basin management plans and water management strategies.
Policy recommendations will be drafted with the support of cross-sector stakeholders to ensure that the documents mirror the integrated environmental needs, including social, economic and ecologic aspects variables.

Research areas:

Maros alluvial fan, Hungary
study on the covered paleo-channels of Maros River.

Tarnów Waterworks, Poland
study on porous aquifers located near industrial sites that pose a serious threat for the quality of water in shallow aquifers.

The Žitný ostrov, Slovakia
The pilot site area is demarcated by canals providing technical possibilities for water flow control, i.e. creating a MAR type Recharge Dam.

Island of Vis, Croatia
A study on karst semiarid hydrogeologic conditions is in progress

Fig.7. MAR types (TUM).

WORK PACKAGE 3

RISK ANALYSIS

HUNGARY

To decrease the possibility and severity of any harmful elements which might cause injury or damage to human health, property or the environment, a risk management plan has been elaborated for an MAR type underground dam system.

Our risk analysis methodology is based on Australian guidelines (NRMMC- EPHC-AHMC, 2006; NRMMC-EPHC-NHMRC, 2009), where the likelihood and severity of a given risk is examined and their joint assessment — based on a risk factor matrix — shows the total magnitude of a risk. We incorporated into this system a list of risk events of the MAR -specific study by Rodriguez- Escaleset al. (2018), in which risk events from literature reviews of 51 MAR facilities are compiled.

POLAND

Assessment was conducted for the „Świerczków" well field. Two methods *(Qualitative Risk Analysis Matrix* and *Fault Tree Analysis)* were selected for it.
The chosen methods made it possible to determine the risks at two phases of implementing the MAR scheme: design/construction and operational. Various aspects of MAR were indicated, both in technical and non- technical terms. Risks that may primarily affect the quality of MAR functioning were identified. This is proven by the high likelihood of these risks together with their severe potential impact on the MAR system.

The risks which most require preventive action are:
a) deterioration of groundwater and surface water quality,
b) clogging,
c) extreme fluctuation of the water table and Dunajec water level as a result of climate change (along with the results of this, such as flooding),
unacceptable water quality.

Fig.8. HUNGARY – fieldwork, chemical measurement.

WORK PACKAGE 3

RISK ANALYSIS

SLOVAKIA

In our risk assessment analysis, we combined two methods: quantitative risks were identified according to the methodology developed by the MARSOL project, while qualitative risk assessment was done in accordance with Australian guidelines. The qualitative method is used to examine the likelihood and severity of a risk, which is subsequently assessed using a risk factor matrix.

According to Marsol methodology, risks were evaluated from technical and non-technical (social, economic, governance & legislation) viewpoints during the design and construction phase and also during the operational phase.
Among non-technical risks occurring during the design and construction phase, a lack of private/public funding was identified as a very serious risk. One possible solution is to disseminate and publicize the benefits of MAR schemes to enable as many investors to be involved as possible.

There were two other risks identified as serious: the low price of water and high cost of installation. These risks can be overcome by providing additional support for the use of MAR facilities (state support, private financial sources) with a view to promoting its financial viability. An assessment of technical risks revealed several instances of serious risks during the design and construction phase: construction difficulties, low water storage, hydrogeological setting. The risks can be reduced by undertaking a specific technical project as well as proper and detailed geological and hydrogeological research. During the operational phase, serious risks include swelling clays, nutrients, droughts and rainfall event periodicity as well as changes in water demand and supply. To be informed about risks in time they should be thoroughly monitored.

CROATIA

The risk assessment was conducted for the conceptual model for impelementing infiltration pond (IP) and aquifer storage and recovery (ASR) methods on the island of Vis, at the Korita pumping site. We used the MAR-RISKAPP assessment tool developed by the MARSOL project to assess potential risks during the design/construction and operational phases. In the risk assessment tool, risks are grouped into technical and non-technical groups. The user qualitatively assesses the risk based on perception and/or experience.

Due to the high heterogeneity of karstic aquifers, MAR is generally considered a high risk operation in such an environment. The most significant technical risks involved in the operational phase are: clogging, dissolution of the aquifer, the unknown fate of infiltrated water (in relation to storage capacity), rapid infiltration of water through highly permeable conduits (high contamination risk due to low filtration capability of karst) and the possibility of an adverse effect on the hydraulic properties of the aquifer.

