

Tisza Case Study on Agriculture and Water Management



Version: final

Date: 26 Oct 2012



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ABBREVIATIONS

BAP	Best Agricultural Practice
BAT	Best Available Technique
DD	Dangerous Substances Directive
DRB	Danube River Basin
DRBMP	Danube River Basin Management Plan
DRPC	Danube River Protection Convention
EC	European Commission
EQS Directive	Environmental Quality Standards Directive
EPER	European Pollutant Emission Register
E PRTR	European Protocol on Pollutant Release and Transfer Register
EU	European Union
GAEC	Good agricultural and environmental conditions
GEF	Global Environmental Facility
GIS	Geographical Information System
GAP	Good Agricultural Practice
GWD	Groundwater Directive
ICPDR	International Commission for the Protection of the Danube River
IPPC	Integrated Pollution Prevention and Control Directive
IWRM	Integrated water resources management
JPM	Joint Programme of Measures
MS	Member States
MONERIS	Modeling Nutrient Emissions into River Systems
MOU	Memorandum of Understanding
PoM	Programme of Measures
RDP	Rural development Programme
RBMP	River Basin Management Plan
SMR	Statutory Management Requirements
TRB	Tisza River Basin
ToR	Terms of Reference
TAR	Tisza Analysis Report
TIRBMP	Tisza Integrated River Basin Management Plan
SS Directive	Sewage Sludge Directive
SWMI	Significant Water Management Issue
UWWT	Urban Wastewater Treatment Directive
UNDP	United Nations Development Programme
WFD	Water Framework Directive

1. Summary

The Tisza River, the longest tributary to the Danube River, flows through five countries -Ukraine (UA), Romania (RO), Slovak Republic (SK), Hungary (HU) and Serbia (RS) - and its basin is the largest sub-basin of the Danube basin. It is an important European resource, boasting a high diversity of landscapes which provide habitats for unique species of animal and plant life, with a significant number of protected areas and national parks..

The Tisza River Basin provides livelihoods for many through agriculture, forestry, pastures, mining, navigation and energy production. The last 150 years of human influence, however, have caused serious problems for the basin's waters. The waters of the Tisza Basin are under the threat of pollution from organic substances from municipalities and urban settlements, nutrients from wastewater and farming and hazardous substances from industry and mining. Furthermore, changes in land-use and river engineering have modified the natural structure of the river and resulted in the loss of natural floodplains and wetlands.

The investigations carried out through the Tisza Analysis Report and the estimation of anticipated effects of implementing the program of measures included in the Integrated Tisza River Basin Management Plan (ITRBMP) suggest that across the Tisza basin a high proportion of water bodies will be at risk of failing to meet the Water Framework Directive's 'good status' objectives due to the impact of agriculture. The impacts from agriculture include, above all, the impacts of nutrients, as well as impacts from water abstraction for agricultural uses.

Reducing pollution is a practical concern for Tisza countries committed to implement the EU Directives and the Joint Program of Measures. After all, what most people, governments and communities want for their rivers, ecosystems and regions is a good water quality, clean rivers and healthy environment. Meeting all these aspirations in a balanced way is the main ITRBMP's challenges.

The main outcomes and key conclusions of the case study includes:

1. **A comprehensive overview and discussion of the legal arrangements**, including EU directives, policies, programmes or other related legal initiatives, existing in the Tisza countries relevant to the agriculture and water management, based on the countries inputs and reporting to the ICPDR.

Key conclusions on the legal assessment are:

- The countries in the Tisza basin have taken great efforts to adopt, adjust and implement the EU Directives in support of implementing of measures to reduce the pressures from

agricultural activities on water resources. The main initiatives are grouped around the WFD, Nitrates Directive and Common Agricultural Policy. There are also other EU legislation such as Integrated Pollution, Prevention and Control Directive applied for agro-industrial installations, or the Directive concerning the placing of plant protection products on the market which is also contributing to the achievement of the WFD objective and reduction of agricultural pressures on the water resources.

- The role of policies is significant in the river basin management when we discuss the pollution coming from agriculture.
- On the Tisza basin level, basic measures (fulfilling the UWWTD and EU Nitrates Directive) for EU MS and the implementation of the ICPDR Best Agricultural Practices Recommendation for Non EU MS are the main measures contributing to nutrient reduction.
- The EC Common Agricultural Policy is the single biggest driver influencing agriculture, and the Rural Development Measures implementation should be linked with the WFD to avoid the degradation of water due to agricultural activities.

2. A discussion of the outcomes of the ITRBM Plan / Measures to reduce pressures from agriculture and improve interlinkages between water management and agricultural sectors

- At the Tisza river basin level, agriculture is an important driver which determines pressures on water resources and which generates point and diffuse sources of pollution. Agriculture is the major source of pollutants, including natural and chemical fertilizers and pesticides application as well as effluent from huge pig farms and agro-industrial units. Further, their emission and further discharge into coastal areas and the marine environment can significantly impact the status of those ecosystems.
- The measures within the TRB addressing pressures from agricultural activities are built in the packages of measures addressing nutrient pollution, following the same concept as for the entire Danube River Basin, and contribute to the fulfillment of the agreed management objectives to enable the achievement of good ecological and chemical status in all affected surface waters.
- The implementation of the UWWTD by EU MS and the reported measures of Non EU MS (18 agglomerations for which wastewater treatment plants will be constructed / rehabilitated by 2015) significantly contribute to the reduction of nutrient point source pollution. An additional measure to decrease phosphates in detergents would further contribute to the P emission reduction.
- The most effective synergies between the CAP and the WFD could be achieved through the co-operation among authorities responsible for rural development planning and river basin management at all appropriate levels. However, until now, policies addressing both areas have lacked co-ordination, being for the most part separately developed and implemented.
- The assessment of nutrient pollution sources undertaken within the frame of the UNDP/GEF Tisza project (2009) is a valuable source of information for targeting the water resources and areas impacted by pressures from agricultural activities.

