PROLINE-CE

WORKPACKAGE T1, ACTIVITY T1.3

D.T1.3.3 LESSONS LEARNT: SYNTHESIS REPORT ABOUT START-UP STAKEHOLDER WORKSHOPS

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1. Introduction

The Deliverable D.T1.3.3 "Lessons learnt: Synthesis report about start-up stakeholder workshops" presents compilation of the results of the seven start-up stakeholder workshops, organized in each PROLINE-CE project partner country (**Fig. 1**), under the framework of the Work Package T1: "Capitalization: Capacity Building and Stakeholder Engagement" as a part of the Activity A.T1.3.: "Identification of strategies and measures to be integrated into existing policy guidelines" coordinated by Croatian Geological Survey (HGI-CGS).
One of the goals of the PROLINE-CE project is identification of strategies and measures that will be integrated into policy guidelines done through intensive key stakeholder involvement.

The workshops were organized during May and June, 2017 by project partners and their associated partners. This represented the first active involvement of stakeholders in the project activities. During the events the current challenges of protection of drinking water resources and protection against floods and droughts through integrated land-use management were presented, as well as examples of best management practices in water management and flood mitigation.

The involvement of authorities, experts and decision makers has resulted with the identification of current gaps that occur in their specific daily operations. Their feedback is essential for the development of further strategies and approach to the issues at hand. The workshops objectives were to start interdisciplinary discussion between stakeholders through joint communication.

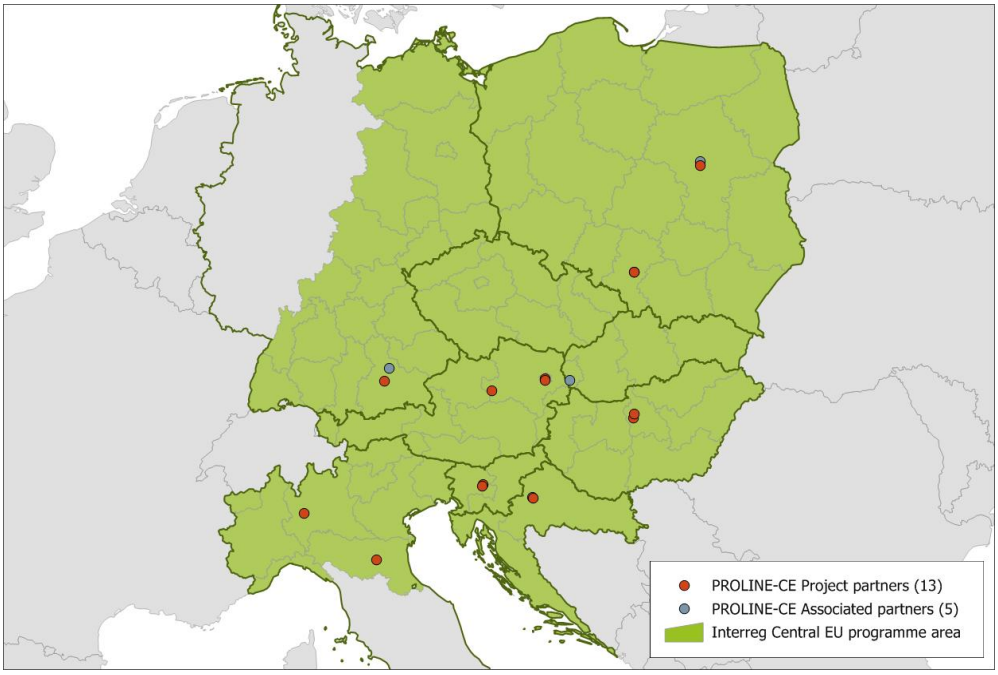


Figure 1. Map of the partner countries (PROLINE-CE web platform)[1]

This report is compiled based on the inputs from the seven national workshops provided by the project partners.

2. Dates, venues and participants of the workshops

The main organizational data on the held national workshops, such as dates, locations and partners involved, along with the total number of attending participants can be seen in the **Table 1**. The number of participants refers to every participating expert, which includes professionals from partner institutions that cannot be counted as stakeholders. The organizational staff of the PROLINE-CE team are not included in the number of participants.

Table 1. List of the workshops

Location	Venue	Date	Responsible project partner + Supporting partner(s)+ Associated partner(s)	Number of participants
Austria, Vienna	"Alte Schieberkammer" Vienna Waters	31.05.2017.	Municipality of the City of Vienna - Vienna Water (MA31) Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) Municipality of Waidhofen/Ybbs (MWY)	16
Croatia, Zagreb	Croatian waters	12.06.2017.	Croatian Geological Survey (HGI-CGS) Croatian waters	24
Germany, Munich	Technical University of Munich	03.05.2017.	Technical University of Munich (HRBM)	17
Hungary, Budapest	Conference Centre of Herman Ottó Institute	07.06.2017.	Herman Otto Institute (HOI) General Directorate of Water Management (OVF)	18
Italy, Rovigo	Fondazione Ca' Vendramin	16.05.2017.	Euro-Mediterranean Centre on Climate Change Foundation (CMCC) Regional Agency for Prevention, Environment and Energy in Emilia-Romagna (ARPAE)	33
Poland, Katowice	Silesian Waterworks PLC	24.05.2017.	Silesian Waterworks PLC (GPW) National Water Management Authority (KZGW) Regional Water Management Board (Warsaw, Cracow, Gliwice, Gdansk, Wroclaw, Szczecin, Poznan) University of Silesia in Katowice	53
Slovenia, Ljubljana	JP Vodovod-Kanalizacija d.o.o.	18.05.2017.	JP Vodovod Kanalizacija d.o.o. (JP VO-KA) University of Ljubljana (UL)	30
			TOTAL	191

Concerning the reached target groups, some of the attending stakeholders were related to the pilot action areas of the project countries whether through their activity or expressed interest (**Table 2**), whereas some of the attending stakeholders were from national (state) ministries and agencies and/or their regional offices.

In **Table 2** the list and the number of attending institutions which represent target groups of the Start-up national stakeholder workshops is shown. It should be pointed out that the departments from larger institutions were counted as one target group.

Table 2 also includes the category of overall target group value that the project aims to actively involve. The target group category "Other" was present on the workshops in Croatia, Hungary, Italy and Poland. The category entails national park administrations, various services such as agro-meteorological, hydrographical, hydrogeological and hydrometeorological.

The number of stakeholders exceeded their targeted value in the following categories: regional and national public authority, infrastructure and public service provider, as well as in the category "Other", which includes meteorological services and medical laboratories (**Table 2**). This indicates a high interest rate among the relevant groups and is a positive input for developing further strategies. Graphical presentation of the percentage of participating stakeholders per target group is depicted in the **Figure 2**.

