D.T4.3.2 ACTION PLAN FOR ADOPTION OF MAR SOLUTION INTO RELEVANT NATIONAL POLICIES AND STRATEGIES PREPARED

Poland

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INTRODUCTION

The present report concerns the national action plans for adopting MAR solutions into national water resource management schemes, policy strategic documents and water management legislation. This document was presented to the decision-makers and stakeholders during bilateral meetings and round-table discussion in 7th of April 2022.

The activities described in the report are in line with the main objective of the DEEPWATER-CE project which is to develop a comprehensive transnational approach for the adoption of MAR solutions in Central European countries to mitigate climate change affecting water resources and to avoid user conflicts regarding access to water.

This reports reflects the authors' view and the funding authorities are not liable for any use that may be made of the information contained therein. All chapters below were written by the University of Silesia in Katowice.

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GENERAL INFORMATION

Project	CE1464 DEEPWATER-CE
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1. BACKGROUND AND APPROACH OF MANAGED AQUIFER RECHARGE SCHEME AND ITS ADOPTION AND / OR INTRODUCTION INTO NATIONAL / REGIONAL LEVEL STRATEGIES, WATER MANAGEMENT PLANS, ETC.

Within the framework of the Interreg Central Europe - DEEPWATER-CE project, work was carried out on the possibility of disseminating methods for managed aquifer recharge (MAR) in order to mitigate the negative effects of climate change and avoid potential user conflicts in access to water. The lead institution in the project is the Authority of Regulatory Affairs of Hungary (formerly the Mining and Geological Survey of Hungary).

Managed aquifer recharge, is the deliberate recharge of water in aquifers for subsequent recovery or environmental benefit. The water recharge process is supervised and monitored to ensure adequate protection of human health and the environment.

MAR methods offer promising solutions for water management, including addressing climate change impacts, increasing groundwater quantity and/or quality, as well as other environmental benefits (e.g. prevention of saltwater intrusion, restoration of degraded ecosystems, prevention of land subsidence, flood effects mitigation and many others). Globally, there is an annual 5% increase in the number of facilities using MAR (e.g. Dillon, 2005; Casanova et al., 2016; Sprenger et al., 2017; Dillon et al., 2019).

Given the fact that each MAR method has its own specific requirements regarding its potential location, the project partners have selected six MAR methods for further detailed research, which could find wide application in Central European countries (DEEPWATER-CE, 2020b, DEEPWATER-CE, 2022a).

The methods include:

Spreading methods: a) infiltration ditches and b) infiltration ponds

These systems involve diverting surface water into infiltration basins/ponds or channels/ditches created for the purpose to increase infiltration through the unsaturated zone. Other possible techniques include over-irrigating crops or diverting flood waters to specific areas - again to deliberately increase infiltration. Infiltration water is stored in an aquifer that meets the selection criteria and is withdrawn by wells during periods of higher demand. Such methods are used to increase the quantity of shallow groundwater as well as its quality due to the natural self-purification processes that occur when water percolates through the aeration zone. It is also worth noting that infiltration of large volumes of water can be done at relatively low cost, and maintenance and anti-siltation procedures are relatively simple.

c) induced bank filtration (IBF)

This method consists in the initiation or enhancement of infiltration (inflow) of surface water through the bank and bed of a river/lake bed into an aquifer as a result of generating a groundwater depression caused by well pumping. The water abstraction system usually consists of a gallery of wells or a series of wells parallel to the bank of a river or lake so that the surface water is in hydraulic contact with the aquifer. River water infiltrating into an aquifer can be self-purified through physical processes such as filtration through the soil reducing suspended solids, biological processes such as removal of organic matter by microorganisms or chemical processes such as ion exchange.

d) aquifer storage and recovery (ASR)

In this MAR method, water is injected through wells directly into the relevant aquifer. This technique is usually used when the unsaturated zone does not have suitable conditions for water infiltration, e.g. when there is a poorly permeable layer above the targeted aquifer. Water stored in the aquifer can be withdrawn as needed by the same well used for injection (ASR) or other wells, depending on field conditions.

In the second case, the method is called Aquifer Storage, Transfer and Recovery (ASTR). The advantages of this system include the partial elimination of the problem of siltation during well reclamation and the fact that infiltration (injection) of large quantities of water can be carried out at relatively low cost. However, this is only possible once this system has been built and put into operation, which is a very expensive and complex process.