Regarding non-technical constraints, the main risks include lack of funding, significant gaps in legislation (at the moment, MAR in Croatia is not regulated and artificial recharge is not even mentioned in any water law or act), health legislations and sanitary risks, and lack of coordination.

WP T3
Results from pilots!

The pilot feasibility study for MAR schemes with integrated environmental approach in porous geological conditions in HUNGARY

MAR IN FLOODPLAIN ALLUVIAL SYSTEMS

In order to obtain accurate information on the geological-geophysical characteristics of the Csanadapaca-Medgyesbodzas pilot site electrical resistivity (ERT) measurements and Geophysical Cone Penetration Tests (GCPT) were performed. The GCPT measurements were performed to calibrate the ERT profiles and contributed to the geological and hydrogeological interpretation of the sediment layers.

Groundwater sampling was carried out to further facilitate the hydrogeological characterization of the site and to provide data for the validation of 3D hydrogeological modelling. Groundwater level data loggers have additionally been installed, complementing the existing monitoring data in the pilot area, in order to get information on groundwater levels at the pilot site.

A complex interpretation of these data provides sufficient geological-hydrogeological knowledge of the pilot site to supports hydrogeological modelling in order to perform a feasibility study for an MAR type underground dam system in the Maros alluvial fan.

Aquifers with different flow systems, separated by a silty-clayey quasi-impermeable layer. The upper is an unconfined aquifer, a local recharge area with local flow path, being greatly exposed not just to the effects of climate change, but also to pollution reflected in high nitrate and locally high sulphate, chloride, strontium and bromide concentrations. The lower aquifer is semi-confined, with little or no sign of pollution.

The $Ó_{18}O$ vs. ÓD distribution shows that all groundwater samples are of meteoric origin: they lie on, or next to, the Global Meteoric Water Line.
The aquifers used for drinking water supply can be found below the second aquifer and the preliminary results indicate they contain Pleistocene infiltration locally at a depth of about 30-33 meters below surface. The sedimentary sequence of these aquifers is very likely to be hydraulically connected.

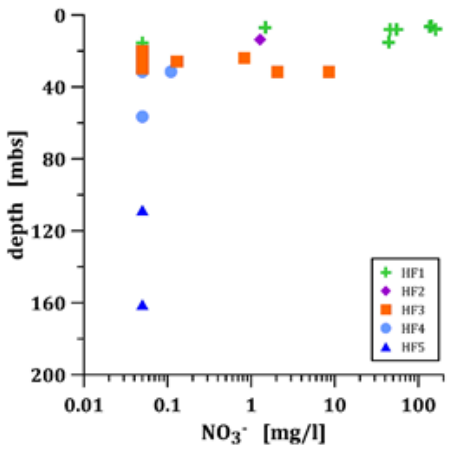


Fig.9. Nitrate concentration vs. depth.

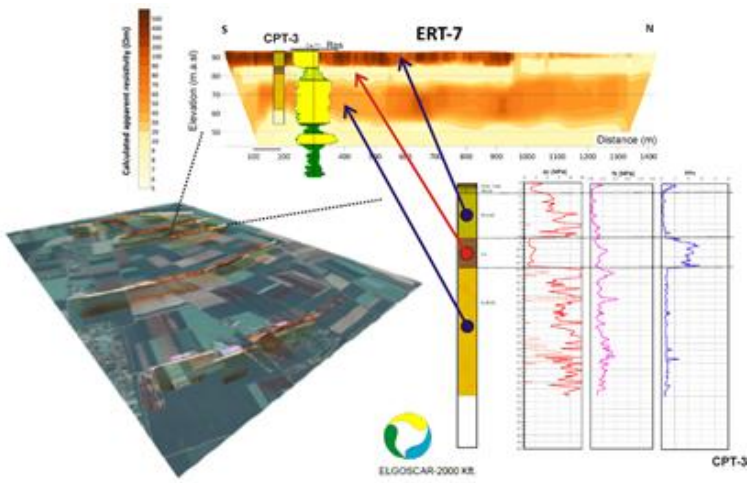


Fig.10. Complex interpretation of data.