Table 2. Number of various stakeholder groups on all seven national workshops

Target groups	Specification of target groups	Number of stakeholders	Number of target groups	Overall target group value
Local public authority	Forest management of the city of Vienna MA 49 (1), City of Waidhofen/Ybbs (1), City of Zagreb-City office for energetics, environment protection and sustainable development (1), Munich communal company (1), German water supply association of the Harpfing Group (1) and Freising-Süd (1), Municipal administration in Neufahrn bei Freising, Germany (1), SPD Munich - department of Environment and Energy (1), Budapest VIII. district Mayor's Office - environment protection officer (1), Head Gardener of the City of Nyiregyhaza (1), Polish District office in Tarnowskich Gorach (1), City government office of Tarnowskich Gorach (1), Polish office of City Chorzow (1), Slovenian municipality Cerklje na Gorenjskem (1), Slovenian municipality Škofja Loka (1), City of Ljubljana - Department for Environmental Protection (1)	16	16	32
Regional public authority	Upper Austria Federal Government (1), Lower Austria Federal Government (6), Croatian counties representatives - Sisak-Moslavina county (1) and Dubrovnik-Neretva county (1), Bavarian State Office for the Environment (1), Italian Regional agency for the prevention and environmental protection of Veneto (2), Italian Regional administration Emilia-Romagna (1), Polish Geological Survey (1), Regional Directorate of State Forests in Katowice (3), Polish Regional Fund for Environmental Protection and Water Management (2)	19	10	18
National public authority	Croatian Ministry of Environment and Energy (3), Bavarian State Agency for Agriculture (1), Hungarian Army Chemical Protection and Information Center (1), Hungarian Ministry of Agriculture (3), Slovenian inspectorate for the environment and spatial planning (2), Slovenian Environment Agency (5), Institute of the Republic of Slovenia for Nature Conservation (1), Slovenian Water Agency (4)	20	8	16
Infrastructure and (public) service provider	Croatian Water supply Zagreb Ltd. (1), Croatian Water supply Source Ploče (1), Croatian VG water supply (1), Polish water supply representatives - Ruda Slaski (1), Dabrowa Gornicza (2), Gliwice (3), Żory (1), and Chrzanow (2), Polish sanitary-epidemiological inspection (6), Slovenian communal and construction company from Krško-Kostak d.d. (1), Slovenian water utility Kranj (1), Public utility company Domžale (1)	21	8	12
Higher education and research	Technical University Vienna (1), Austrian Federal research institution for Forests (2), University of Life Science Vienna (1), Croatian Faculty of Agriculture (1), Meteorological and hydrological service of Croatia (3), Croatian research institute OIKON Ltd. (2), IRES ecology (3) and Green infrastructure Ltd. (1), Ludwig-Maximilian University Munich (2), National Hungarian Agricultural Research and Innovation Centre (1), Debrecen University - Water and Environment Management Institute (1), Szent Istvan University - Department of Agriculture (2), University of Bologna (1), University of Trento (1), Fondazione Ca'Vendramin research institute (1), Ca'Foscari University of Venice (1), Institute of Environmental protection - National Research Institute Warsaw (1), Slovenian ecological engineering Institute Ltd. (1), Urban spatial planning institute of Ljubljana (1), Slovenian Geological Survey (1)	28	20	21
Interest groups including NGOs	Vienna Business Agency (1), Austrian Association for Gas and Water (1), Croatian water course protection association SLAP (1), Bavarian Farmers' Association (4), Hungarian Climatological Association (1), Italian Nautica Torricella Association (1), Italian voluntary ecological group G.E.L.A. Guardie ecologiche (1), Global water partnership Central and Eastern Europe (1) , Global water partnership - Slovenia (1)	12	8	18
General public	Italian journalist for La voce di Rovigo (1) and Il Gazettino (1)	2	2	7500
Other	Prisma Solutions consulting organisation (2), Terra Compacta Ltd. (1), Aqua Kem Ltd.(1), Bavarian farmers (1),SEBA Hydrometrie Ltd. Germany (1), Bavarian field seeds producer (1), Planning office ECOZEPT (1), Hungarian VTK Innosystem - Nature, water and envionmental protection Ltd. (1), Italian regional council Aipo (8), Po River Basin Authority (2), Reclamation Consortium of the River Po (1), Polish Medical laboratory JARS Sp. z.o.o. (13), Integraph Polska Sp. - provider of software for environmental analysis (1), Slovenian consulting group IRGO in engineering, hydrology and environment protection (1)	35	14	10
	TOTAL	153	86	

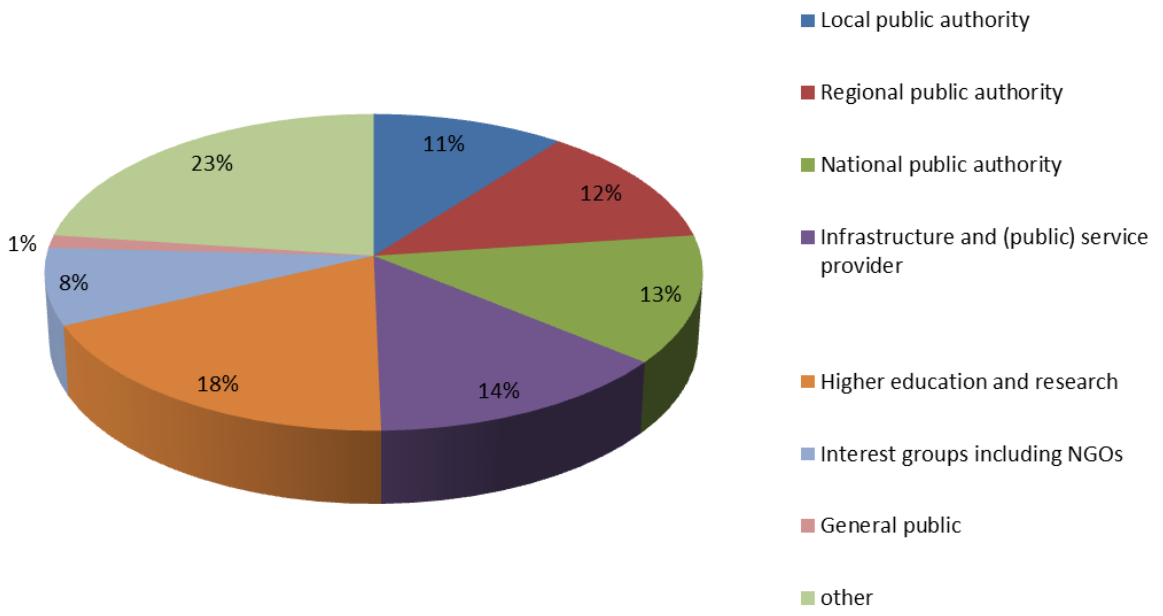


Figure 2. Stakeholders reached during the workshops

From the **Figure 2**, it is visible that the distribution of stakeholders is generally even, ranging from 8 % to 23 %, except for the category "General public", which was only present in Italy via journalists from renowned newspapers (1%). The highest range of participating stakeholders was from the higher education and research (18%), followed by Infractructure and (public) service providers (14%), and 13% of national public authority, while regional authority constituted 12%. Local public authority was present with 11%, and Interest groups with 8% of the stakeholders present. Even though the category "Other" has the largest participation rates, it is not pointed out due to its marginal impact on the project implementation. The category is constituted of various services (meteorological, hydrological, hydrometeorological) and smaller organizations that have expressed their interest in the topics discussed on the workshops, but cannot contribute in a significant manner. It is interesting to note that among the services present, the greatest group was a Polish medical laboratory JARS Sp. Z.o.o. with 8.5% followed by A.I.Po Italian interregional agency for the catchment area of the River Po with 5%.

The **Figure 3** shows the percentage of target groups i.e. number of institutions that attended the workshop. The higher education and research is the largest participating category with 23%, while the local public authority was present with 19%. The representatives from the institutions that belong within these categories represented the majority of the target groups that took part in the event. The regional public authority was present with 12%, while the national public authority, the infrastructure service providers and interest groups share the 9%. General public is represented with 2%. The category "Other" with 16% demonstrated the public interest in the topics argued on the workshops.

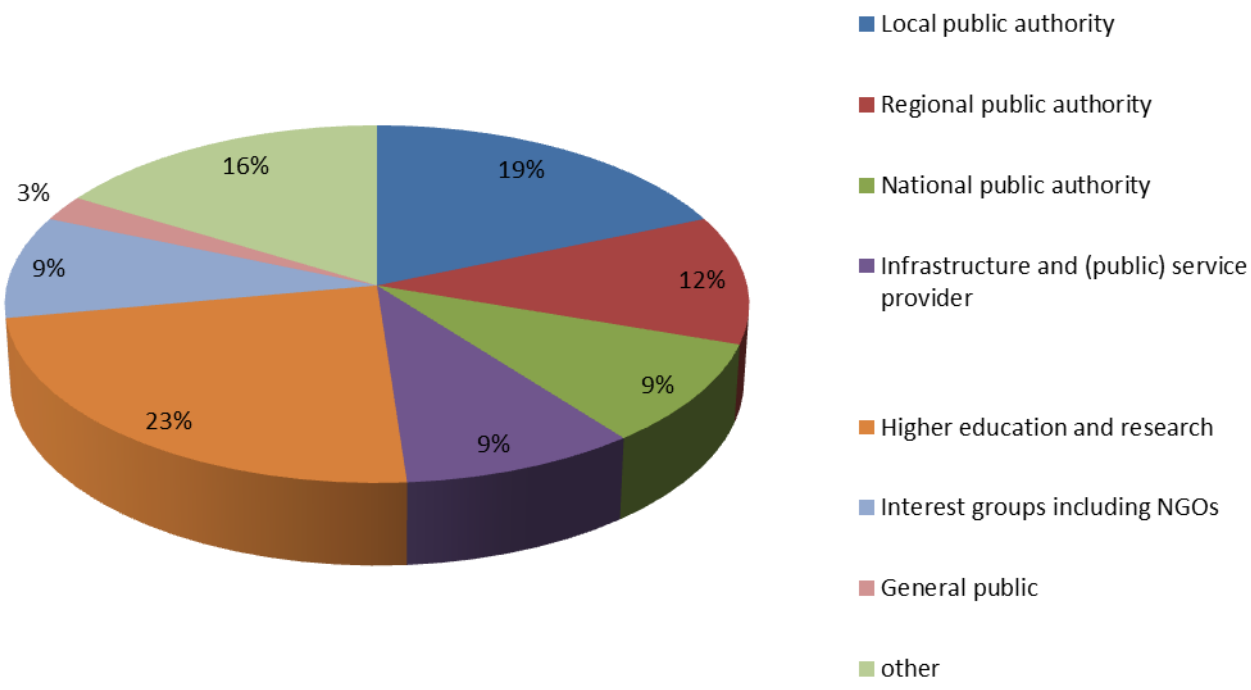


Figure 3. Percentage of target groups (institutions) that attended the Start-up national stakeholder workshops

Stakeholders represent individual participants who have professional interest or experience related to PROLINE-CE topics (e.g. public water suppliers, agronomers, planners and consultants, foresters, hydrologists).