In-channel modifications: e) recharge dams and f) underground dams

Some MAR techniques involve modifying flow conditions in the riverbed to improve infiltration of water into an aquifer by blocking the flow of water with a dam constructed across the riverbed. Such structures can be used to increase infiltration of water retained upstream of the dam or to control water runoff. In the case of impermeable riverbeds, sand and gravel can be accumulated in front of the dam, thus creating an artificial aquifer that stores water. Another useful feature of this method is that the structures are installed in watercourse beds and do not interfere with the development of the investment area. Underground dams of low permeability material can also be created in river and reservoir bottoms to retain water in the alluvium for as long as possible. In this way, groundwater storage capacity can be increased. These are relatively low cost structures (often made by the local community) that require little maintenance. As with the physical surface barrier (feed) method, these structures are mostly installed in stream beds and therefore do not interfere with land development.

The most important documents describing the achievements and results obtained within the implementation of the DEEPWATER-CE project are the reports jointly produced by the project partners, which present:

a) Collection of good practices and an analysis of existing selected MAR solutions in the European Union (DEEPWATER-CE, 2020a).

b) Decision support toolbox for the designation of potential MAR sites in Central Europe (DEEPWATER-CE, 2020b).

c) Common methodological guidance for MAR feasibility studies in pilot areas (DEEPWATER-CE, 2020c).

d) Comparative analysis of current MAR legislation and policy in Central European countries (DEEPWATER-CE, 2021e), as well as the guidelines to how to improve the process of introducing MAR into the legislation of Central European countries (DEEPWATER-CE, 2021f) and a set of policy recommendations for the inclusion of managed aquifer recharge solutions into the legislation, indicating which elements should be prioritised (DEEPWATER-CE, 2022b).

In addition to the aggregated international reports mentioned above that compile the information gathered from the project partners, the partner countries (including Poland) prepared a number of national level reports on the results of activities in the pilot sites.

In Poland, works in the pilot area focused on the analysis of two of the six MAR methods outlined above: infiltration ditches and induced bank filtration. A pilot feasibility study was carried out in Tarnów, southern Poland, at the Świerczków well field, which uses the above-mentioned MAR systems to supply drinking water to the inhabitants of the city and the surrounding area. The well field is owned by the Tarnów Waterworks (Tarnowskie Wodociągi Sp. z o.o.), an associated partner in the DEEPWATER-CE project (AP5). The results from the pilot works are presented in the following reports on:

a) comprehensive analysis of archival data for the Świerczków well field in Tarnów (DEEPWATER-CE, 2021a).

b) description of the results of the field work carried out (DEEPWATER-CE, 2021b).

c) description of the methodology and mapping of the suitability of areas within the Dunajec catchment boundary for implementation of the six MAR methods (DEEPWATER-CE, 2021d).

d) a detailed description of the preliminary environmental impact assessment (EIA) carried out (DEEPWATER-CE, 2022d) and of the risk analysis performed for the areas designated for the construction of the MAR system as well as the area where MAR currently operates (DEEPWATER-CE, 2021c).

e) characteristics of water demand and supply in the Tarnów area, as well as a description of the cost-benefit analysis (CBA) carried out for the planned extension of the MAR facility in Tarnów (DEEPWATER-CE, 2022c).

All the main outputs of the project can be found, among others, on:

- the project website *(www.interreg-central.eu/Content.Node/DEEPWATER-CE.html)*,
- group on the ResearchGate platform *(www.researchgate.net/project/DEEPWATER-CE)*.

After reviewing the results of the DEEPWATER-CE project, a well field owner/operator planning to implement a MAR system at their site should be able to assess whether the planned MAR project will be environmentally and economically effective. In order to implement innovative water management solutions in the form of a MAR system, a potentially suitable area can be selected by implementing: a review of climate maps and models, analysis of archival data and creation of own suitability maps based on the methodology proposed by the team in the DEEPWATER-CE project (DEEPWATER-CE, 2021d). In the next stage, it is also possible to carry out, according to the methodological proposal presented in the project, a risk analysis, an environmental impact assessment and a cost-benefit analysis as well as to determine the scope and conduct the necessary field work for the MAR feasibility study.

With the knowledge of the next planned actions for the implementation and proper functioning of the MAR facility, and after getting familiar with the set of documents produced within the framework of this project, the decision-making bodies in the field of water management will be able to propose to the legislative bodies organisational and legal solutions to regulate the MAR operation. It does not have to be, especially at the beginning of the legislative path, a binding document such as the Water Law. These can be, for example, guidelines (sets of good practices) such as the Water Safety Plan (*iwa-network.org/projects/water-safety-planning/*) or solutions described in the Australian collection of good practices (*waterquality.gov.au/guidelines/recycled-water#managed-aquifer-recharge-phase-2*). The project activities carried out while developing good practice recommendations and national action plans can be of great help in creating such guidelines and legal solutions.