- An **investigation of the common challenges of agriculture and water management** in the Tisza basin, which highlighted the main common interests and main conflicting fields between agricultural and water management sectors
 - The most relevant *common interests* are related to the achievement of sustainable development, monitoring activities of water bodies for implementing water and agricultural policies, integration across water and agricultural policy areas, territorial water management and flood management.
 - The *shared conflicts* include issues linked to affordability of financing, water management and conservation and acceptance by the farmers of agri-environmental measures to achieve good water quality.
 - Farmers do not see the benefit of environmental measures in several cases
 - Environmental benefits are highly dependent on market factors

3. An **evaluation on the Tisza basin level of the present land uses and available water resources**, which highlighted the main points:

- The water resources of the Tisza River Basin are mainly used for public water supply, irrigation and industrial purposes, but also for other uses, such as agriculture, fishing and recreation.
- Integration of water quality and quantity in land and water planning is an essential issue
- The increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities;
- Most of the countries reported that however the irrigation system is set up in larger areas in due the economic reasons they are not used/utilized
- There is a great uncertainty about the water demand and the required water quantities abstraction for irrigation by the end of the next planning period. Limited data were provided either based on expert judgement or extrapolated based on the potential area to be irrigated in the future

4. An **overview of the stakeholders involvement** in the dialogue between water management and agriculture, with illustration of good practices.

The main conclusions are:

- In all countries in the TRB, the dialogue between the water and agricultural sectors focuses on the implementation of EU legislation, preparation of national legislation, development of strategic and technical documents, including the provision of advisory service to the farmers. Communication between these sectors depends on type of activity and following an agreed procedure.
- A progressive implementation of the Water Framework Directive in TRB has huge potential to address the problem of pollution from agriculture. This will need integration across policy areas and the active involvement of all stakeholders.

The investigations carried out within the frame of this case study allow the formulation of **recommendations**, clustered per topics: policies, measures and implementation.

On policies

Need to have more stringent regulation in national and/or basin wide scale to reach good water status

Land use policies need to be integrated in the river basin management plans.

It should be a better coherence between farming policies and the WFD.

Integration of water quality and quantity in land and water planning is important.

On measures

The RD measures should have clearly expressed objectives and consist of clear requirements at a farm level.

The role of best agricultural practices in meeting the WFD objectives needs to be acknowledged
Agri environmental measures need to be adapted to the type of farming practice (arable, dairy), agriculture intensity, climate influence and type of soil, as well as to the organizational circumstances, and have to suit local conditions.

On implementation

At a national level there needs to be increased support for organic farming.

The role of markets at a national level, taxes on agricultural inputs that cause diffuse pollution such as pesticides and fertilizers, would encourage their more efficient use and reduce pollution.

Training and information must be made available to farmers and crofters about the impacts of their activities on freshwater ecosystems and habitats.

There is a need to improve information on the planned water abstraction and land use practices changes to sustain sustainable development in line with integrated river basin management.

The cooperation of stakeholders from agricultural sector and water managers on the inter-linkages between agriculture and water management (agriculture and environment) should be strengthened.

It is important to highlight the need to improve the data and information on water uses, which would facilitate the proper water balance assessments and the definition of the minimum flows for ecological quality and pressure criteria.

The purposes of the Tisza case study on agriculture and water management is three-fold.

First, it provides an overview of our consultation process in the Tisza countries regarding the following questions:

- Are the existing agricultural policy structures and ongoing agricultural measures assisting in the best possible manner to reach the objectives outlined in the ITRBM Plan?
- Which kind of further steps are recommended to achieve better correspondence between agriculture and water management sectors and to achieve common objectives?

- What kind of additional stakeholder dialogue would be necessary between agriculture and water management sectors to facilitate the practical realization of integrated river basin management in the basin?

Second, it provides a summary of the findings and results from each Tisza country in the implementation of measures highlighted in the Integrated Tisza River Basin Management Plan (ITRBMP), especially the Water Framework Directive, Nitrates Directive and the Best Agricultural Practices), aiming to achieve multiple benefits for both water quality and water quantity in the TRB.

Third, it will prepare the participants at the Workshop on Agriculture and Water Management (5 - 6 November 2012, Bucharest Romania) for the discussion by illustrating the challenges, problems and options for accelerating the implementation of agricultural measures in the Tisza sub basin. The participants at the workshop are the relevant stakeholders involved in water management and land use planning.

The case study is organized according to four broad headings derived from the Tisza Group agreed outline, and based on the national reports prepared as basis for the present case study. The case study includes as well a summary, a chapter dedicated to the conclusions and the recommendations, references and annexes. Finally, the case study will include possible questions for discussion with invited panelists and the audience at the Workshop on Agriculture and Water Management.

This document makes use of the outcomes of the five Tisza countries - national contributions for the development of the case study. Further, it compiles existing resource information of the ICPDR based on the outcomes of the Tisza Group, including:

- Tisza Analysis Report – 2007 (study on available water resources and water uses)
- Integrated Tisza River Basin Management Plan (ITRBMP)
- Draft Communication Strategy for integrated water management in the Tisza River Basin
- Integrated Land Development pilot project (UNDP/GEF Tisza project)
- Pollution reduction strategy for the TRB (UNDP/GEF Tisza project)
- Ongoing work - Climate change scenarios relevant for the TRB – summary of outcomes of research studies.
- Finally, a core element of the case study is the update of the study included in the Tisza Analysis Report – 2007 on available water resources and water uses as well as preparation of relevant map on the distribution of irrigation areas in the TRB.