WP T3
Results from pilots!

The pilot feasibility study for MAR schemes with integrated environmental approach in porous geological conditions in POLAND

MAR IN AQUIFERS NEAR INDUSTRIAL SITES

The last half of the year has seen less field works than the period presented in the previous *Newsletter 4*. Nevertheless, it has been a highly important period for us as far the field is concerned. The reason for this is the finalisation of pilot site field works as part of the project and the completion of the process of gathering the data necessary to create the *Report on the field work for the pilot feasibility study for MAR deployment in the Tarnów area*.

Field work performed during the last six months included:

- monthly measurements of the water table in abstraction wells, piezometers and infiltration ditches using an electric water level meter,
- monthly groundwater, surface water and precipitation sampling for field measurements and laboratory analyses,
- monthly reading of data from dataloggers installed in wells, piezometers and infiltration ditches as well as installation of one new datalogger in May,
- geophysical survey using Electrical Resistivity Tomography method (ERT) in September.

During the final period, we will continue the data analysis already underway to achieve the most accurate results possible. One of the most crucial elements will be a a set of reports demonstrating how the use of MAR can considerably improve groundwater quality

Fig.11. Field water testing with a spectrophotometer.

Fig.12. Cleansing pumping of a piezometer DW-7.

Fig.13. Water sampling and field labolatory.

WP T3
Results from pilots!

The Pilot Feasibility Study for MAR schemes with integrated environmental approach in porous geological conditions in SLOVAKIA

MAR IN AREAS USED IN AGRICULTURAL PURPOSES

The location of the pilot site was chosen on the basis of generał and specific screening criteria developed as part of the DEEPWATER CE project. The pilot site is łocated in porous conditions in the agricultural area of the Podunajska Lowland, in the Zitny ostrov area.

The pilot area is characterised by a dense network of irrigation channels with technical tools (sluices, barriers) for regulating water flow in channels. The ability to regulate the flow in channels is a crucial point in the process of creating a MAR type recharge dam and researching interaction between surface water and groundwater.

The field measurements aimed at researching the quantification of infiltrated surface water from a MAR type recharge dam scheme with a view to replenishing groundwater sources were made between October 2020 and May 2021. The aims of said field measurements were achieved: to assess and quantify the scope for aquifer recharge by *(i) assessment of the lateral range of infiltrated surface water impact on the groundwater level based on data from research into the hydraulic conductivity of soil; (ii) modelling surface water and groundwater interaction and (iii) draft scenarios for technical regulation of water flow in channels to ensure groundwater recharge at the pilot site.*

Field measurements covered the flow measurements in channels, geometry of channels, groundwater table measurements, soil sampling and measurements of hydraulic properties of soils or rocks using the Auger hole method in the field and by measuring and assessing retention curves in the laboratory. The soil samples were evaluated in the laboratory with a view to obtaining input data to calibrate the mathematical models (MODFLOW and HYDRUS).

By assessing the hydrochemistry of surface water and groundwater as well as the potential risks of them being polluted by scattered environmental loads and bigger potential polluters (the industrial enterprises have their own waste water treatment plants), it was found that they do not pose a significant threat of water or produce priority substances. Therefore, the assessment of the hydrochemistry and ecological potential of surface waters suggests that they are suitable for MAR systems

The field measurements and their assessment were performed by the Water Research Institute in co-operation with the Slovak University of Technology in Bratislava.

Fig.14. Flow measurment in channel.

Fig.15. Soil sampling.

WPT 3
Results from pilots!

The Pilot Feasibility Study for MAR schemes with integrated environmental approach in semiarid karst regions in **CROATIA**

MAR IN AQUIFERS LOCATED IN SEMIARID KARST AREAS

The fieldwork for the pilot feasibility study for MAR deployment in Split-Dalmatia county was conducted by the PP8 Croatian Geological Survey, supported by PP7 ViK Split and AP Croatian Waters. The fieldwork was done in the semi-arid karst region of Dalmatia, on the remote island of Vis. The fieldwork mainly included hydrogeological, hydrological, geophysical, hydrochemical, and structural- geological research. Periodical monthly field and laboratory research began in September 2019 and lasted until September 2021. To understand the behavior of such a complex and heterogeneous karstic system, a long line of high-resolution data are required. The main aquifer on the island (Korita) displayed long-term stability despite record-low precipitation in 2020 and 2021, with a slight increase in chloride and EC concentration. This indicated relatively high groundwater reserves that have shown resilience towards over-pumping and are protected from seawater intrusions, making them an ideal candidate for implementation of IP and/or ASR. Additionally, the site is known for its excellent groundwater quality.