Although MAR is a complex topic requiring expertise in many fields, the analysis of the current knowledge and the project activities have shown many positive aspects of the use of MAR related to the economy and the improvement of the environment status. MAR solutions should therefore be covered by clear legal provisions, incorporated into the legislation of countries that intend to improve the status of water bodies by using MAR. The work carried out by the DEEPWATER-CE project can make an important contribution to establishing such legislation in the future.

2. VISION OF ACTION PLAN

One of the main aims of the DEEPWATER-CE project is to popularise MAR methods. This applies to all the participating countries: Poland, Slovakia, Hungary, Croatia and Germany. As a part of the project, the partners analysed the multifaceted conditions of MAR in their countries. The results of the analyses clearly indicate that the MAR aspect requires actions which would, on the one hand, popularise the idea of managed aquifer recharge and, on the other hand, introduce formal and legal regulations in this respect. Indeed, significant gaps in the specific MAR legislation have been identified in all participating countries. EU legislation (directives: WFD, UWWTD, GWD, DWD) introduces framework principles that can and should be applied to MAR, but there are no specific provisions in the form of regulations of the bodies that regulate water management (in Poland this is the Ministry of Infrastructure). Taking into account the possibility of stimulating the interest in methods of covering the demand for raw materials, including water, by creating systems that prefer an economic way of obtaining such resources, it seems fully justified to create a support programme for investors and users of MAR.

Undoubtedly, managed aquifer recharge should be counted among the pro-environmental measures, in line with the current policy of the European Union aimed at protecting natural resources and counteracting the causes and effects of the climate change, including extreme weather events such as floods and droughts. Currently, a “draft law on investments to counteract the effects of droughts” - the drought special act - is being processed in Poland. The current stage of work for this document is the submission of a new draft for consultation. This will be followed by the public consultations. The aim of the proposed regulations is to introduce a package of solutions that will facilitate water retention and improve the availability of water resources in Poland in order to mitigate the negative effects of increasingly prolonged periods of drought. MAR fits perfectly into this line of action.

Thus, the creation of a government/state program economically supporting MAR, analogous to "my heat", "my electricity", or "my electric car" programs would have measurable environmental and collective water supply impacts. Given the volume of MAR-based intakes’ operations, and the need to ensure that the system is recharged with surface water, it is necessary to ensure appropriate water management that takes into account the location and operation of MAR at the catchment level. This is a task for the water administration - The State Water Holding Polish Waters (Państwowe Gospodarstwo Wodne Wody Polskie PGW-WP). The basic document that takes into account the role of MAR in the management of waters at a catchment level is the River Basin Management Plan (RBMP). It is crucial that these plans be harmonised with local spatial development plans (LDPs), as land use within land areas is of fundamental importance for the qualitative and quantitative protection of water resources.

3. OBJECTIVES, PRIORITIES, TIMELINE AND POTENTIAL FUNDING PROGRAMME OF ACTION PLAN, NECESSARY INSTITUTIONAL BACKGROUND

The objective to be achieved by the project is to signal to institutions such as the National Water Management Council (NWMC [Państwowa Rada Gospodarki Wodnej]), which is an advisory body to the minister in charge of water management in Poland (currently the Minister of Infrastructure), the need for systemic solutions to promote and regulate MAR operations. The implementation of the project so far has been an opportunity to promote MAR solutions. To date, 6 meetings have been held, attended by over 300 people, representing 72 entities of different levels and professions (Table 1). The task of the research unit, which is the University of Silesia in Katowice, is to prepare the factual basis for the functioning of MAR, as well as the analysis of formal and legal conditions. The conclusions of these analyses are available on the DEEPWATER-CE website and were also presented at the seminars and stakeholder meetings. The University of Silesia, apart from its substantive activities, has no influence on the water policy of the institutions responsible for its implementation. As a part of the activities of this Action Plan (AP), an official written submission to the Ministry of Infrastructure will be sent (Annex II to this Action Plan), which will be pointing out the need for regulation of managed aquifer recharge. The analysis of the current legal status carried out within the project indicates a number of issues that require regulation: These include:

- unambiguous definition of the relationship/ratio of groundwater and surface water in the quantitative resources of MAR facilities;
- detailed regulation of the fees charged for water exploitation;
- detailed regulation for conducting MAR monitoring;
- specific risk assessment regulations for infiltration intakes;
- detailed regulations for the designation of well field protection zones;
- specific regulations on the quality of MAR's recharge water as well as the recharged water (native groundwater in the aquifer).

In addition, in view of the environmental benefits of introducing MAR techniques in the area, in a written request to the Ministry of Infrastructure, a proposal was included to establish a working group which could deal exclusively with the issue of managed aquifer recharge.

According to the project implementers, the activities for MAR could be supported by the National Fund for Environmental Protection and Water Management (Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej - NFOSiGW). Under the current conditions, water management with respect to both surface and groundwater is the responsibility of the State Water Holding Polish Waters. It is therefore a key institution that should seek to promote MAR.