2. Setting the Scene - Addressing common challenges of agriculture and water management

2.1 Ongoing EU developments/directives

Background

Water pollution caused by agricultural activities remains one of the most important environmental issues in TRB. The nutrient loads discharged from the TRB are an important factor responsible for the deterioration and eutrophication of parts of the Black Sea ecosystem. On the Tisza basin level, basic measures (fulfilling the UWWTD and EU Nitrates Directive) for EU MS and the implementation of the ICPDR Best Agricultural Practices Recommendation for Non EU MS are the main measures contributing to nutrient reduction. The implementation of the UWWTD by EU MS and the reported measures of Non EU MS (18 agglomerations for which wastewater treatment plants will be constructed / rehabilitated by 2015) significantly contribute to the reduction of nutrient point source pollution. An additional measure to decrease phosphates in detergents would further contribute to the P emission reduction.

The assessment of nutrient pollution sources undertaken within the frame of the UNDP/GEF Tisza project (2009) is a valuable source of information for targeting the water resources and areas impacted by pressures from agricultural activities.

This information have been supplemented and updated by the recent assessments (national background papers) carried out by Tisza Group for the development of this case study. The measures within the TRB addressing pressures from agricultural activities are built in the packages of measures addressing nutrient pollution, following the same concept as for the entire Danube River Basin, and contribute to the fulfillment of the agreed management objectives (Table 1) to enable the achievement of good ecological and chemical status in all affected surface waters (Annex 1).

Vision	Management Objectives	
	EU Member States	Non EU Member States
The ICPDR's basin-wide vision for nutrient pollution is the balanced management of nutrient	Implementation of the management objectives described for organic pollution with additional focus on the reduction on nutrient point source emissions.	Implementation of the management objectives described for organic pollution with additional focus on the reduction on nutrient point source emissions.
	Implementation of the EU Nitrates Directive (91/676/EEC) taking vulnerable zones into account in case natural freshwater lakes, other freshwater bodies of the TRB are found to be eutrophic or in the near future may become eutrophic.	

emissions via point and diffuse sources in the entire Danube River Basin District that neither the waters of the DRBD nor the Black Sea - via TRB - are threatened or impacted by eutrophication	Reduction of the total amount of nutrients entering the Tisza and its tributaries to levels consistent with the achievement of the good ecological status/potential in the Tisza River Basin by 2015.	Reduction of the total amount of nutrients entering the Tisza and its tributaries to levels consistent with the achievement of the good ecological status/potential in the Tisza River Basin by 2015
	Implementations of best environmental practices (BEP) regarding agricultural practices linked to EU Common Agricultural Policy (CAP).	Implementations of best environmental practices (BEP) regarding agricultural practices for reduction of non-point sources.
	Reduction of discharged nutrient loads in the Black Sea Basin to such levels, which permit the Black Sea ecosystems to recover to conditions similar to those observed in the 1960s.	Reduction of discharged nutrient loads in the Black Sea Basin to such levels, which permit the Black Sea ecosystems to recover to conditions similar to those observed in the 1960s.
	Reduction of phosphates in detergents preferably by eliminating phosphates in detergent products.	Reduction of phosphates in detergents preferably by eliminating phosphates in detergent products.
	Create baseline scenarios of nutrient input by 2015 taking the respective preconditions and requirements of the Tisza Countries (EU Member States, Non EU Member States) into account.	Create baseline scenarios of nutrient input by 2015 taking the respective preconditions and requirements of the Tisza Countries (EU Member States, Non EU Member States) into account.
	Definition of basin-wide, sub-basin and/or national quantitative reduction targets (i.e. for point and diffuse sources) taking the respective preconditions and requirements of the Danube Countries into account.	Definition of basin-wide, sub-basin and/or national quantitative reduction targets (i.e. for point and diffuse sources) taking the respective preconditions and requirements of the Danube Countries into account.

Table 1 Nutrient related vision and management objectives in TRB

Interlinkage between WFD and EU agricultural policies

According to the WFD, river basin management plans, including summaries of programmes of measures, have been drawn up, in an effort to achieve the Directive’s environmental objective of the “good ecological status” of all waters by 2015. As for the DRB, the Tisza programmes of measures shall be made operational by 2012 (Art. 11 WFD), to contribute to the implementation of the environmental objectives of the WFD. The single biggest driver of how we farm is the EC Common Agricultural Policy (CAP). In the framework of the rural development policy, the Community offers a menu of measures to address the agricultural pressures and impacts. Many positive experiences in the TRB illustrate that rural development programmes - measures under the Rural Development Regulation – may contribute to the achievement of the WFD objectives, and prove the clear link between water and agricultural policies and the existing possibilities for combining the efforts of the two policies in order to achieve positive environmental effects..

The effect of measures addressing agricultural pressures is influenced by a sequence of factors such as the climate conditions, type of farming system and management practices, the intensity of agricultural production, but also by the knowledge and capability of the farmers to apply the

BAP and the existing cooperation among competent authorities responsible for rural development planning and river basin management at all appropriate levels.

Relevant policy measures to reduce pressures due to agricultural activities, which are currently under implementation at national level

The countries in the Tisza basin have taken great efforts to adopt, adjust and implement the EU Directives in support of implementing of measures to reduce the pressures from agricultural activities on water resources. The main initiatives are grouped around the WFD, Nitrates Directive and Common Agricultural Policy. There are also other EU legislation such as Integrated Pollution, Prevention and Control Directive applied for agro-industrial installations, or the Directive concerning the placing of plant protection products on the market which is also contributing to the achievement of the WFD objective and reduction of agricultural pressures on the water resources.

