

PROLINE-CE

WORKPACKAGE T2, ACTIVITY T2.3

IMPLEMENTATION OF BEST PRACTICES FOR WATER PROTECTION IN PILOT ACTIONS

D.T2.3.1 EVALUATION REPORTS FOR EACH PILOT ACTION

PILOT ACTION: PA3.2 Along Danube Bend

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TABLE OF CONTENTS

1. Introduction	1
2. Evaluation of BMPs in Pilot Action.....	1
2.1. Implementation of BMPs	1
2.2. Acceptance of BMPs among stakeholders	2
2.3. Overview table about implementation of BMPs in Pilot Action and their acceptance among stakeholders	4
3. Conclusions	6
4. References.....	6



1. Introduction

Best management practices (hereinafter BMPs) for drinking water protection and management derived from T1 were reviewed and relevant BMPs were selected for particular pilot action. Implementation status of BMPs was verified in Pilot Actions (T2); in case of lacks identified, possibilities of improvement and implementation were also assessed. Drinking water protection and management and best practices are strategically implemented in the pilot actions, in order to achieve a function-oriented land-use based spatial management for water protection at the operational level. Measures and actions were analysed and proposed concerning mitigation of extremes and achieving a sustainable drinking water level. PROLINE-CE pilot actions reflect the broad range of possible conflicts regarding drinking water protection, such as: forest ecosystem service function; land-use planning conflicts; flooding issues; impact of climate change and land-use changes; demonstration of effectiveness of measures including ecosystem services and economic efficiency.

Review of main land use conflicts and BMPs on Pilot Action level has already been done in Pilot Action BMPs reports, which were a basis for *D.T2.1.2 Transnational case review of best management practices in pilot actions*. Description of natural characteristics of Pilot Site is presented in *D.T.1.4 Descriptive documentation of pilot actions and related issues*.

Activities within Pilot Action are described in *D.T2.2.2 Partner-specific Pilot Action documentation report*.

The Deliverable *D.T2.3.1 Evaluation reports for each pilot action* presents an evaluation of actual implementation and thematic interpretation of tested management practices as well as their acceptance among stakeholders and experts is carried out for pilot action PA3.2 Along Danube Bend.

2. Evaluation of BMPs in Pilot Action

2.1. Implementation of BMPs

Within the frame of the project, three particular groups of BMPs have been considered: (1) Participation in Agro-Environmental Program, (2) Municipal sewage disinfection and (3) Ensuring the drinking water supply during high water or flood.

(1) - Since a significant proportion of the pilot area is under agricultural management, proper agricultural practices are essential in ensuring the safety of underlying and downstream water resources. Many of these practices have already been implemented. However, the high investment cost of farming equipment - especially considering precision agriculture - often proves to be a limiting factor in the application of the best available methods.



(2) - Besides agriculture, the most typical polluting source in the area is municipal wastewater. Improvement of sewage systems is continuously ongoing in the region depending on available funding.

(3) - High water levels and floods can cause problems at certain wells by either flooding the well or polluting its source water.

2.2. Acceptance of BMPs among stakeholders

The first national stakeholder workshop for the PROLINE-CE project was held on June 7th, 2017 in the Conference Centre of Herman Ottó Institute (HOI), in Budapest. The workshop was part of the thematic work package T1: Capitalization: Capacity Building and Stakeholder Engagement.

The aim of the workshop was to present the framework, the objectives and goals of the PROLINE-CE project, as well as the results achieved so far to the participating representatives. As organisers we targeted to reach a broad range of stakeholders in order to gain a good insight into the challenges of drinking water resources protection, thus we invited participants from various domains. Universities, scientific institutes, water management bodies, ministries, national* parks, mayor's offices mainly from those counties where the pilot areas are situated, and NGOs concerned with environment and water protection. The input provided by the target groups is essential in further developing best management practices in land use for drinking water protection and flood/drought mitigation.

After the lunch break the participants returned for the discussion and were asked to discuss the selected topics. The moderated discussion became very lively and different opinions were debated. The discussion was moderated by the representatives of the PP HOI and PP OVF.

The topics were:

- efficiency of legislation on protection of drinking water resources
- vegetation regulations interventions on floodplains (flood risk management)
- draught strategy - effects of irrigation development on water resources
- as a specific discussion theme, the question of agro-forestry was raised, which generated very lively discussions later on, around the end of the workshop.

Items discussed and considered as important to deal with in the continuation of the project:

- In Hungary forests appear as clusters not as land cadastre data
- it would be desirable to turn some agricultural areas into wooded lands
- need for enhancing the adaptation potential is important
- promotion of "Silva pastorata" initiative supporting the regulated grazing in forested areas, even in orchards
- European Union practices are more flexible than Hungarian ones
- greening is an important issue
- need to turn towards a complex landscape utilization



- it is crucial the arrangement of land ownership situation
- use of remote sensing could be an efficient tool
- targeting a water catchment level thinking/approach
- reasonable development of irrigation; not only investments should be done as development, but a reasonable and cost-efficient management is desirable as well.

The 2nd national stakeholder workshop for Danube bend area within the framework of PROLINE-CE project was held on June 05th 2018 at Herman Ottó Institute, in Budapest.

The aim of the workshop was to present the objectives and goals of the PROLINE-CE project for the stakeholders of Danube bend area. The lectures were focused to the environmentally friendly agricultural systems and climate change and its impact on water resources on PA 3.2 Danube bend area. The participants came from the water sector, professional sector and scientific sector.