4. EXPECTED RESULTS AND TRANSFERABILITY

a. Stakeholders and their influence – policy recommendation

The DEEPWATER-CE project's activities focus on extensive collaboration with a wide range of stakeholders, representing diverse groups interested in the project outcomes. The presentation of the project outcomes to date by means of three training courses and a wide range of communication activities disseminating the results of the DEEPWATER-CE project, including meetings with different target groups, information leaflets, brochures and newsletters, have succeeded in attracting a wide range of stakeholders in Poland, interested in using or promoting the idea of managed aquifer recharge. Stakeholder groups in Poland consist of state institutions related to administration, environmental protection and water management at local, regional and national levels, scientific institutions and universities, companies from the geological, hydrogeological and environmental protection industry, water supply companies, non-governmental organisations, as well as ordinary citizens (general public) interested in water management and environmental protection in its broadest sense.
The number of stakeholders participating in at least one training or seminar is shown in Table 1.

Table 1. Stakeholder groups.

Stakeholder target groups	number of institutions
Public authorities and institutions at local level	5
Public authorities and institutions at regional level	9
Public authorities and institutions at national level	6
Providers of public services and infrastructure (e.g. water companies)	11
Stakeholder groups, including NGOs	6
Higher education and public research institutes	18
Companies	17
Business support organisations	0
Total	**72**

Successful collaboration with the stakeholders is a key element in spreading the knowledge of the benefits of MAR and generating interest in managed aquifer recharge. Joint activities increase the chances of accelerating the introduction of the developed MAR solutions implementation strategy into legal regulations and executive documents such as RBMP and drought prevention plans. In addition, stakeholders from the selected groups are also influential in raising public awareness on the use of MAR techniques and training professionals.

b. Transferability potentials

According to the Central Europe Programme Application Manual: "Transferability is the potential to apply project outputs or outcomes in other regions or different contexts" (Application Manual, 2017). The results achieved in the project should be transferable and usable in other organisations/regions/countries outside the defined partnership. This transfer of knowledge, products and outcomes should enable existing regional disparities to be effectively bridged. When considering in this context the transferability of the products and results of the DEEPWATER-CE project, including the Action Plan, it should be concluded that the potentially most relevant and fastest implementation of the developed solutions should take place in areas where potential exposure exists or where problems of quantitative and/or qualitative access to groundwater due to climate change or user conflicts have already been identified. In Poland, the Regulation of the Minister of Infrastructure of 15 July 2021 on the adoption of the Plan for counteracting the effects of drought (Journal of Laws 2021, item 1615) may be helpful in locating such areas. Areas affected by water scarcity in Poland undoubtedly need different types of solutions to combat the growing problem of drinking water shortages. Among other things, the maps developed for the need of mentioned regulation showing the risk of hydrological drought in a selected period of time, as well as the maps of surface water bodies for which implementation of a selected type of drought measures is recommended. One such map is Map 16 (Fig. 1), which shows the recommended implementation of Action 6: "Analysis of options for increasing retention in catchments using natural and artificial retention". Such activities should take into account the outcomes obtained in the DEEPWATER-CE project related to application of MAR methods. The map presented shows that the need for additional retention, both natural and artificial, applies to large areas of Poland, especially in the south-eastern part of the country. Areas recommended for increased retention in catchment areas correspond well with the project outcomes, which indicate areas with the highest exposure to climate change in Poland (Fig. 2.). The maps prepared within the project can be used to forecast areas where MAR solutions would be most useful.

Using further results of the project, Regional Water Management Boards should make maps for the identified area in Poland based on the methodology developed in the DEEPWATER-CE project that will indicate potential locations useful for the application of MAR methods. This is to be followed by the planning and implementation of a feasibility study including comprehensive field work, the completion of a water monitoring network, environmental impact assessment or risk analysis.

It should be stressed, however, that the implementation of such measures both on a regional and national scale could be effective if the relevant guidelines and legal regulations are in place. Given the demonstrated lack of such regulations in the participating countries (DEEPWATER-CE 2022b), it makes sense to enact framework regulations at European Union level and detailed guidelines at national level.