A comprehensive overview and discussion of the legal arrangements, including EU directives, policies, programmes or other related legal initiatives, existing in the Tisza countries relevant to the agriculture and water management is presented below, based on the countries inputs and reporting to the ICPDR.

Implementation of the Water Framework Directive

The Water Framework Directive (WFD) 2000/60/EC establishes the framework for Community Action in the fields of Water Policy to prevent further deterioration and to protect and enhance the status of all waters. In making Community Actions operational, environmental objectives are to be achieved by implementing necessary measures to prevent deterioration, to protect, enhance and restore waters with the aim of achieving a “good status” of all community waters by 2015. Exceptionally and according to the WFD provisions, this deadline may be extended up to 2021 or 2027, but suitable measures have to be put in place from 2012 onwards.

The Water Framework Directive requires that Member States (MS) identify water bodies which currently do not meet the good status requirement, causes of not meeting this requirement and necessary measures to bring these water bodies to good status by 2015. River Basin Management Plans (RBMPs), which have had to be prepared by 2009 and their Programmes of Measures (POMs) are a central tool in this process.

As stated in Article 11.3 of the WFD, the POM includes both mandatory and voluntary measures. In addition, measures are divided into basic and supplementary measures. Basic measures are described as minimum requirements that include relevant existing EU legislation (e.g. the Nitrates Directive), controls over abstraction of surface and groundwater, controls over practices influencing source and diffuse emission of pollutants and require measures to implement applying the cost recovery principle. In addition to these basic measures, and if necessary to achieve the objectives of the WFD, the Member States have identified 'supplementary measures', whose definition is left to their discretion in line with Article 11.4 of the WFD. These supplementary measures can also be mandatory by their nature.

After the adoption of the RBMPs, the challenge for the Member States and the River Basin Authorities is now to make the measures that have been identified in the **POMs operational before the end of 2012** as stated in Article 11.7 of the WFD.

Following the requirements of Article 11(7) of the WFD which “establishes that measures have to be made operational by December 2012” and Article 15(3) which states that “within three years of the publication of each river basin management plan, EU Member States shall submit an interim report to the European Commission, describing progress in the implementation of the planned programme of measures”, the **National 2012 Interim Report on implementation of programme of measures** will be elaborated and submitted to the EC accordingly.

Also having in view the reporting obligations to ICPDR, in the frame of the planning process at the Tisza sub-basin level, the implementation of the Joint Tisza Programme of Measures is under way, using the same approaches used in the frame of Danube Basin District (for water quality issues) for achieving the management objective of ITRB Management Plan for the agreed SWMIs.

The objective of the 2012 Interim Report at national, sub-basin and Danube basin level is to provide an overview on the status of measures implementation as included in the national RBM Plans, Tisza and Danube RBM Plans.

The information, the assessment and the recommendations of this case study will serve as basis of the development of the Tisza Implementation Report (to be finalized in 2013), as it was foreseen by the EU Grant for supplementing data and information gaps from the development of the ITRBMP.

Country in the Tisza Sub basin	Water Framework Directive (2000/60/EC). It requires Member States to establish river basin management and to achieve the environmental objectives for water bodies.	Status
Hungary	The RBMP's specific content elements are defined by Government Order No. 221/2004 (21.07.) on certain questions of river basin management. The National River Basin Management Plan was enacted by Government Decree No. 1127/2010. (21.06.) and it was later confirmed by the Government by means of their Decree No. 1042/2012. (23.02.).	Under implementation
Romania	Water Law 107/1996/2006 with subsequent amendments Ministerial Order 913/2000 for the setting-up of the structure for WFD implementation Governmental Decision 80/2011 concerning the approval of the National River Basin Management Plan for the part of the RO territory of the international Danube river basin Referring to the implementation stage of WFD in Romania, the RBMPlans (including programme of measures) elaborated according to the content and deadlines stipulated by WFD, were published and approved through Governmental Decision 80/2011, being reported to the EC according to the requirements of Article 15 of WFD.	Under implementation
Serbia	Serbia began transposing the EU Water Framework Directive (WFD) into its national legislation as late as 2010. The Water Law (Official Gazette of the RoS 31/10) requires the establishment of	Under implementation

	water management plans consistent with the WFD. However, the development of the planning groundwork in the water sector by the Water Directorate – including the Water Management Strategy and the Danube River Basin Management Plan (National) – is still under way, while the development of water management plans for water districts has started recently.	
Slovakia	<p>The WFD Implementation Strategy was approved by the Government Decree No. 46/2004. The aim of this document was to propose the optimal procedure for the complete WFD implementation in the Slovak Republic to eliminate the risk of its incorrect application. The strategy has been updated yearly with the plan of tasks in more detail for the next two years.</p> <p>Realization of measures contained in national POM became obligatory through issued Government Regulation SR No. 279/2011 Coll. establishing the Program of measures to achieve environmental objectives.</p>	Under implementation
Ukraine	<p>As far as Ukraine is not a member of EU, Water Framework Directive's requirements are not legally binding at national level at present. However, 26th of December 2011 the Decree of the Minister of Environment # 571 "On Preparation of Basin Plan of Adaptation of Environmental legislation of Ukraine to European Legislation" # 571 was adopted. There the development of the RBMPs is considered as one of the most important steps for harmonization of the legislation.</p> <p>The Law of Ukraine "On the Basic Grounds (Strategy) of State Environmental Policy till 2020" (just started to be implemented in 2011)</p>	Under implementation

Implementation of the EU Nitrates Directive

The EU Nitrates Directive aims to limit the amount of nitrate permitted and applied and the resulting concentrations in surface waters and groundwaters. It includes a key set of measures to reduce nutrients relate to farming practices and land management. Nitrates in particular, leach easily into water from soils that have been fertilised with mineral fertilisers or treated with manure or slurry. High nitrate levels are one of the greatest challenges facing the WFD implementation in the TRB. Action programmes have been established in the EU MS by either applying the *whole territory approach* or in so called *Nitrate Vulnerable Zones* under the Nitrates Directive.