Target groups represent clusters of institutions, thematically organised as seen above in **Fig.3**, such as ministries, authorities, universities, institutes, public utilities, NGOs, laboratories and consultant offices.

2.1. Organization of the workshops

The workshops were divided into two parts:

- The PROLINE-CE objectives presentation
  - > a general presentation of the project
  - > capacity building presentations from the experts;
- An interactive dialogue with stakeholders in order to collect feedback on different aspects of protection of water resources, land-use management and flood protection (focusing on non-structural measures);

At the end of the event a feedback questionnaire was distributed to workshop participants in order to gather the input from the attending participants that will benefit future workshops. In some project partner countries, the members of the associated and supporting partner institutions filled out the feedback questionnaires (**Table 4**). The survey form contained questions regarding the satisfaction rate of the stakeholders in respect with the organization, relevance of the topics discussed, the increase of each individual's knowledge base as well as their introduction to the PROLINE-CE activities. And to offer their ideas how to further improve such a workshop in the months to come.

In the first part of the workshop, the target groups were informed by the project partners on the main objectives of the PROLINE-CE project. In this way the target groups were given the insight of the main project activities, existing best practices and mechanisms of implementing new best management practices. Furthermore, this helped to raise the awareness of the participators on the current problems in land-use and flood management related to drinking water protection.

Flood risk management, as the second part presented within the workshops, encompassed the best management practices in flood protection as well as all the existing policies, strategies and action plans in the project partner country, respectively. Positive and negative management practices were also presented in order to give good examples to the stakeholders. The various non-structural methods were emphasized as being vital to good management practice.

After these presentations, different field experts displayed the significant issues that are occurring in the water and land-use management sectors which impede the effective legislation implementation and sustainable development. Their aim was to familiarize the participants with the current gaps and proposed policy recommendations which prompted further dialogue. The experts covered the topics of the existing national water policies, strategies and action plans regarding drinking water protection in comparison with the EU regulations. Moreover, the participants have been informed about the non-structural measures in the country.

Table 3. List of lecturers and presentations held on project partner workshops

PP	Lecturers	Presentation titles
Austria	PhD Wolfgang Zerobin	Welcome speech
	MSc. Hubert Siegel	General information regarding the project
	MSc. Markus Hochleitner	Pilot Area Waidhofen/Ybbs
	PhD Gerhard Kuschnig	Pilot Area "Vienna Water"
	PhD Christian Steiner	Soil protection and function of soil
	PhD Roland Köck	Forestry – Climate Change and Drinking Water Protection
	PhD Georg Frank	Forest and Biodiversity
Croatia	PhD Josip Terzić	Introductory project information
	MSc. Želimir Pekaš	Challenges in drinking water resource management
	PhD Marina Bubalo Kovačić	Influence of agriculture on groundwater
	Prof. Vladimir Kušan, PhD	Land use and drinking water
Germany	Prof. Markus Disse, PhD	Modelling strategies for an integrated drinking water and flood protection
	MSc. Daniel Bittner	Best Management Practices for an integrated drinking water and flood protection
Hungary	PhD András Béres	Welcome speech
	MSc. Mihály Végh	Innovative approach to the effective protection of drinking water supply
	MSc. Mátyás Prommer	International overview of best practices
	MSc. Ágnes Tahy	Presentation on workshop discussion themes
	PhD Attila Borovics	Agro-forestry as a new approach to agricultural production, water resources protection and nature conservation
Italy	PhD Lino Tosini	Welcome speech
	PhD Guido Rianna and PhD Silvia Torresan	Introductory project information
	PhD Francesco Puma	Po Basin Water Balance Plan and Water Uses Observatory
	PhD Silvano Pecora	Low flow monitoring and forecast supporting water resources management in the Po river basin performed by ARPAE
	PhD Claudia Vezzani	Drough Management Plan and Drought Impact Monitoring System
Poland	MSc. Mirosław Szemla	Welcome speech
	MSc. Joanna Czekaj	Planned activities, expected results and progress of the PROLINE-CE project
	MSc. Norbert Jaźwiński	Challenges related to land use in the context of protection of water resources
	MSc. Andrzej Siudy	Water management in tanks managed by the Upper Silesian Waterworks Company in the light of the water management

		instructions in force
	MSc. Joanna Czekaj	Best practices implemented in the Kozlowa Góra reservoir catchment
Slovenia	MSc. Nataša Šušteršič	Welcome speech
	MSc. Suzana Stražar	Integration of PROLINE-CE project topics into the Slovenian Water Agency mission
	MSc. Alja Grošelj	Establishment, development and management of Tivoli, Rožnik and Šišenski hill Landscape Park (Pilot Action)
	PhD Barbara Čenčur Curk	PROLINE-CE project general presentation
	MSc. Branka Bračič Železnik	The challenges of drinking water resources protection from the point of view of land use case of Ljubljana and Dravlje valley pilot action
	PhD Primož Banovec	Flood hazard and measures in Slovenia

In the second part of the workshop, a dynamic discussion was performed that involved all attendees. Austria, Croatia, Germany and Slovenia had a carousel panel discussion with rotating posts, while Hungary, Poland and Italy opted for sessions with one coordinator proposing the problems at hand and steering the debate. The discussed issues and proposed measures were written down and processed in the project partner workshop reports.

The stakeholder inputs coupled with relevant administration levels contributed to the improvement of the knowledge base of drinking water protection strategies in land-use management. Without the local and regional authority, as well as institutions in higher education and research, the implementation of proposed measures would be impossible. A strong stakeholder involvement will disseminate results by existing networks on a national, transnational and EU-level and support further developments on the topic.

3. Summary of workshop presentations

3.1. Water management vs. land use

3.1.1. Austria

After the introductory words by the Head of the Vienna Water and the Lead Partner representative MSc. Hubert Siegel (**Fig. 3**) regarding the project, MSc. Markus Hochleitner provided the stakeholders with general information on the pilot area of Waidhofen/Ybbs: location, catchment area, type of soils, water regime. He introduced the "Forest Hydrotope Model" as well and its effects on the "Water-Forest-Household". He presented the impacts caused through climate change and transition in the catchment area. Among other, he demanded stable forests, regulation of the game stock, small-scale forest use and restricted road construction. Furthermore, collaboration with the forest owners would be essential.

PhD Gerhard Kuschnig from Vienna Waters introduced the general facts and information for the pilot area of Vienna Waters that included the height distribution, geology, land use, hydrology etc. He emphasized that the land use activities pose potential risks of hazards.

PhD Christian Steiner from the Office of the Provincial Government of Lower Austria explained the basis of existence and functions of soils, potential hazards and activities for protection. He also referred to the EUSDR Strategy for the Danube Region regarding the four Pillars and EUSALP.

PhD Roland Köck from the Institute of silviculture explained impacts on forests and water, how forests can protect water resources and best practices for water protection. He also presented protected areas in Austria and explained the criteria for protecting drinking water and avoiding floods. Furthermore, the "Forest-Hydrotope-Model" was presented as a basis for "best practice".

PhD Georg Frank from the Federal Research and Training Centre for Forests, Natural Hazards and Landscape provided the participants with an engaged presentation concerning the topic forest and biodiversity and its dependencies.

Figure 3. Lead Partner representative presentations and welcome speech in Austria

3.1.2. Croatia

PhD Josip Terzić, Head of the Department of Hydrology and Engineering Geology of the Croatian Geological Survey, introduced the project and its objectives.

MSc. Želimir Pekaš from Croatian Waters, who works in water management, outlined the current issues in drinking water protection, explained the difficulties of syncing national legislation with the European one, gave a risk assessment and announced the planned activities for groundwater protection (**Fig. 4**). The results of detailed chemical analyses were presented and the risks connected to the decline of water quality. Drinking water spring protection zones were depicted on the state map showing a very graphic portrayal of the unsatisfactory degree of preservation on a national level.