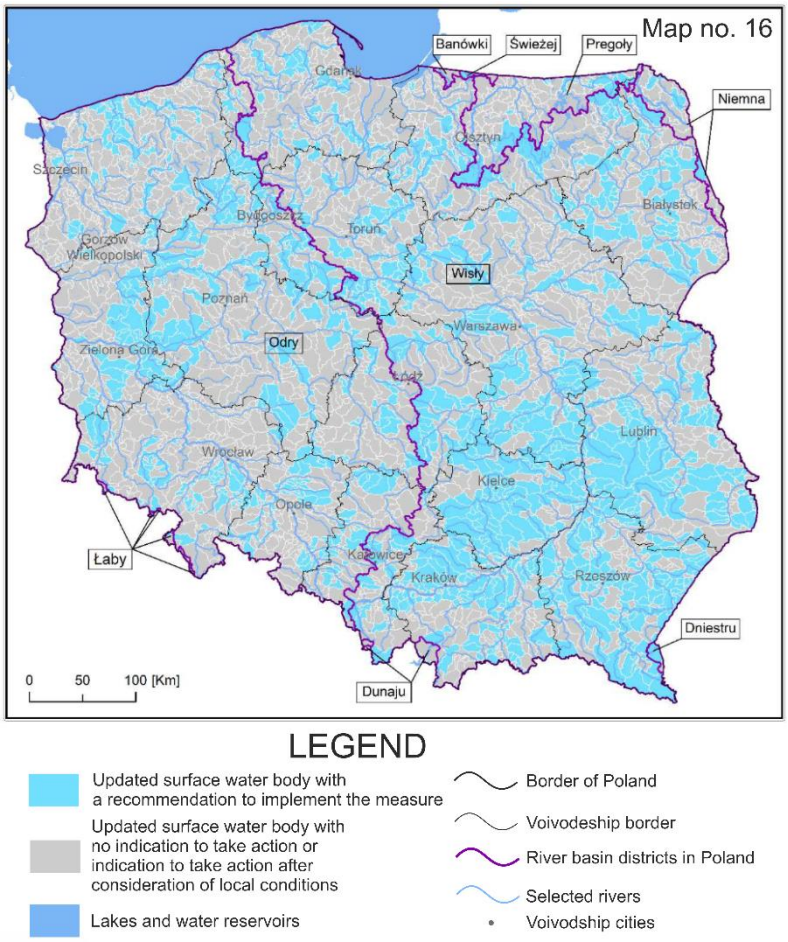

Fig. 1. Map of Surface Water Bodies where implementation of Action 6 is recommended: Analysis of options for increasing retention in catchments using natural and artificial retention (Journal of Laws 2021, item 1615).

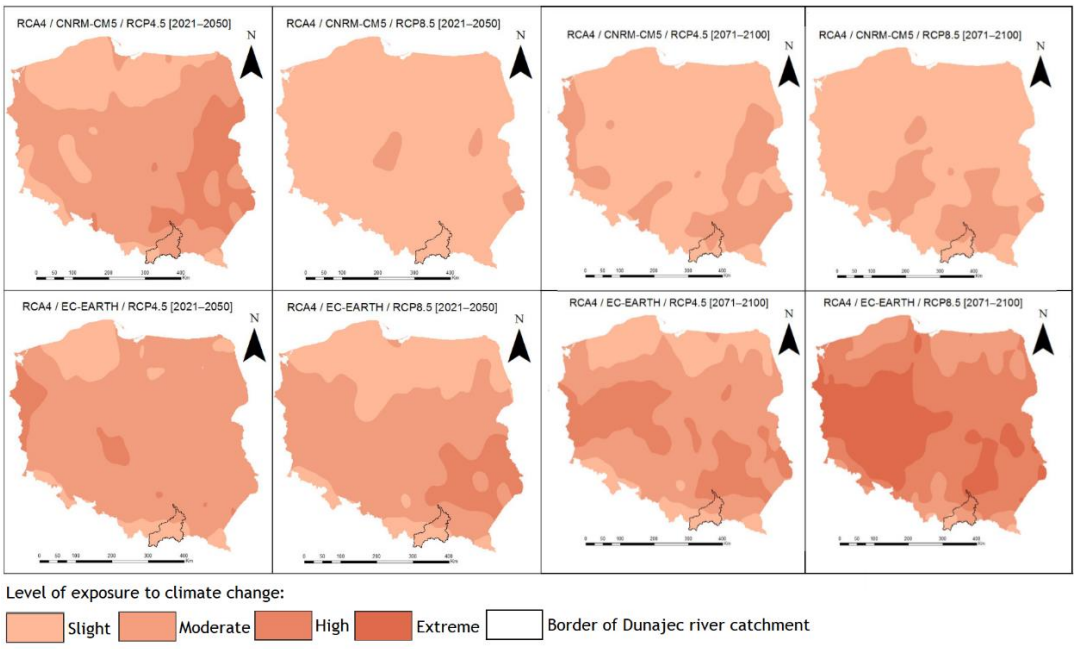

Fig. 2. Climate change exposure maps for Poland for 2021-2050 and 2071-2100, based on EC-EARTH and CNRM-CM5 models and RCP 4.5 and 8.5 scenarios (DEEPWATER-CE, 2021d).