Tritium activity demonstrated a mixture of sub-modern and modern waters in the Korita aquifer. Therefore, one could conclude that the recharged water would not be quickly discharges through a highly karstified fracture network (e.g. discharge into the sea). Climatological analyses demonstrated a marked upward trend in air temperature and relatively stable precipitation until 2100. The regional climate models Aladin, RegCM3, and Promes showed a potentially significant loss of water resources until the end of the century, which could significantly affect freshwater availability at the Korita site, emphasizing the importance of alternative solutions (e.g. MAR). Additionally, a negative impact on aquifer recharge is expected from seasonal redistribution of precipitation, i.e. an increase in summer precipitation and a decrease in winter precipitation. The Korita pumping site and aquifer are the most promising locations for implementing IP and ASR systems. However, further research should be conducted to reduce uncertainty and to obtain a more detailed insight into the hydraulic properties of the aquifer.

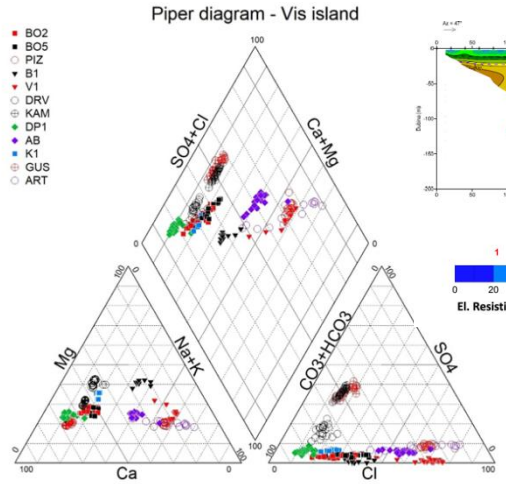


Fig.16. Piper diagram of groundwater samples from the island of Vis.