PhD Marina Bubalo Kovačić, a postdoctoral researcher from the Faculty of Agriculture who specialized in melioration and water management, analysed the impact of various contaminants on water resources, mentioned the project of national groundwater quality monitoring and the locations of sampling. The presentation included the maps of land use in regards to agriculture, pesticides and fertilizers used for individual crops and maps of aquifer and soil vulnerability.

Figure 4. Presentations of (a) MSc. Pekaš and (b) Prof. Kušan, PhD on the Croatia workshop in the Croatian Water headquarters

Prof. Vladimir Kušan, PhD from OIKON Ltd. who lectured on the Faculty of Forestry and Faculty of Agriculture and is a GIS expert, illustrated the complication with conflicting land use data, demonstrated various models of water retention in regards to the land use and how evapotranspiration and filtration vary depending on the degree of urbanization.

3.1.3. Germany

Prof. Markus Disse, PhD Head of the chair Hydrology and River Basin Management at the Technical University of Munich discussed the importance of processed modelling of the local flood protection measures. He dissected the procedure starting from the impact of land use on the soil characteristics which should be monitored and analysed regularly, up to the installation of the

measuring technology and the computation behind it. The results showed expected high waters for various land-use types. It raised an interesting dialogue during the discussion (**Fig. 5 and 6**).

Figure 5. Stakeholder panel discussion during the Germany workshop

MSc. Daniel Bittner from the Department of Civil, Geo and Environmental Engineering on the Technical University of Munich introduced the best management practices for an integrated approach to drinking water and flood protection. The best land-use practices in agriculture and forestry were mentioned. SWOT analysis was also present, illustrating the positive communication between the land owners and water suppliers, the obligation for compensation measures that stimulates good cooperation between the involved parties, the ever growing awareness in the public and the expansion of drinking water protection zones, just to name a few.

Figure 6. Start-up stakeholder workshop in Germany, the panel discussion

3.1.4. Hungary

MSc. Mátyás Prommer, policy officer of the Herman Ottó Institute in Budapest (HOI), presented an overview of best practices which included:

- protection of drinking water resources by international cooperation,
- the existence of a demand for developing “multi-functional forest” in EU,
- the need for further legislation and additional conservation efforts in grassland management, focussing on ecosystem services aspects and adequately financed projects for regional cooperation efforts,
- the need for a strong transnational regulation in wetland management,
- mentioning a trend in management of agricultural areas, turning towards ecological services and for finding new innovative tools for drinking water resource protection.

MSc. Ágnes Tahy, a representative from the General Directorate of Water Management (OVF) in Budapest, offered her input in efficiency of legislation on protection of drinking water resources, vegetation regulations interventions on floodplains (flood risk management) and drought strategy – effects of irrigation development on water resources. Furthermore, the question of agro-forestry was raised which engaged the attendees in a lively discussion afterwards.

PhD Attila Borovics, Forestry Science Institute, spoke of agro-forestry practices as a new approach to agricultural production, water resources protection and nature conservation. He discussed the potential of new/old role of trees within the agriculture for protection, increase of biodiversity, creation of favourable micro-climatic conditions and many more (**Fig. 7**). The newfound popularity of agro-forestry was mentioned, using natural resources in a sustainable way, generating new sources of income and else. Due to all of that, one of the most urgent tasks is to bring in harmony the objectives of forestry, water management and nature conservation.

Figure 7. Lectures by (a) PhD Attila Borovics and (b) MSc. Agnes Tahy on agro-forestry and flood risk management on the workshop in Hungary

3.1.5. Italy

Secretary-General of Po River Basin Authority, PhD Francesco Puma, introduced the Po basin Water Balance Plan approved in December 2016, highlighting that it is based on the following principles: information, cooperation (f.e. between Regions and Central Government), stakeholder involvement and quantitative protection of water resources. In this perspective, these principles represent an innovative approach for Italy in an attempt to reach shared solutions through participatory decision processes and to reduce current gaps. Such approach has been implemented by establishing the National Permanent Observatory Network on water uses that aims to strengthen cooperation and dialogue among relevant parties and promote sustainable use of the resource, as well as actions needed for the proactive management of drought events. It brings together public and private authorities at different levels including authorities for irrigation and drinking water, reclamation consortia and energy-managing bodies. Activities and meetings of the Observatory are strictly linked to water availability conditions acting as the "Steering Committee" for hydrological and water resources monitoring and forecasting during water crisis.

Afterwards, PhD Silvano Pecora (ARPAE Emilia Romagna) provided an exhaustive frame about the Low flow monitoring and forecast supporting water resources management in the Po river basin performed by ARPAE (**Fig. 8**); he highlighted the key role of proper monitoring and predictive activities to clearly retrieve actual conditions and deal with future challenges on short and long term horizons. The presentation covered meteorological forecasts (monthly, seasonal forecasts), hydrological low flow forecasts, hydrological and water balance models, hydrological frequency analysis and indexes SPI/SFI, available water resources computation, discharge and water level monitoring and measures, saltwater intrusion and snow cover. Those topics tended to point out the extreme complexity characterizing the Po river basin.

Figure 8. Presentations on water resource management of the Po River Basin on the Italian stakeholder workshop

3.1.6. Poland

MSc. Norbert Jaźwiński (coordinator of the project for the KZGW), who presented the current state of water management in the country and the results of SWOT analysis of water management in the presentation titled "Challenges related to land use in the context of protection of water resources".

MSc. Andrzej Siudy, the head of Kozłowa Góra and Goczałkowice, administered by the GPW S.A. presented an extremely interesting presentation titled „Water management in tanks managed by the Upper Silesian Waterworks Company in the light of the water management instructions in force", in which, based on examples of existing flood events, pointed out the need for rigid flood management instructions.

MSc. Joanna Czekaj, a research assistant at the University of Silesia offered a review of the current best practices in land use management in the context of the protection of the water resources in the Pilot Area - Kozłowa Góra reservoir basin, from the source of the Brynica River to the dam section. Analysis of the available documents has highlighted the lack of regulation on good practices in forest management in the context of the protection of the aquatic environment (**Fig. 9**).

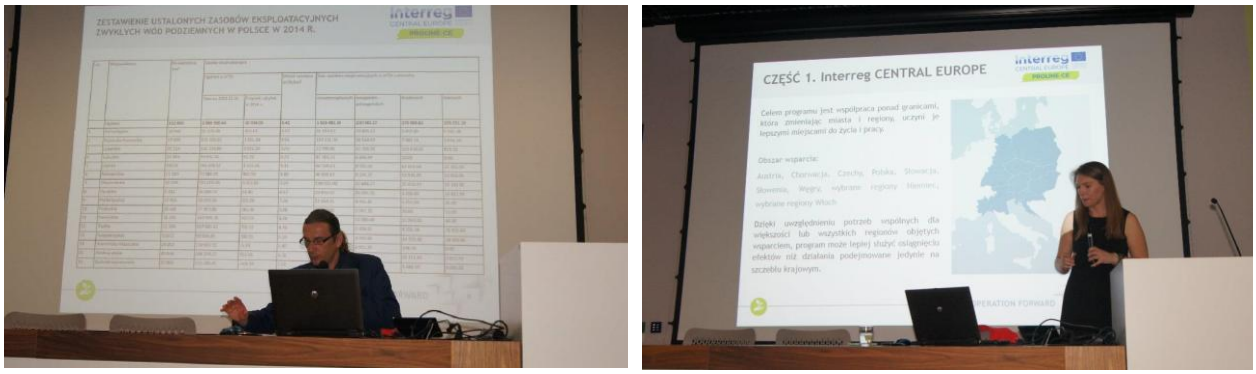


Figure 9. Presentations by Norbert Jaźwiński and Joanna Czekaj during the stakeholder workshop in Poland

3.1.7. Slovenia

After the welcome from MSc. Nataša Šušteršič from the Research department of Public water utility JP Vodovod-kanalizacija Ljubljana and a speech regarding the project's integration with the Agency's mission by Suzana Stražar from the Slovenian Water Agency, a presentation from Alja Grošelj from the Institute of the Republic of Slovenia for Nature Conservation presented establishment, development and management of Tivoli, Rožnik and Šišenski hill Landscape Park, which is a part of the Slovenian Pilot Action. PhD Barbara Čenčur Curk from the University of Ljubljana offered the general presentation of PROLINE-CE project and its first results (**Fig. 10**), followed by the lecture from MSc. Branka Bračič Železnik of Public water utility JP Vodovod-kanalizacija Ljubljana that presented the challenges of drinking water resources protection from

the point of view of land use management for the case of Ljubljana and Dravlje valley pilot action.