c. Influence on the institutional capacity of target group organisations

As mentioned in section 3, the institution responsible for national water management is the State Water Holding Polish Waters. Groundwater monitoring is carried out by the Polish Hydrogeological Survey (Państwowa Służba Hydrogeologiczna), while surface water monitoring is carried out by the Institute of Meteorology and Water Management - National Research Institute (Instytut Meteorologii i Gospodarki Wodnej – Państwowy Instytut Badawczy). As far as the system's functioning is concerned, MAR issues fall within the interest of these three institutions, reporting to the competent minister (currently the Minister of Infrastructure). Therefore, synergic action of the above-mentioned entities is necessary, hence, within the framework of the Action Plan, an initiative was taken to address a written statement on systemic implementation of MAR to the advisory body of the Minister of Infrastructure.

At the same time, the bilateral meetings with the stakeholders planned within the framework of the AP, which include the above-mentioned entities, as well as the common meeting planned to conclude the project will be an opportunity to signal the relevant issues identified within the DEEPWATER-CE project and to discuss them, the effects of which discussion cannot be foreseen at the moment. However, it can be assumed that the implementation of the actions postulated in the AP, mainly legislative, will have an impact on the institutional capacities of the institutions indicated, such as influencing internal protocols, improving the knowledge and skills of staff, launching organisational units dedicated to MAR, etc.

A separate aspect is cooperation with the NGO sector. Recent years have seen a dynamic development of social sector activity in both water conservation and water management issues. As part of the project, contact was made with an association of community organisations working on surface water -" Save the Rivers" coalition (Koalicja Ratujmy Rzeki - http://www.ratujmyrzeki.pl/english). The Save the Rivers coalition is made up of 50 NGOs. As planned, the results of the project in the form of reports and studies, as well as the Action Plan, will be presented to the representatives of the coalition at the meeting. The participation of environmental organisations is justified by the problems that can accompany the creation of a MAR, e.g. regarding the damming up of watercourses, criticised by the environmental organisations. The problem of creating environmental barriers was identified within one of the DEEPWATER-CE reports, (DEEPWATER-CE, 2022d). Hence, the importance of participation of community-based organisations, which usually have expertise in this area. From a societal point of view, the greater the participation of MAR stakeholders, the greater the chances of creating technically, socially and environmentally optimal solutions.

The meetings disseminating the outcomes of the project also attracted considerable interest from research institutions and higher education institutions. These stakeholder groups should effectively contribute to training professionals as well as raising public awareness of MAR methods benefits. The University of Silesia in Katowice, as a representative of the project consortium and an institution educating students, has already taken steps in this regard by implementing MAR issues into selected subjects related to the aquatic environment. The second aspect of the contribution of this stakeholder group should be to engage in international research teams on MAR, resulting in rapid knowledge transfer to the country and creating a broad base of experts.

5. MONITORING OF THE ACTION PLAN

At which occasion / event is the AP planned to be discussed?	When will be the event organised and by whom?	What will be the aim to have a discussion about the AP?	What kind of conclusions / results will be expressed?
Seminar to disseminate project results (D.C.5.1)	28.02.2022 University of Silesia in Katowice	Information on the gaps and the current state of MAR legal solutions and the need to implement real actions to promote the solutions in Poland	The need to present comprehensive solutions to facilitate the use of MAR in Poland.
Bilateral meeting (D.C.5.2) with NGOs involved in water issues	23.03.2022 University of Silesia in Katowice	Discussion of the proposals contained in the action plan.	To put forward a proposal for an action plan, to draw attention to need to thoroughly perform EIA when implementing MAR projects.
Bilateral meeting (D.C.5.2) with representative of NWMC and representative of SHP	01.04.2022 University of Silesia in Katowice	Discussion of the proposals contained in the action plan.	To put forward proposals for an action plan, to signal the need for MAR regulation and MAR promotion mechanisms.
Meeting within task D.T4.2.4	07.08.2022 University of Silesia in Katowice	Proposals to develop and incorporate systemic solutions to support the use of managed aquifer recharge methods.	To show 5 main recommendations that could lead to a significant increase in the use of MAR methods.
Bilateral meeting (D.C.5.2) with a representative of Tarnów Waterworks	08.04.2022 University of Silesia in Katowice	Discussion of the proposals contained in the action plan.	Bringing forward a proposal for an action plan, to draw attention to modify the current legislation in order to have an unambiguous legal approach to infiltration intakes.
Bilateral meeting (D.C.5.2) with a representative of the Polish Geological Institute	11.04.2022 University of Silesia in Katowice	Discussion of the proposals contained in the action plan.	Presentation of a proposal for an action plan, to draw attention to the need to carry out a cost-benefit analysis to assess the benefits of using MAR system.