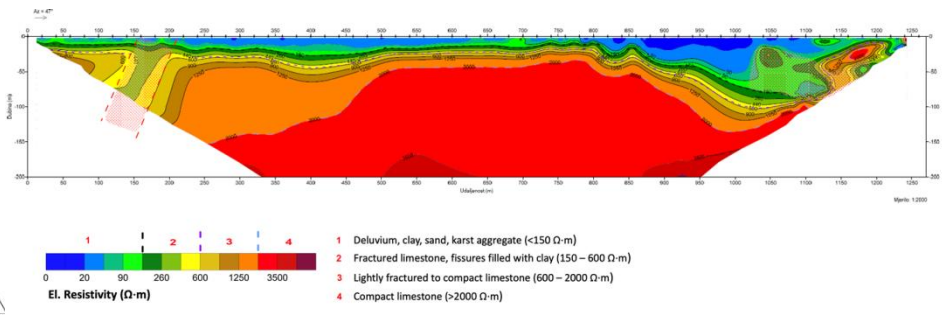


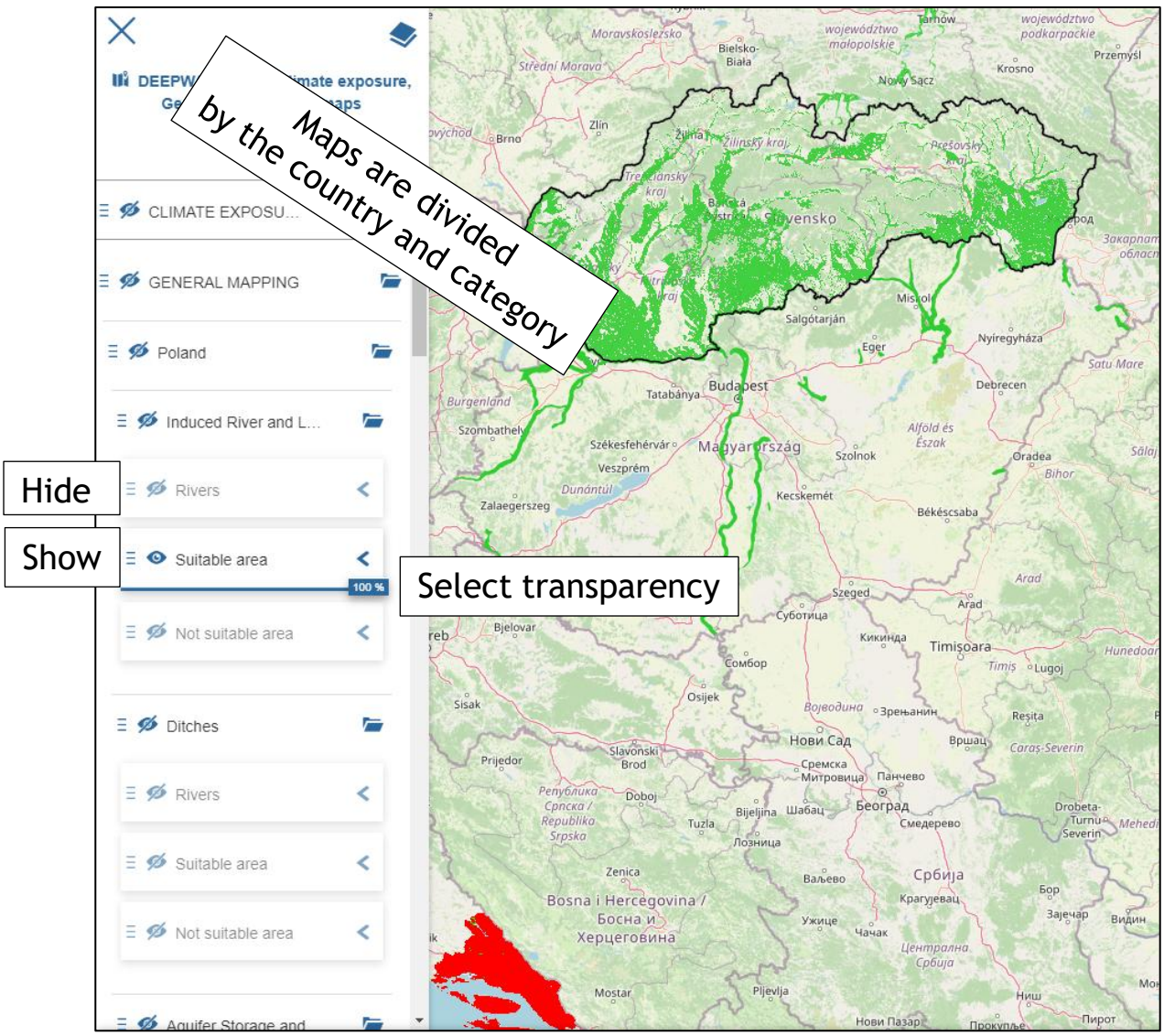
Fig.17. Electrical resistivity tomography profile.

WORK PACKAGE 3

The set of prepared GIS data and Global Groundwater Information System (GGIS) of IGRAC - All of the DEEPWATER climate and suitability maps have been uploaded to our Map Viewer!

HOW TO BROWSE OUR MAPS?

Simply enter **https://ggis.un-igrac.org/maps/2171/embed** in the browser...



...and view any suitability or climate exposure map you want!

WORK PACKAGE 4

Development of policy recommendations and national action plans

In a nutshell, the fourth work package of the DEEPWATER-CE project is to frame and present policy recommendations for the application and dissemination of MAR systems in a general handbook format. The European Union's water regulations contain minimal recommendations for purposeful recharge of water to aquifers. Therefore, to promote the method widely applied by governing bodies, policymakers, professional organizations, users and society, the beginning of the handbook provides a brief, comprehensive description of MAR systems developed so far and adopted in many parts of the world. Then, the regulatory and legal environments developed in each country are presented.