Figure 10. Presentations of (a) MSc. Suzana Stražar and (b) PhD Barbara Čenčur Curk during the Slovenian stakeholder workshop

Overview of water management vs. land use

The majority of the project partners stressed out the difficulties between water and flood mitigation and land-use management, the disproportion in the implemented measures and issues with drinking water protection zones. Some countries, such as Austria and Hungary, offered innovative ideas in the topic of forest management, promoting forest hydrotope models and agro-forestry. Germany and Poland were more flood oriented and discussed numerical models of flood protection zones and the need for stricter flood management regulations. Slovenia and Italy considered their pilot action areas extensively, focusing on implementation of best management practices on a local level to develop their strategies for a nationwide initiative. Croatia, Hungary and Slovenia have issues with excessive and unmonitored pesticide and fertilizer use in agriculture that pose a great risk to the water quality. Stricter regulations are needed to stop this trend. Overall, the presentations covered national strengths and difficulties that are waiting to be dealt with.

3.2. Flood and drought risk management

In recent years, floods events severely affected communities in CE domain; in this regard, the frequency and magnitude of such events could be amplified under the effect of variation in rainfall patterns induced by climate changes.

Adequate strategies, legislation and adaptive measures must be implemented, as well as public awareness needs to be raised in order to deal with this natural phenomenon.

Only few project partners covered this issue with expert lectures. It is interesting to note that the countries that included flood risk management were the ones that had problems with the said issue as of late.

3.2.1. Croatia

Prof. Vladimir Kušan, PhD (OIKON Ltd.) spoke of the torrent flood problem in urban areas and how bad land-use practices influence this hazard in particular. He mentioned a successful UK project that deals with the importance of permeable surfaces in cities and a great example of good rainwater management legislative in Germany as positive practices.

3.2.2. Italy

PhD Claudia Vezzani (Po River Hydrographic District Authority) focused the attention on the Water Balance Plan, included in the District Management Plan, and on two relevant tools developed within the Water Balance Plan itself: Drought Management Plan and Drought Impact Monitoring System. Regarding the former, first of all the perspective change has been emphasized, moving from a reactive (crisis management) to a proactive (risk management) attitude in attempting to make the entire system regulating water resources in the River Basin more resilient. Then the different alerting levels corresponding to different operational phases have been introduced in the Drought management Plan. Finally the Drought Impact Monitoring System has been discussed, a tool to survey and represent in a systematic way, at the district scale, impacts associated with the different severity levels connected with river flow values. River flow values and induced impacts along the river course are assessed recurring to expert elicitation and strong involvement of stakeholders. In particular, the approach proposed by Nebraska Western Drought Coordination Council consisting of six phases (identification of the main actors, consequences evaluation, impacts prioritization, retrieving causes, assessing and ranking protection measurements) has been considered. Of course, impacts/values and counter measurements are strongly related to local geomorphological ecological and socio-economical context.

3.2.3. Slovenia

Flood hazard and measures in Slovenia were presented by PhD Primož Banovec from the Faculty of Civil Engineering and Geodesy in Ljubljana. Some flood protection measures might induce dramatical changes in groundwater level and flow including infiltration capacity. With the development of flood protection measures the groundwater interactions should be addressed thoroughly. In case of drinking water use during flood events, special safety levels of electrical installations are of critical importance. Quite regularly it could be observed that, especially small water courses are covered and narrowed on the benefits of other uses (traffic, houses etc.).

Overview of flood risk management

Due to the PROLINE-CE project goals, protection against floods is a key issue and should be addressed and discussed with relevant stakeholders on project specific events, especially those related to the pilot areas that are prone to flood hazard. In regards to present-day climate change, flooding events may occur in areas that weren't previously vulnerable, therefore the need for evaluation of non-structural measures with important decision makers and general public is imperative. This subject is vital for further strategies development and improved implementation

of management practices related to flood mitigation, so it should be included in future project workshops.

4. Summary of issues explored during stakeholder discussions

The second objective of the workshops was to obtain feedback from the participating stakeholders addressing the issues which are relevant on a national level which demonstrate their experience and professional background.

This chapter summarizes problems regarding (a) general management topics, (b) water management, (c) land use and (d) flood mitigation that have been recognized by stakeholders.

(a) Problems regarding **general management** topics are mostly administrative in nature and although the overall situation cannot be described as bad (mainly due to legal acquis of the EU), further efforts must be directed in order to:

- Increase public awareness about importance of drinking water resources protection
- Increase communication efforts and stimulate two-way communication between public authorities and general public
- Improve legislation, policies and laws in accordance with present day and future challenges
- Address the climate changes and their impact on water resources
- Stimulate good management practices and penalize bad management practices
- Apply international best management practices and use existing knowledge or methodology
- Enhance adaptation potential and incorporate more flexible practices
- Promote education on environmental and ecological topics, focusing on long term sustainability and protection of natural resources
- Enforce stricter controls and sanctions (e.g. agriculture, industry, forestry)

Many stakeholders have concluded that in order to achieve positive progress in case of the above mentioned issues, systematic and long term approach must be fostered. Furthermore, it is common that due to the lack of strong political determination, engagement of community and clear development strategies, progress is substantially impaired.

(b) When considering the most significant problems in scope of **water management**, stakeholders have identified numerous issues - some are country-specific while some are recognized as a global threat to water resources such as pressures depicted in **Fig. 11**.