On the workshop agro-forestry systems was presented. Zsolt Keserű (National Center for Agricultural Research and Innovation) presented the Hungarian examples, pilot areas and potential applications of the systems. Dr. Péter Gergő Kovács introduced good agricultural practices to protect water with new technologies and precision crop production. Dr. István Waltner presented climate change and its impacts on water resources. Adaptation methods and the problems with partially filtered wells was analyzed. In the frame of roundtable discussion, the expert of National Water Management Directorate asked about the foundation system of agroforestry activities, and about licensing procedure and precision crop production. The difficulty of the data collection for climate model and forest grazing was discussed. Everyone agreed that the widest possible dissemination of environmentally friendly agricultural and agro-forestry methods is important from the point of view of drinking water protection.

Following the second workshop, an interview with a representative of the Budapest Waterworks has also been conducted. Project representatives discussed the findings of the workshop and requested comments.

Stakeholders agreed that the application of good agricultural practices in the PA is a key in reducing the risk of potential contamination. Since the selection of nitrate-sensitive zones, farmers have been aware of the required practices to reduce the leaching of N. They are also motivated, since excess N presents itself in the form of increased cost.

However, it has also been pointed out that since most of the water resources in the area are filtered by the Danube bank, the most important factor affecting drinking water quality is the water quality of the Danube itself. Therefore, upstream agricultural practices and other factors (such as effluent sewage, sediment load or floods) may have more significant effect than local agriculture. Farmers working in the area immediately around the wells understand the significance of protecting such wells and generally comply with the regulations.



While the techniques of precision agriculture are promising in further reducing potential risks, there is still a lot of room for improvement, since the price of modern equipment is often a limiting factor in the widespread application of such techniques.

While the positive effects of agroforestry applications have been presented internationally, there is a lack of recent long-term studies conducted in Hungary, due to regulations limiting such land use. However, recent changes in such regulations - including available subsidies - have allowed the re-introduction of agroforestry methods to the land use options available to the wider public. Due to the nature of such applications there is only limited data currently available on the effectiveness of larger scale application of agroforestry methods. There is a particular interest in the use of riparian forests as grazing grounds for animal stocks.

2.3. Overview table about implementation of BMPs in Pilot Action and their acceptance among stakeholders

Table 1: GAs and proposed BMPs with recommendations for implementation in Pilot Action.

Actual management practice (GAP)		Nutrients used in agricultural production infiltrate into the soil causing groundwater contamination	Lack of proper sewerage system
Proposed BMP		Participation in Agro Environment Program	Municipal sewage disinfection
Proposed solutions and recommendations	Adaptation of existing land use management practices	Existing practices can generally be adapted to employ better methods.	Not applicable
	Adaptation of existing flood/drought management practices	There were no clear recommendations.	Not applicable
	Adaptation of policy guidelines	The availability of subsidies act as a main driver for the implementation of such practices. Guidelines can be adapted to not only prohibit certain practices in sensitive areas, but to better encourage sound practices beyond the required minimum.	There are already relevant existing policy guidelines.



IMPLEMENTATION		Yes	Yes
In case of NO:	<ul style="list-style-type: none"> • possibility of implementation 		
	<ul style="list-style-type: none"> • proposal of procedure for implementation 		
	<ul style="list-style-type: none"> • other (please, specify) 		
ACCEPTANCE AMONG STAKEHOLDERS AND EXPERTS			
	<ul style="list-style-type: none"> • possibility of implementation 	Financial aspects significantly limit widespread implementation.	Sewage systems are continuously being improved in the region.
	<ul style="list-style-type: none"> • proposal of procedure for implementation 	Educating farmers about the available methods. Raising awareness. Improving available subsidies and grants.	Increased funding in critical regions could improve results.
	<ul style="list-style-type: none"> • other (please, specify) 	No recommendations	No recommendations

Actual management practice (GAP)		When flood occurs, the river may flood the well structures, or surface water can enter the wells.
Proposed BMP		Ensure the drinking water supply during high water or flood.
Proposed solutions and recommendations	Adaptation of existing land use management practices	Not applicable
	Adaptation of existing flood/drought management practices	Management practices could be applied for better protection of the wells during floods.
	Adaptation of policy guidelines	There are no clear recommendations at present.
IMPLEMENTATION		Yes
In case of NO:	<ul style="list-style-type: none"> • possibility of implementation 	
	<ul style="list-style-type: none"> • proposal of procedure for 	



	implementation	
	• other (please, specify)	
ACCEPTANCE AMONG STAKEHOLDERS AND EXPERTS		
	• possibility of implementation	Location of individual wells is a critical factor, some are easier to protect than others.
	• proposal of procedure for implementation	Implementation can only be done at a local level.
	• other (please, specify)	No recommendations

3. Conclusions

The implementation of the proposed BMPs is partially underway. Better management practices are being used by farmers, particularly in highly sensitive areas. Wastewater treatment is being improved in the region. However, there is still room for improvements, dependent on available funding. The protection of wells during high water or flood events is only a problem in a few specific cases and as such are mostly dealt with on a case-by case basis. Nevertheless, such changes in flood levels might increase the risk of such events and therefore they should not be neglected in the region.

4. References

- Agri-environmental Management - a reference manual to the submission of subsidies applications, developed by the Hungarian Chamber of Agriculture, 2015