The implementation of the Nitrates Directive is ongoing in Slovakia (60% of total agricultural area), in Hungary (the revision of the designation of NVZ is planned for 2013) in Romania (in the TRB, the NVZs surface is about 35,049 skm, representing about 48.3 % from the Tisza RB), in Serbia, planned for 2013, and still to be considered in Ukraine.

Country in the Tisza Sub basin	Directive 91/676/EEC (Nitrate Directive) – concerning the protection of waters against pollution by nitrates from agricultural sources, having as objective the reducing of water pollution caused or induced by nitrates from agricultural sources	Status
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Hungary	<p>Government Order No. 27/2006 (07.02.) on the protection of waters against nitrate pollution from agricultural sources</p> <p>MARD (Ministry of Agriculture and Rural Development) Order No. 59/2008. (29.04.) on the detailed rules of the action programme necessary for the protection of waters against nitrate pollution from agricultural sources and on the data supply and recording (this defines the rules of “good agricultural practice”)</p> <p>MARD Order No. 50/2008. (24.04.) on the determination of the system of conditions necessary for the unified territory-based supports and for the sustaining of the “Proper Agricultural and Environmental Status” to be fulfilled in order to be eligible for certain rural development-related supports and that of the rate of changing animals into animal units.</p> <p>Government Order No. 220/2004 (21.07.) on the rules of protecting the quality of surface waters</p> <p>Government Order No. 219/2004. (21.07.) on the protection of groundwaters</p> <p>Government Order No. 240/2000. (23.12.) on the designation of surface waters sensitive from the viewpoint of urban wastewater treatment and their catchment areas</p>	Ongoing
Romania	<p>GD 964/2000 amended by GD 1360/2005 concerning the approval of the Action Plan for the protection of waters against nitrate pollution from agricultural sources</p> <p>Joint Ministerial Order no.1552/743/2008 for the approval of the list containing the localities by counties where there are sources of nitrates from agricultural activities(Vulnerable Zones)</p> <p>Ministerial Order 1387/2006 on approval of the procedure for public participation in the development, amendment or revision of Actions Programs for vulnerable zones</p> <p>Ministerial Order no.1072/2003 regarding the monitoring system of the surface water and groundwater from the agricultural sources</p> <p>Joint Ministerial Order no. 452/105.951/2001, for the approval of the rules for organisation and functioning, aims and competence of the Commission and Supporting Group for the implementation of the Action Plan for the protection of waters against pollution with nitrates from agriculture sources</p> <p>Joint Ministerial Order no. 241/196/2005 for the approval of the list containing the localities by counties where there are sources of nitrates from agricultural activities</p> <p>Joint Ministerial Order nr.242/197/2005 regarding the monitoring system of the soil from the vulnerable and potential vulnerable zones and the system management of organic residues from agriculture</p> <p>Decision no. 21130/DC/2010 of the Interministerial Commission for the application of the Action Plan for protection of waters against nitrate pollution from agricultural sources</p>	Ongoing
Serbia	Nitrate Directive, remain to be transposed into Serbia’s legal system.	Ongoing
Slovakia	Act No. 364/2004 Coll. on waters in wording of Act No. 384/2009 Coll. (§ 35 (3 and 4) through that was transposed Directive 91/676/EEC concerning the protection of waters against pollution	Ongoing

	<p>caused by nitrates from agricultural sources (Nitrate Directive). An indispensable part of Nitrates Directive implementation is development and implementing of :</p> <ul style="list-style-type: none"> - Action Programme developed in harmony with Decree of MA SR No. 199/2008 Coll. in wording of Decree No. 462/2011 Coll. – obligatory in vulnerable zones which are defined by Government Regulation No. 617/2004 Coll. (basic measure) - Code of good agricultural practice with regard to water preservation against pollution from agriculture – application in the whole territory of Slovakia is on voluntary base (supplementary measure). 	
Ukraine	<p>At present, Ukrainian legislation reflects only partially the requirements of the above mentioned Directive.</p> <p>In order to approximate the legislation of Ukraine to the requirements of this Directive, a number of legal acts should be adopted. The issue of prevention of pollution of water by nitrates from agricultural sources belongs to the priority directions of the legislation harmonization with the <i>acquis communautaire</i> (p. 4.8). as it is stated in the Law of Ukraine “On the Basic Grounds (Strategy) of State Environmental Policy till 2020” from 21st of December 2010.</p> <p>Cabinet of the Ministers during the next 3 years since enforcement of the Ukraine-EU Association Agreement plans the follows (see Progressive Plan of Adaptation of legislation of Ukraine to EU legislation):</p> <ul style="list-style-type: none"> - Development of the draft law on identification of nitrates vulnerable zones - Development and implementation of special Action plans regarding nitrate vulnerable zones - Development of the codes of best agricultural practices. <p>There is also an Integrated Program of effective use of ameliorated lands and improvement of ecological state of agricultural lands and rural settlements in Zakarpattya Oblast in 2011-2020 (Decree from 24.12.2010 № 870) – total budget 75 mln. uah, not approved yet</p>	planned

Implementation of the Common Agriculture Policy (CAP)

Common agricultural policy (CAP) is the most integrated and one of the most important EU policies based on EU agricultural subsidies and programs. It was created more than 50 years ago after Second World War as a respond on the fears of food shortages experienced during the war times. It was established to subsidize farmers and encourage them to produce more to ensure stable food supplies. At European level, the **Common Agriculture Policy** (one of the oldest policies in the EU) has been reformed on many occasions, especially during the past decade and a half. CAP has two pillars. The Single Farm Payment comes under Pillar 1 and measures of Pillar 2 aim to support rural communities development and diversification.