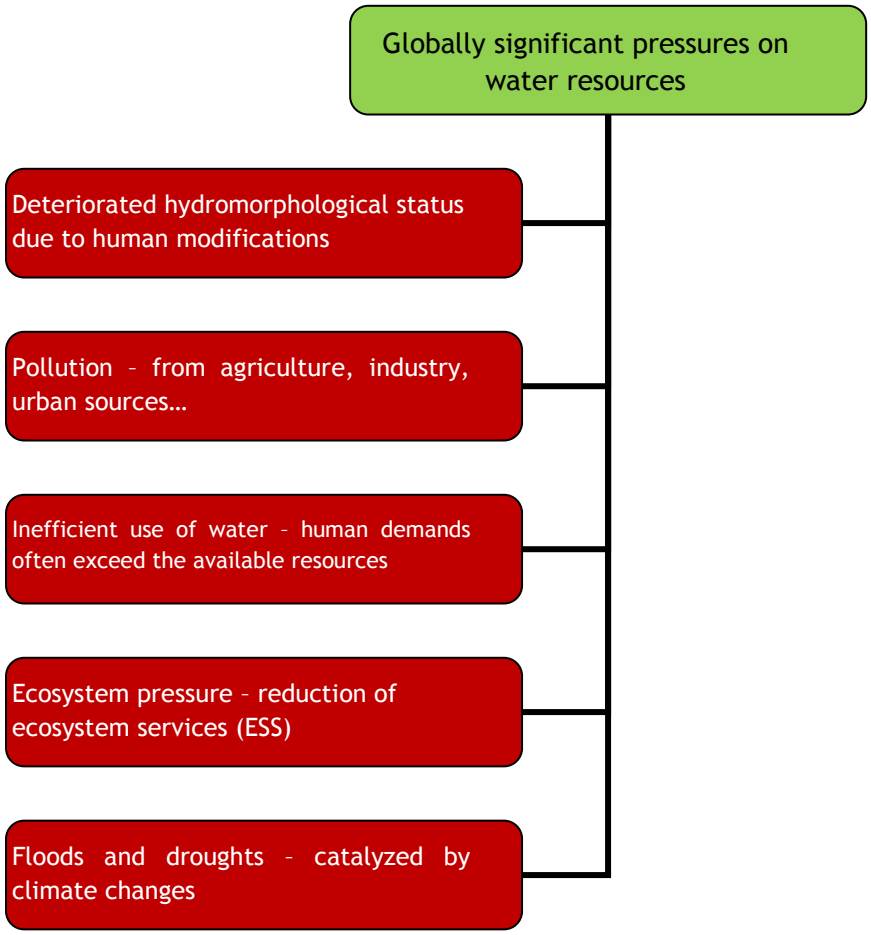
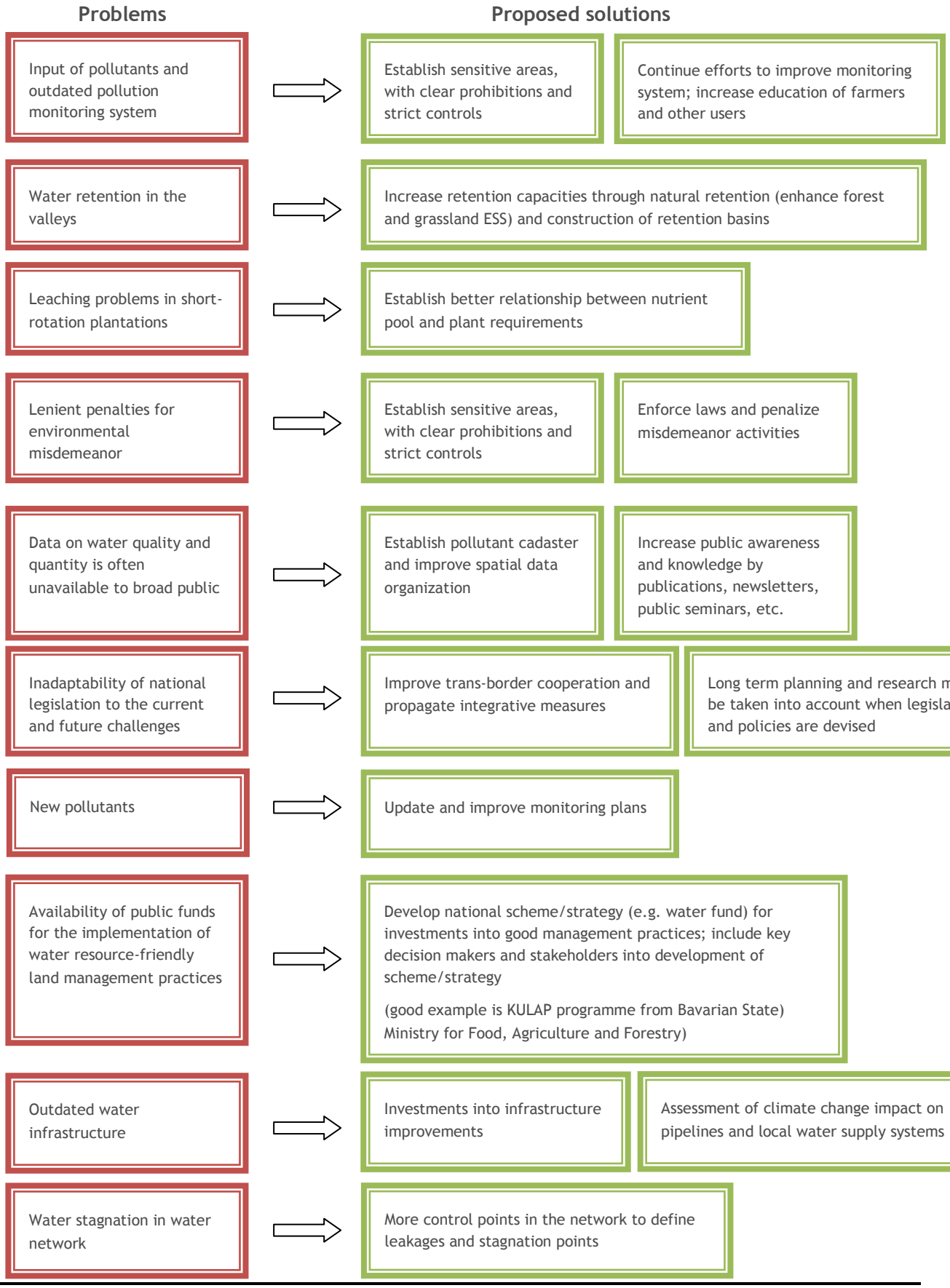


Figure 11. Globally recognized pressures on water resources

During the national stakeholder workshops, country-specific problems and issues have been presented and discussed. It is necessary to point out that some of the country-specific problems and responses may apply to other countries as well, regardless of not being reported or articulated during workshops. Therefore, a general overview is given for all PROLINE-CE partner countries.

Figure 12 summarizes problems in water management and proposed solutions, as identified by stakeholders during national workshops. In order to effectively improve water management, it is necessary to combine proposed solutions (**Fig. 12**) with best management practices – using efficient and good examples of problem-specific solutions that have strong scientific basis and have been tested and proven in real scenarios.


Problems
Proposed solutions
Input of pollutants and outdated pollution monitoring system
Establish sensitive areas, with clear prohibitions and strict controls
Continue efforts to improve monitoring system; increase education of farmers and other users
Water retention in the valleys
Increase retention capacities through natural retention (enhance forest and grassland ESS) and construction of retention basins
Leaching problems in short-rotation plantations
Establish better relationship between nutrient pool and plant requirements
Lenient penalties for environmental misdemeanor
Establish sensitive areas, with clear prohibitions and strict controls
Enforce laws and penalize misdemeanor activities
Data on water quality and quantity is often unavailable to broad public
Establish pollutant cadaster and improve spatial data organization
Increase public awareness and knowledge by publications, newsletters, public seminars, etc.
Inadaptability of national legislation to the current and future challenges
Improve trans-border cooperation and propagate integrative measures
Long term planning and research must be taken into account when legislation and policies are devised
New pollutants
Update and improve monitoring plans
Availability of public funds for the implementation of water resource-friendly land management practices
Develop national scheme/strategy (e.g. water fund) for investments into good management practices; include key decision makers and stakeholders into development of scheme/strategy
(good example is KULAP programme from Bavarian State) Ministry for Food, Agriculture and Forestry)
Outdated water infrastructure
Investments into infrastructure improvements
Assessment of climate change impact on pipelines and local water supply systems
Water stagnation in water network
More control points in the network to define leakages and stagnation points

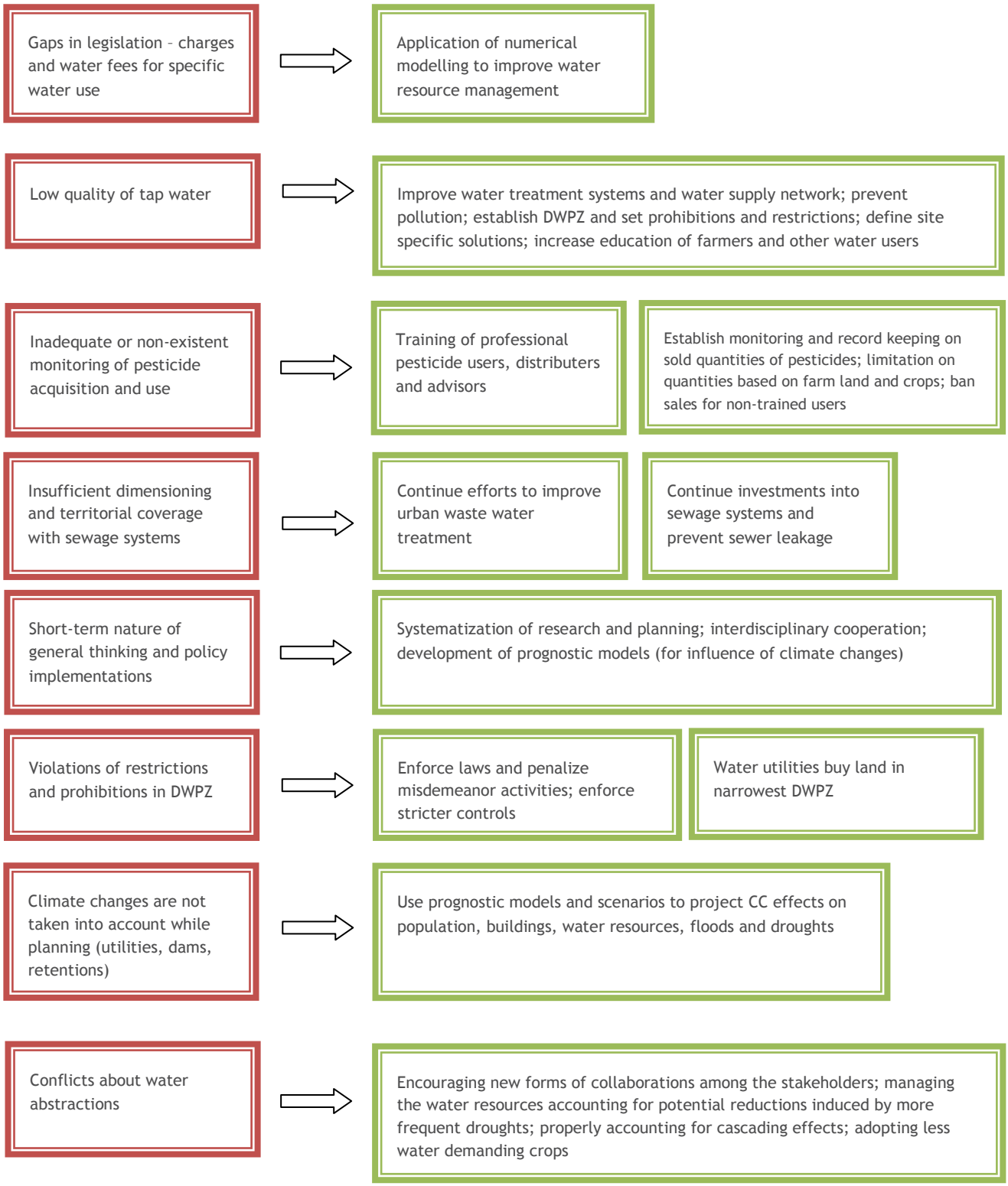


Figure 12. Scheme of problems in water management (red) and proposed solutions (green), as identified by stakeholders during national workshops