At the moment, under the current formal and organisational conditions of the DEEPWATER-CE project, it is not possible to check to what extent this Action Plan will be possible to implement. In the near future, it is undoubtedly worthwhile to ensure that the subject of MAR is included in, inter alia:

- The National Environmental Policy 2030 2030 (isap.sejm.gov.pl/isap.nsf/download.xsp/WMP20190000794/O/M20190794.pdf);
- National Water and Environment Plan (kzgw.gov.pl/images/Aktualnosci/20161012/aPWSK.pdf);
- River Basin Management Plans (planned update [aRBMP]- 2022, consultation ended 14 October 2021).

Although the DEEPWATER-CE contractors do not have the capacity to undertake such activities personally, it is possible to outline a potential MAR development scenario for the country. The scenario would include:

- preparation of a valorisation of the area of Poland with regard to the possibility of implementing MAR;
- preparation and implementation of an information campaign on the benefits of MAR;
- preparing a financial support system for MAR operators;
- preparation of legal solutions governing MAR activities (including monitoring);
- preparation of workshops to train MAR specialists.

6. EXECUTIVE SUMMARY

Within the framework of the Interreg Central Europe programme, the DEEPWATER-CE project team worked on the feasibility of disseminating various methods of managed aquifer recharge in order to mitigate the negative effects of climate change and avoid potential user conflicts over access to water. The analyses covered six ways of supplying water intakes. In Poland, at the infiltration well field Świerczków in the city of Tarnów, research was conducted on additional infiltration ditch recharge as well as the induced bank filtration process. The three-year study showed that managed aquifer recharge is a complex subject, requiring expertise in a number of fields. The project provided a number of specialised studies that can be downloaded from the project websites (*interreg-central.eu/Content.Node/DEEPWATER-CE.html, researchgate.net/project/DEEPWATER-CE*). These studies address both the universal principles for the operation of intakes using managed aquifer recharge methods and national problems in this sector. The analyses carried out show clearly that managed aquifer recharge has a number of potential pro-environmental benefits for water management - it enables water retention, often improves water quality and improves the availability of water resources (water quantity), mitigating the negative effects of climate change. Hence, it is advisable to introduce a number of systemic measures that would lead to an increase in the share of managed aquifer recharge in the supply of water to the population. The plan to popularise this way of using water resources proposes taking the following actions (action plan):

- inclusion of managed aquifer recharge in the national strategic documents,
- taking the managed aquifer recharge into account in the river basin management plans,
- identification of the areas predisposed (potentially suitable) to the introduction of managed aquifer recharge, with environmental protection rules taken into consideration,
- introduction of financial mechanisms to promote the use of water from different types of intakes (e.g. infiltration, as in the case of the Polish pilot site),
- introduction of legislative solutions comprehensively governing the managed recharge of groundwater resources stored in the aquifers as well as the operation of infiltration well fields,
- conducting an appropriate information and education campaign aimed at the public and the decision-making entities alike,
- preparation (training) of specialised personnel for the managed aquifer recharge sector.

Attached as Annex I to this Action Plan is a Declaration of Intent, which will be presented together with this Plan to a decision-making body, selected by the University of Silesia in Katowice, related to the water management sector.

7. LITERATURE

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ANNEX I.

Declaration of intent

On behalf of the decision-making body of <name of the partner organisation> I, the undersigned, hereby declare, that the Action Plan designed in the framework of the CE1464 DEEPWATER-CE Project was endorsed and/or accepted and/or adopted by our organisation.

Date:

……..

<Name and position>

<Name of the partner organisation>

……..

(Stamp and signature)

ANNEX II.

Sosnowiec, 27-04-2022

Ministerstwo Infrastruktury

Departament Gospodarki Wodnej i Żeglugi Śródlądowej

Sz. P. Monika Niemiec-Butryn

Szanowna Pani Dyrektor,

W ramach programu Interreg Europa Środkowa – realizowaliśmy międzynarodowy projekt DEEPWATER-CE, poświęcony stworzeniu kompleksowych rozwiązań prowadzących do rozpowszechnienia dodatkowego, sztucznego zasilania zasobów wód podziemnych. Zrealizowane w ramach projektu, trzyletnie badania wykazały, iż dodatkowe zasilanie warstw wodonośnych jest tematyką złożoną, wymagającą specjalistycznej wiedzy z szeregu dziedzin oraz odpowiednich systemowych rozwiązań w zakresie zapisów prawnych. Realizacja projektu dostarczyła wielu specjalistycznych opracowań możliwych do pobrania ze strony projektu *www.interreg-central.eu/Content.Node/DEEPWATER-CE.html*. Opracowania te odnoszą się zarówno do uniwersalnych zasad dotyczących funkcjonowania ujęć infiltracyjnych jak i do krajowych problemów tego sektora.