In 2008 the CAP Health Check was launched. It aims to modernize the policy and provide assistance when answering to new challenges such as climate change. The EU 27 also agreed to further cut direct subsidies to farmers, for the benefit of rural development policy, and to abolish milk production quotas.

As the milestones in the CAP history the following could be mentioned: the 2003 reform, the simplification of the CAP, the 2008 Health Check and the CAP post-2013.

The recent reform of the EU Common Agricultural Policy (CAP) has increased the opportunities to support farmers in addressing some environmental issues. The working document prepared by the European Commission (DG Environment) has highlighted a number of opportunities where the CAP can help achieve the WFD objectives.

In October 2011, the Commission proposed a reform of the CAP, which maintained the current structure but sought to improve the environmental credentials of Pillar 1 and re-distribute payments more equitably amongst farmers and amongst Member States. Key proposals included:

- a compulsory basic payment, making up 70% of a farmer's payment;
- a compulsory "greening" payment, making up the remaining 30% of a farmer's payment, requiring farmers to maintain existing permanent grassland, to have 7% "ecological focus area" (fallow land, terraces, landscape features, buffer strips and afforested areas) and to cultivate three different arable crops (under certain conditions); and
- simplification of the cross-compliance system.

The current assessment of the 2012 implementation report of the JPM in the Danube and as well in the RRB have shown the scale of the agricultural pressures in Danube and the degree to which existing measures, including CAP, will contribute to achieving the WFD objectives.

The reforms of the Common Agricultural Policy (CAP) of June 2003 and April 2004 focus on rural development by introducing a financial instrument - **European Agricultural Fund for Rural Development (EAFRD) and a single programme -Rural Development Programme (RDP)**. This instrument, which was established by Regulation (EC) 1290/2005, aims at strengthening the EU's rural development policy and simplifying its implementation for the period 2007-2013. The CAP is due to be reformed by 2013, based on a set of legal proposals designed to make the CAP a more effective policy and with a view to having the CAP reform in place as from 1st January 2014.

One of the 10 key points of the Reform is the **encouraging of the agri-environmental initiatives**.

EAFRD aims at strengthening the EU's rural development policy and simplifying its implementation, being based on a **strategic approach** -. The national strategy plan covers the period from 1 January 2007 to 31 December 2013 and the implementation of the national strategic plans is carried out through rural development programmes containing a package of measures grouped around 4 axes.

The EAFDR is structured around four axes, which are represented by the following:

Axis 1: Improving the competitiveness of the agricultural and forestry sector

Axis 2: improving the environment and the countryside - Regulation on the single payment (Regulation No 73/2009).

Axis 3: quality of life in rural areas and diversification of the rural economy

Axis 4: Leader

In terms of the financial participation, the EARDF has been allocated a budget of EUR 96.3 billion for the period 2007-2013, or 20 % of the funds dedicated to the CAP.

According to Council Regulation (EC) no. 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) , the measures for achieving WFD objectives can be financed through EAFRD. Also payments under Article 38 of the Rural Development Regulation will contribute to the implementation of the Water Framework Directive.

It is specified that **Article 38 of the Regulation 1698/2005** could provide farmers support to be annually granted per hectare of agricultural area in order to compensate the income losses generated by the disadvantages resulting from the implementation of Directives 79/409/EEC, 92/43/EEC (Natura 2000 Directives) and especially the WFD 2000/60/EC.

The implementation of CAP in the Tisza countries is described below.

Country in the Tisza Sub basin	Common Agricultural Policy (CAP)	Status
Hungary	The CAP is implemented in Hungary. About 10-15 thousand hectares enlargement can be realistically planned yearly, taking into consideration the potential irrigation development subsidized by European source (CAP). On the basis of this the realization of the 180 thousand hectares irrigated area can be expected within 6-10 years. However, timing can be significantly changed as a consequence of the EU subsidization of irrigation development in 2014-2020.	Ongoing
Romania	<p>For Romania, the EAFRD is a financing opportunity of approx.7,5 billion EURO (2007-2013), based on the principle of co-financing of private investment projects and the European funds for agriculture in Romania can be accessed through National Rural Development Programme (NRDP).</p> <p>The National Rural Development Programme 2007-2013 (latest version <i>-consolidated version, June 2010</i>) is structured in four axes, the axis 2 being focused upon maintaining and enhancing the quality of the rural environment in Romania and upon promoting the sustainable management of both agricultural and forestry land.</p> <p>The strategic objectives, the measures supported through NRDP structured according to strategic objectives and financial mechanism are represented by :</p> <p>1.Continuing the use of agricultural land in less favoured areas and promoting sustainable farming – measures : support for less favoured mountain areas, payments to farmers in less favoured area, other than mountain areas - 1,100.9 mil EURO</p> <p>2. Preserving and improving the status of natural resources</p>	Ongoing