The **COLLECTION of NATIONAL LEGISLATION and POLICIES** on MAR was the first stage of work, during which a questionnaire was compiled for our partners. This template contained detailed questions about the regulatory framework, institutional framework and stakeholders, and good practices and gaps. The five project participating partners sent back their responses to the online questionnaire. Furthermore, the Italian partner sent an overview ofabout their existing legislation practices on MAR.

The **COMPARATIVE TRANSNATIONAL REPORT** was finished this summer, after analyzing the partners' answers to the questionnaire mentioned before.
Furthermore, the **TRANSNATIONAL GUIDELINE** report was compiled by an external expert this autumn. The handbook describes the complex and lengthy designing process of a recharge system and the aspects that are expected to present the most difficulties by summarizing the technical, environmental, and regulatory challenges to project implementation.
Then, an external expert developed a **COMMON TRANSNATIONAL ACTION PLAN TEMPLATE** for adopting MAR in CE countries. This template will serve as a guideline for the elaborating country-specific action plans to be made by the relevant partners.

The MGSH sent the template to the project partners, this autumn.
In the following stage, the partners will prepare their own Action Plan according to the Transnational Guideline. The Action Plans will include policy recommendations which will be presented to the decision makers.

Local community meetings in pilots & local dissamination events

HUNGARY

30 th September 2021

The local communinity meeting and the local dissemination event at the Hungarian pilot site in Medgyesbodzas was organised jointly on 30th of September 2021, for local stakeholders (residents, farmers, companies). It was organised by GeoGold Karpatia Ltd. and the MGSH. Colleagues of the General Directorate of Water Management (OVF) and the mayor of Medgyesbodzas were also present. The number of local stakeholders participating in the meeting was 20. During the meeting, two presentations were held by Erika Varga (MGSH) and Róbert Hegyi (OVF) about the DEEPWATER-CE project and water management in Hungary. The forum following the presentations was a good opportunity to receive feedback from the locals about the project, and they also had the chance to give their opinion by completing questionnaires.

Fig.18. Project meeting in Hungary.

Fig.19. During the disscusion.

Tarnów, Poland

24th September 2021

With the co-operation of the University of Silesia in Katowice and Tarnów Waterworks Ltd., we organised a meeting at the pilot site, which combined a local community meeting and a local dissemination event. This was divided into two main parts:

In Part One, we familiarized participants with the purpose of the project, discussed different ways of applying Managed Aquifer Recharge (MAR) and presented the results of our work on selecting areas where MAR would have a high potential for application in partner countries,

In Part Two, we discussed the water supply issue in the Tarnów urban area, showing preliminary work results in the pilot area of Świerczków, where a tour to our study area was organised.

During the meeting, the following topics were discussed:

- methods of additional groundwater recharge,
- our maps showing the suitability of certain areas for additional groundwater recharge of the Dunajec river basin, with particular emphasis on the Tarnów region,
- water supply in the Tarnów urban area,

preliminary results of works carried out in the pilot area in Tarnów.

You can find materials to download on our project homepage:.

You can find materials to download on our project homepage:

https://www.interreg-central.eu/Content.Node/Materials-from-local-

Fig.20. Participants in Tarnów meeting.

Local community meetings in pilots

SLOVAKIA
Dolný Bar 14.10.2021
During a local community meeting, the Water Research Institute team presented a short talk about the project, including its aims, the principles of MAR, selection of the pilot site and information about investigation works at all 4 project pilot sites. Local dissemination event followed the previous meeting. The results of the pilot site research were presented by the Slovak University of Technology in Bratislava and WRI team. The last presentation provided information about the activities of NGO Zelene dedicstvo - Zold orokseg and discussed the possibility of implementing the MAR system for the protection of the Klatov river branch. Both meetings were attended by 37 participants in total.
Fig. 24. During the presentation.
The meetings provided a platform for future possibilities for implementing MAR, not only for agricultural usage, but also for biodiversity protection in the Zitny ostrov area.

Fig.23. Meeting with our local community.

Fig. 24. During the presentation.