Since PROLINE-CE project partner countries have many common problems related to water management, transnational dissemination of experiences and best management practices is a good way to address many sectoral problems. Interesting point was made during Slovenian workshop – despite new knowledges and technologies, stakeholders gave priority to conservative protection of water resources in a way that it protects the area and does not involve new activities, which could affect drinking water sources. Furthermore, balanced approach related to balanced protection and use of water resources should be applied. Overprotection might impede development, while under protection might affect sustainable development and deplete resources.

(c) Another important topic during stakeholders' workshops was **land use**, especially conflicts between particular type of land use (mainly agriculture and forestry) and protection of drinking water resources. Land-use practices can influence quality and quantity of drinking water, as well as severity of damages caused by flood events (e.g. building in flood prone areas). During workshops a wide variety of problems and proposed solutions were formulated, as shown in a scheme in **Figure 13**.

Problems	Proposed solutions
Land loss on prior forested areas; Erosion in general	Adapted land use; promotion of mixed forests; reforestation all year long; good grassland management, enhance forest protection; promote permanent forests
Inadequate machine usage (tillage)	Minimum tillage; cover crops; cultural rotation; conservation tillage techniques; no tillage on slopes
Clearcutting	Prohibit clear cuts, except sanitary cuts; establish continuous cover forest systems (CCF)
Erosion due to ski resorts	Technical and ecological measurements to reach the goal of a sustainable restoration of affected areas
No vision or strategy regarding land use	Long term national development strategy; reconcile spatial plans and data; inter-institutional cooperation
City plans influenced by local interest which leads to unfair planning	More flexibility in the planning of action plans; more interdisciplinary and intrasectoral approach; promote high involvement of land owners and users; promote transparency
Land use conflict between agricultural and urban areas; Drought in agriculture	Implementation of the Nitrate Directive; smart irrigation system;
Forests appear as clusters, not as land cadastre data	Turn some agricultural areas into forests; promote silvopastoral initiative; greening practices; complex landscape utilization; remote sensing

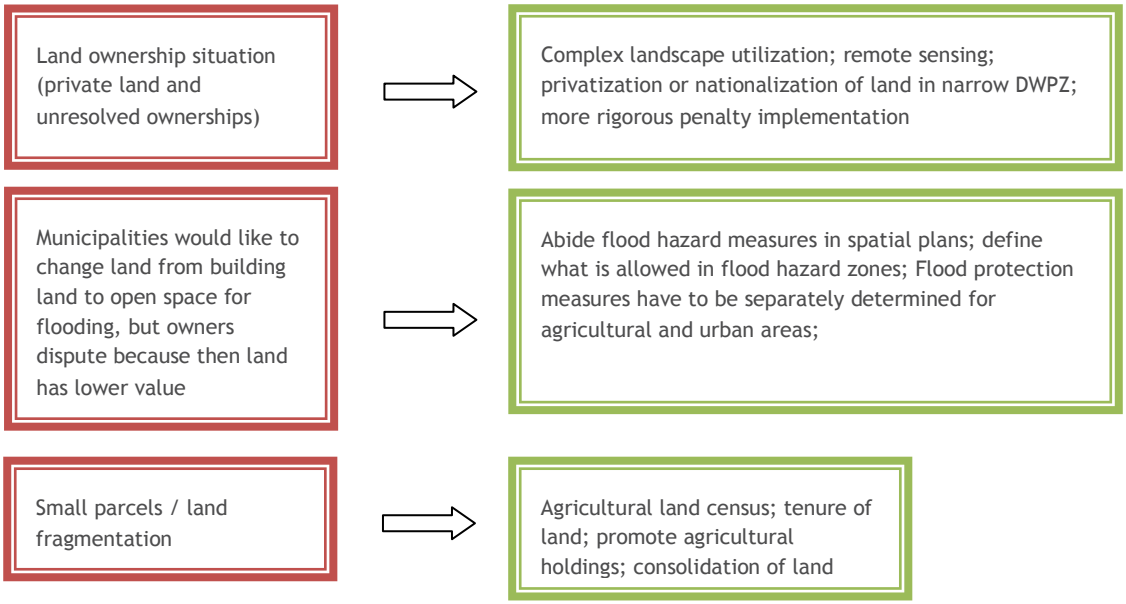


Figure 13. Scheme of problems concerning land use (red) and proposed solutions (green), as identified by stakeholders during national workshops

Interesting point was made during Bavarian workshops – in relation to urban land use and defined flood plains/inundation, it is necessary to use decentralized, site-specific protection measures. This initially requires more time and effort, and depends on how much money can the community afford.

Important conclusion was that local communities are not adequately involved in development of drinking water protection plans - plans are presented to the community as a finished work and little discussion is allowed to find more appropriate site specific solutions. In addition to this, public funds for the implementation of water-friendly land management practices are usually inadequate – in case of all PROLINE-CE partner countries. This is particularly conspicuous outside DWPZ. Additionally, a problem that might be hardest to solve is controlling the environment and groundwater by irregular and harmful behaviour of individuals, especially in DWPZ (waste dumping, illegal gravel excavations, etc.) – even if one or two offenders are penalised, others will not be – as pointed out during Slovenian workshops. The aim is to increase culture of people and their behaviour towards the environment by education and awareness rising - processes that are slow and take significant amount of time. Lastly, it was concluded that adapting measures in the DWPZ should be a more dynamic process.

(d) One of the focal points during stakeholder workshops was flood management and mitigation. Due to acceleration of climate changes, we are witnessing progressively extreme events on the European territory such as floods and droughts. It is important to obtain historical knowledge on the flood management, and protection of water resources should be upgraded with actual developments and disseminated to general public. Awareness rising and continuous education should provide a general framework for all countries. Furthermore, one of the key problems identified during stakeholder workshops was flood-induced groundwater pollution, which is hard to identify and model, and therefore, requires improvements. This should also be included in RBMPs. Another important aspect in flood management is necessity to regularly update and maintain flood risk and hazard maps, based upon the modelling and changes occurring in the dynamic environment.

Non-structural measures use knowledge, practice or agreement to reduce disaster risks and impacts, in particular through policies and laws, public awareness raising, training and education. In respect to flood mitigation, some of the measures mentioned were managing the upper parts of the basin, better spatial planning, synching of legislation on a local and national level and an interdisciplinary approach to the problems encountered in flood prevention startegies.

Summary of identified problems and issues from all workshops can be seen on **Figure 14**.