	<p>and habitats – Agri-environment payments ; Natura 2000 Payments for agricultural lands - 996,4 mil EURO</p> <p>3. Promoting the sustainable management of forestry lands – First afforestation of agricultural lands; First afforestation of non-agricultural lands; Natura 2000 Payments - 229,4 mil EURO.</p> <p>Under each axis priorities have been defines, under axis 2 the second priority being represented by the protection and sustainable management of natural resources, notably water and soil.</p> <p>There is a range of actions included in Axis 2, which have the potential for reducing this threat (e.g. agri-environment requirements thereby contributing to the achievement of the Water Framework Directive objectives. Along with these actions under Axis 2 there are other interventions supported under both Axes 1 and 3 that will add valuable contributions for water resources protection (e.g. support under Axis 1 to achieve standards under the Nitrate Directive and support under Axis 3 for sewerage systems).</p> <p>Within the National Rural Development Programme for the period 2007-2013, under the axis 2 the EAFRD non-refundable support corresponding to this axis is of 82% from the public support, being the highest among the all four axis.</p> <p>According to financial allocation for each measure of Axis 2, the results indicated that the measures “Agri-environment payments” has the highest financial weight, benefiting of an allocation of 9,87% out of the total PNDR and of 42,83% of the total of Axis 2.</p> <p>On the other hand, in terms of payments made/carried out, the measures “Agri-environment payments” have also the highest weight, respectively 1,43% out of the total PNDR and 14,49% of the allocation for respective measure.</p> <p>As regards the status of Axis 2 for year 2012 the first call was between 2nd-31th May 2012, which will be followed by other calls: 16th august – 14th September 2012 15th November – 14th December 2012.</p> <p>In frame of current National Rural Development Programme (NRDP), the measure 213 (payments for WFD) is not funded.</p>	
Serbia	<p>In 2005, the government adopted the Agriculture Development Strategy. The reformed agricultural policy was intended to increase the competitiveness of commercial family farms. In terms of implementation mechanisms, agricultural policy focused on encouraging investments. A number of other strategic documents adopted from 2001-2008 tackle (directly or indirectly) certain aspects of agriculture and rural development.</p>	Ongoing

	<p>The EU has funded a technical assistance project titled Support to Rural Development Programming and Payments System (2006-2008), managed by the European Agency for Reconstruction.</p> <p>First Draft National Rural Development Strategy Plan 2008-2013 has been prepared. In March 2008, a National Rural Development Program for 2008-2013 was drafted, but not yet been adopted by the Parliament.</p> <p>Support for rural development has become more actively implemented since 2004: from direct support to producers (purchase of cattle), to support for investments in agriculture and support for the certification of organic agriculture, to more general support for the rural population. In 2008 program five separate measures intended for environmental protection and the countryside, the preservation of plant and animal genetic resources, the development of organic production, protection from erosion and the management of regional waterways have all been implemented. Finally, since 2007 the strengthening of local partnerships and the capacity of local rural stakeholders has been supported by LEADER-like measures; the founding of rural information centers has been co-financed, as have the establishment of rural networks and the education of local action groups.</p>	
Slovakia	<p>Program of Rural Development for programming period 2007 – 2013 focuses on farm modernization, increasing economic value of forest, farming and maintaining endangered species of animals, continuing favorable condition of the forest inhabitants, diversification into non-agricultural activities, investment into leisure and hospitality facilities, encouragement of rural tourism and village revitalization and development of social infrastructure and services.</p> <p>Rural Development Programme of Slovak Republic for period 2007-2013 (RDP SR 2007-2013). Measures of axis 1 and 2 are supplementary measures in view of Water Plan of Slovakia – they are applied on voluntary base.</p> <p>Measures of axis 1 and axes 2 which are relevant to the water protection include for Axis 1: Improving competitiveness of the agricultural and forest sector (farm modernization, infrastructure related to development and adaptation of the agricultural and forest sector, training and information activities , and use of advisory services); and Axis 2: Improving of the environment and countryside (Measures targeting the sustainable use of agricultural land – such as Payments to less favourable areas, NATURA 2000 payments and payments linked to Directive 2000/60/EC and Agri-environmental payments and Measures targeting the sustainable use of forestry land - First afforestation of</p>	Ongoing

	<p>agricultural land, NATURA 2000 payments – forest land, Forest environment payments, and Restoring forestry potential and introducing prevention).</p> <p>In new EU budget perspective for the years 2014 – 2020 Slovakia support preserving of direct payment as a base of first pillar of CAP, but insists on withdrawing of historical principle.</p> <p>The Government Regulation No. 488/2010 Coll. on the conditions of support provision in agriculture through direct payments in wording of Government Regulation No. 495/2011 Coll. This regulation defines Good Agricultural and Environmental Conditions (GAEC) as well as Statutory Mandatory Requirements (SMR) as part of cross-compliance system. The SMR and the majority of the standards of GAEC relate to existing national legislation requirements that farmers should already to respect. The measures within GAEC are related to soil protection against soil erosion and maintenance of soil organic matter and soil structure, ensuring a minimum level of maintenance, avoiding the deterioration of habitats and water protection/management.</p> <p>The Government Regulation No. 488/2010 Coll. on the conditions of support provision in agriculture through direct payments in wording of Government Regulation No. 495/2011 Coll.</p> <p>The Act No. 543/2002 Coll. on Nature and landscape protection. This act requires to define and complete basic elements of ecological network of cultural landscape defined through projects of territorial system of ecological stability of landscape-ecological plans part of which are surface water bodies. Development of Local territorial system of ecological stability within land consolidation projects is by methodological guidelines of MARD SR one of the obligatory phases. Land consolidation projects are supported by measure of Rural Development Programme (Axis 1) „Infrastructure concerned to development and adaptation of agriculture and forestry“.</p>	
Ukraine	<p>Integrated Program of effective use of meliorated lands and improvement of ecological state of agricultural lands and rural settlements in Zakarpattya Oblast in 2011-2020 (Decree from 24.12.2010 № 870) – total budget 75 mln. uah, not approved yet</p>	Ongoing

Implementation of the Directive 91/414/CEE concerning the placing of plant protection products on the market

This Directive lays down the rules and procedures for approval of the active substances at EU-level and for the authorization at Member State level of plant protection products (PPPs) containing these substances.