CROATIA
Komiža and Vis, 20-21.10.2021
Our Croatian partner held the local dissemination event in the Geopark Vis Archipelago Visitor Center and Vis Elementary School. The participants were students of the first to eighth grade and professors of Komiza and the Vis Elementary Schools. The main goal of the local dissemination event was to present the DEEPWATER-CE project, to explain its objectives and the benefits it could have for the local water supply. Since the participants were mostly children, the basics of geology and hydrogeology were briefly explained to them. Another relevant topic was water supply systems in Croatia, and more specifically on the island of Vis. It should be noted that older children had an impressive knowledge of the island's geology and local water supply management. Subsequently, the DEEPWATER-CE project was presented with emphasis on MAR, the Croatian pilot site on the island of Vis, all fieldwork conducted, and the results obtained. During the presentation, the participants also inquired about climate change, the current state of groundwater on the island of Vis in terms of quality and quantity, and the future prognosis for the water supply on the island.

Fig.25. Croatian lecture at school.

Other project activities!

THE PRESS CONFERENCE ABOUT PILOTS STUDIES

HUNGARY

The Press Conference took place at Medgyesbodzas, on 16th June 2021. During the event, Teodóra Szócs, the head of the hydrogeology department of the MGSH, held a presentation about the DEEPWATER-CE project, and the local MAR construction and its future use. After the presentation, Kalman Olah, the Mayor of Csanadapaca, and Gabor Varga, the Mayor of Medgyesbodzas, assured the present team members and the local audience of their support for this project.

SLOVAKIA

A press conference, with the participation of journalists, was held on 30.6.2021 at the Water Research Institute (WRI) and, at the same time, online. Project experts from the WRI together with an expert from the Slovak University of Technology in Bratislava provided information about the aims of the project, its importance and activities involved, criteria for pilot site selection and its characteristics, and fieldwork overview. After this hybrid conference, the Slovak DEEPWATER-CE team moved to the pilot site together with the journalists.

THE JOURNALIST'S ON-SITE VISIT

HUNGARY

The journalists' on-site visit took place in the pilot area, where the water sampling process was presented by employees of the MSGH and a cone penetration test (CPT) was demonstrated by Elgoscar Ltd. (external expertise). Three articles and a video block for the news were produced by the four media representatives present. After the field work, Teodóra Szocs (MSGH) and Antal Serfózó (Geogold Karpatia Ltd.) were interviewed by a local television channel, Behir.hu.

SLOVAKIA

The experts from the Water Research Institute and Slovak University of Technology in Bratislava, together with journalists, visited the pilot site at Zitny ostrov, roughly demarcated by a line linking the towns of Samorin, Dunajska Streda and Gabcikovo. The purpose of the field visit was to present field measurements to journalists in practice. During the visit, the WRI team presented soil sampling and water level measurments in probes. Journalists from the national media channel (Slovak TV and Broadcasting) interviewed WRI and external experts. Representatives from Vodarenske pohlady and Vodohospodarsky spravodajca provided short summary of the project in their journals.

Fig.21. Press conference in Medgyesbodzás.

Fig.22. Journalists on-site visit near channel Šuľany-Jurová.

VIRTUAL SQUARE!

As part of the our activities, we have launched the NATIONAL VIRTUAL SQUARE on LinkedIn!

What is a NATIONAL VIRTUAL SQUARE?

The Virtual Square (VS) is a place for everyone who is interested in hydrogeological topic or wants to learn more about Managed Aquifer Recharge (MAR) or share their opinion and knowledge about MAR systems with us.

The VS is an internet platform using LinkedIn possibilities, aiming at facilitating cooperation within cross-sectoral stakeholder groups (CSSGs).

A stakeholder can be a person, a group of people or a representative of an institution interested in DEEPWATER-CE topics and research findings that can be implemented in our country in the future.

National Virtual Squares

HUNGARY GERMANY POLAND SLOVAKIA CROATIA

Transnational Virtual Square

European Union

Interreg
CENTRAL EUROPE

DEEPWATER-CE

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MBFSZ Mining and Geologic Survey of Hungary

Deepwater-ce

At our official webpage you can find more information about the aims of the project, the partners involved, project news and events, and our outputs.

Also on ResearchGate platform includes our main reports and results:
https://www.researchgate.net/project/DEEPWATER-CE

30.04.2022

https://www.interreg-central.eu/Content.Node/DEEPWATER-CE.html

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