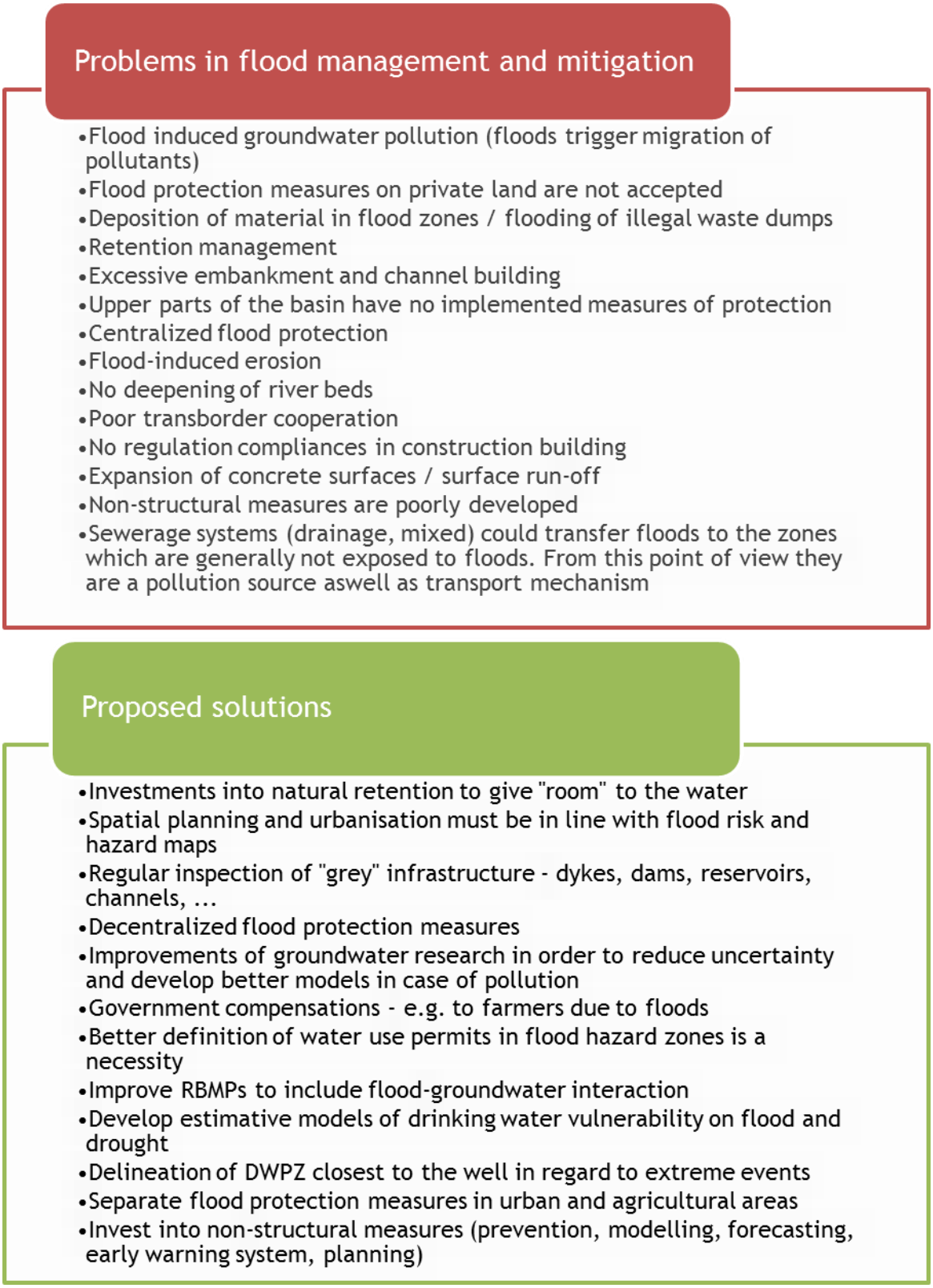


Figure 14. Identified problems and proposed solutions in flood management

5. Feedback on the workshop from the stakeholders

In order to improve the PROLINE-CE stakeholder workshops and to get feedback from participants about the event, participants were asked to answer several questions about the workshop in the feedback questionnaire, which yielded very positive results of stakeholder satisfaction. The target satisfaction percentage was 70% and as it is visible from the **Fig. 15** graph, it was generally surpassed. Austria, Croatia, Hungary and Slovenia received above 80% of satisfaction, while Germany, Italy and Poland did not achieve the anticipated score (**Table 4.**).

Table 4. Stakeholder satisfaction statistics

PP Country	Number of filled questionnaires	Percentage of satisfied stakeholders
Austria	19	89
Croatia	21	94
Germany	19	72
Hungary	23	89
Italy	22	63
Poland	46	70
Slovenia	22	92
Total	**172**	**81.3**

Number of filled questionnaires was 172 which included participants from partner institutions that cannot be counted as stakeholders. The stakeholders that were present on workshops in Croatia and Slovenia expressed the highest satisfaction rate. Due to lower satisfaction percentage, some partner countries should consider these results as encouragement for improvement in future project events.

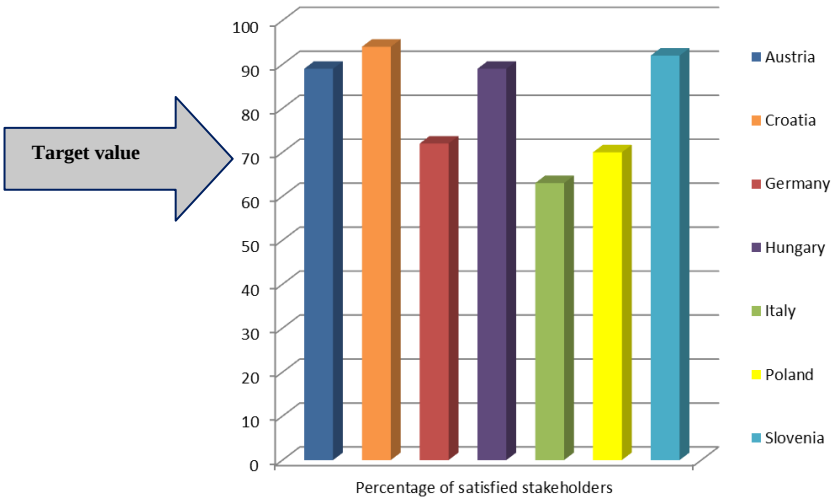


Figure 15. Questionnaire feedback of stakeholder satisfaction in partner countries

Certain constructive comments were received such as inviting more water suppliers, legislation creators, planners and decision makers, farmers, builders and urbanists. There was a lack of a variety of land use planning topics. Additional topics were pointed out as not being covered enough during the workshops: legislation, spatial planning and interaction with professionals, integrated water protection, climate change and topics that lead to concrete solutions.

Stakeholders' feedback is a key input of information that shapes the workshops to come, offering insight into the actual problems and improving the overall communication between the organizers and participants.

6. Conclusions and issues for possible consideration

Since all the project partners pointed out the need for constructive dialogue between the various involved sectors, it is important to continue the communication and offer opportunities for the exchange of information and management practices. The use of specific technical terminology for the explanation of some of the complex topics within the PROLINE-CE, turned out to be one of the challenges that the workshop organizers had to deal with.

Furthermore, many have stated diverse issues with poor implementation of the existing legislation. Even though it should be dealt with on a national level, the first step is bringing and syncing the regulations on the EU plane in order to have a uniform base on which to build upon. Another matter mentioned was the low awareness and insufficient education of the population regarding water and flood protection measures that should be handled with media releases and promotional campaigns and workshops of this kind. The first step in the right direction was the involvement of stakeholders (e.g. land users and owners, public water suppliers) and their input in relevant topics which creates an avalanche of actions.

The "General public" was the largest stakeholder and target group category present at the national workshops. It showcases the interest that the discussed topics have sparked within the public and their active participation is the best feedback the organizers could get. Two other categories that dominated the events were Higher education and Regional public authority. Such results are indicative of a good stakeholder base in relevant institutions and organizations that have an impact in the public.

The problems discussed during the workshops were summarized and divided into four thematic groups – general management, water management, land use and flood mitigation. The first group of issues is mostly connected to legislation and several proposed solutions include: address the climate changes and their impact on water resources, stimulate good management practices and penalize bad management practices, apply international best management practices and use existing knowledge or methodology, enhance adaptation potential and incorporate more flexible practices. The water management problems were mostly country-specific, but could be applicable to other countries as well. Some of the suggested ideas are: establishment of sensitive areas with clear prohibitions and strict controls, increase retention capacities through natural retention (enhance forest and grassland ESS) and construction of retention basins, update and improve monitoring plans, training of professional pesticide users, distributers and advisors and improve the water treatment systems and water supply network in order to prevent pollution and maximize the efficiency of the water system. Issues related to land-use management had the following proposals given: technical and ecological measurement to reach the goal of a sustainable restoration of affected areas, minimum tillage, cover crops, cultural rotation and conservation tillage technique implementation, turning of some agricultural areas into forests, promoting of silvipastoral initiative, greening practices and complex landscape utilization, as well as abiding the flood hazard measures in spatial plans and defining what is allowed in flood hazard zones.

Flood mitigation was a topic many countries could closely relate to and the ideas for its management included: spatial planning and urbanization must be in line with flood risk and hazard maps, improvement of groundwater research in order to reduce uncertainty and develop better

models in case of pollution, developing estimative models of drinking water vulnerability on flood and drought, as well as investing into non-structural measures such as prevention, forecasting, early warning system and planning to minimize flood impact.

7. References

- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Austria
- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Croatia
- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Germany
- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Hungary
- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Italy
- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Poland
- D.T1.3.2. Start-up stakeholder workshop implemented plus related documentation from Slovenia
- [1] http://proline-ce.fgg.uni-lj.si/about/