Przeprowadzone analizy jasno wykazują, iż sztuczne zasilanie niesie za sobą szereg potencjalnych prośrodowiskowych korzyści dla gospodarki wodnej - umożliwia retencjonowanie wody, często poprawia jej jakość, a także poprawia dostępność zasobów wodnych łagodząc negatywne skutki, jakie niosą ze sobą coraz częstsze okresy suszy. W sztucznym zasilaniu wód podziemnych dostrzegamy szansę łagodzenia negatywnych skutków zmian klimatu i unikania potencjalnych konfliktów użytkowników w dostępie do wody. Stąd też nie mamy wątpliwości, że wprowadzenie odpowiednich systemowych działań, które doprowadziłyby do wzrostu udziału sztucznego zasilania warstw wodonośnych w zaopatrzeniu ludności w wodę przyniesie szereg korzyści natury zarówno środowiskowej, społecznej jak i gospodarczej.

Analizując w kontekście sztucznego zasilania warstw wodonośnych publicznie dostępne dokumenty oraz aspekt formalno–prawny stwierdziliśmy:

1. Znikome uwzględnienie sztucznego zasilania zasobów wód podziemnych w krajowych dokumentach strategicznych dotyczących gospodarki wodnej. Przykładowo w „Programie wodno-środowiskowym kraju" uwzględniono sztuczne zasilanie zasobów wód podziemnych jedynie w jednolitej części wód podziemnych nr 1.
2. Praktycznie brak uwzględnienia sztucznego zasilania zasobów wód podziemnych w planach gospodarowania wodami w obszarach dorzeczy – zarówno dla dorzecza i Odry jak i dorzecza Wisły.
3. Brak regulacji prawnych szczegółowo regulujących funkcjonowanie sztucznego zasilania zasobów wód podziemnych.

W sposób szczególny chcieliśmy zwrócić Państwa uwagę na ostatni z punktów. W Ustawie prawo wodne wyróżnia się wody powierzchniowe i podziemne, natomiast wody eksploatowane przez ujęcia infiltracyjne, traktuje się uznaniowo jako albo podziemne (np. w Tarnowie) albo jako powierzchniowe (np. we Wrocławiu). Brak jednoznacznych uregulowań prawnych rodzi szereg niejasności w zakresie dokumentowania zasobów, wyznaczania stref ochronnych, analiz ryzyka, prowadzenia monitoringu oraz w zakresie naliczania opłat środowiskowych. Stąd też widzimy potrzebę wprowadzenia regulacji prawnych, porządkujących kwestie wzbogacania zasobów wód podziemnych i ich eksploatacji. Naszym zdaniem należałoby wprowadzić do porządku prawnego, oprócz funkcjonujących pojęć: ujęcia wód podziemnych oraz ujęcia wód powierzchniowych, nowy rodzaj ujęć – ujęcia wód infiltracyjnych/stosujących metody sztucznego zasilania. Wykonane w ramach projektu analizy wskazują, iż przepisy powinny precyzyjnie regulować funkcjonowanie tego typu ujęć w zakresie:

- jakości wód (zasilających i zasilanych),
- jednoznacznego określenia relacji/stosunku wód podziemnych i powierzchniowych w zasobach ilościowych ujęć,
- warunków hydrologicznych i hydrogeologicznych jakie muszą być spełnione przy lokalizacji ujęć wód infiltracyjnych,
- lokalizacji względem ognisk zanieczyszczeń,
- oceny ryzyka dla ujęć infiltracyjnych,
- wyznaczania stref ochronnych,
- sposobu naliczania opłat,
- prowadzenia monitoringu.

Przedstawiając powyższe zwracamy się z propozycją, aby w porozumieniu z podmiotami odpowiedzialnymi za gospodarkę wodną (Państwowe Gospodarstwo Wodne Wody Polskie, Państwowa Służba Hydrogeologiczna, Instytut Meteorologii i Gospodarki Wodnej oraz przedstawiciele branży wodociągowej) powołać zespół, który opracuje założenia do aktu prawnego, który mógłby zasygnalizowane aspekty uporządkować. Deklarujemy jednocześnie, iż w przypadku powstania takiego zespołu, możemy służyć pomocą merytoryczną w zakresie hydrogeologii i udostępnić wyniki projektu DEEPWATER-CE.

Z wyrazami szacunku

dr Sławomir Sitek

Kierownik Projektu DEEPWATER-CE z ramienia

Uniwersytetu Śląskiego w Katowicach

Kierownik Projektu DEEPWATER-CE

dr Sławomir Sitek