Information on the current level of implementation is provided below.

Country in the Tisza Sub basin	Directive 91/414/CEE concerning the placing of plant protection products on the market	Status
Hungary	<p>Hungarian law regarding the Plant Protection Products Directive (91/414/EEC)</p> <p>Government Order No. 156/2002. (11.07.) on the detailed rules of retail and wholesale trading of plant protection products</p> <p>MARD Order No. 89/2004. (15.05.) on the licensing of the putting into circulation and use of plant protection products and on the packaging, labeling, storage and transport of plant protection products</p> <p>MARD Order No. 5/2001. (06.01.) on plant protection activity</p> <p>The usage of plant protection products is controlled since 2011 as the condition of the agricultural direct payments. Farmers shall – inter alia – keep a register of the conducted treatments with plant protection products, based on which the recording, storage, and the usage of plant protection products in accordance with the licenses can be controlled.</p> <p>In order to implement the 2009/128/EC Directive on the usage of pesticides a National Action Plan on Plant Protection will be prepared by the end of 2012.</p>	Ongoing
Romania	<p>GD 1559/2004 amended by GD 894/2005, GD 628/2006, GD 1606/2009 concerning the approval procedure of the plant protection products on the market and their use on Romanian territory</p> <p>Governmental Ordinance 41/2007 concerning the placing of plant production products on the market, as well as for the amending and repeal of some norms for plant protection</p> <p>Law 28/2009 for approval of Governmental Ordinance 41/2007 for the placing of plant protection products on the market as well as some norms for plant protection</p>	Ongoing
Slovakia	<p>Act No. 405/2011 Coll. on plant medical care and Decrees of the MARD SR to this act No. 485 to 492/2011 Coll. These regulations contain transposition of Directive 2009/128/EC, which establishes a framework to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide</p>	Ongoing

	use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides.	
Ukraine	Basic measures are stated in the draft law “On Amendments to the Law of Ukraine “On protection of Plants”, which Ukrainian government adopted in general on 17th of February 2011. Taking into account that pesticides are toxic substances, the main goal to reinforce of the governmental control over use of pesticide. Additional measures include: use of only allowed chemical substances for stimulating of the growth and protection of plants, insertion of the poisonous substances based on scientifically grounded standards, support to organic farming, use in the animal breeding of the biodegradable washing substances, use for disinfection of means based on hydrogen peroxide instead of chloral containing substances Recommended measures are similar to the ones regarding the nutrient pollution.	Ongoing

Implementation of the Integrated Pollution prevention and control Directive 2008/1/EC (IPPC Directive)

The IPPC Directive concerning the agro-industrial installations defines the obligations with which industrial and agricultural activities with a high pollution potential must comply. The aim is to prevent or reduce pollution of the atmosphere, water and soil, as well as the quantities of waste arising from industrial and agricultural installations, to ensure a high level of environmental protection

The status of implementation in the TRB is summarized below.

Country in the Tisza Sub basin	Directive 2008/1/EC concerning Integrated Pollution prevention and control (applicable to agro-industrial installations)	Status
Hungary	The relevant provisions of the IPPC Directive (96/61/EC) are enforced in respect of the animal husbandry farms too. Licensing of the animal husbandry farms with large number of animals takes place in accordance with the rules of the integrated environmental licensing process. The relevant law is Government Order No. 314/2005. (25.12.) on environmental impact assessment and integrated environmental licensing process. Financial incentives of animal husbandry farms are ensured by the NHRDP.	Ongoing
Romania	Law 84/2006 for the approval of the Governmental Ordinance 152/2005 amended by Governmental Ordinance	Ongoing

	152/2005 for integrated pollution prevention and control GD 140/2008 for the establishing of some measures for the application of the provisions of the Regulation (EC) no 166/2006 of the European Parliament and of the Council concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC	
Serbia		Planned
Slovakia	Act No.245/2003 Coll. on IPPC in its latest wording – implementing EU IPPC Directive.	
Ukraine		Planned

Implementation of the Directive 2009/128/EC to achieve the sustainable use of pesticides

The Directive 2009/128/EC is establishing a framework for Community action to achieve the sustainable use of pesticides - by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides. In particular, the Directive demands that each Member State adopts a National Action Plan to set “quantitative objectives, targets, measures and timetables to reduce risks and impacts of pesticide use on human health and the environment”.

Furthermore, each Member State must “encourage the development of Integrated Pest Management (IPM) and of alternative approaches or techniques in order to reduce dependency on the use of pesticides”. Member States have until December 2012 to communicate these National Action Plans to both the European Commission and to other Member States.

The overview of implementation status is presented.

Country in the Tisza Sub basin	Directive 2009/128/EC establishing a framework for Community action to achieve the sustainable use of pesticides	Status
Romania	Emergency Ordinance 34/2012 establishing an institutional framework for action to achieve the sustainable use of pesticides on Romanian territory	Ongoing
Slovakia	Act No. 405/2011 Coll. on plant medical care and Decrees of the MARD SR to this act No. 485 to 492/2011 Coll. These regulations contain transposition of Directive 2009/128/EC, which establishes a framework to achieve a sustainable use of pesticides by reducing the risks and impacts of pesticide use on human health and the environment and promoting the use of integrated pest management and of alternative approaches or techniques such as non-chemical alternatives to pesticides. Action program of sustainable pesticides use in Slovakia is	Ongoing

	<p>under preparation and will be ready end of 2012. It is oriented to increasing the environmental awareness of farmers in area of sustainable pesticide use.</p> <p>State programme of remediation of environmental burdens – approved by Slovak government on March 3rd 2010 creates a platform also for elimination of burdens caused by agriculture (pesticides). Remediation which will be realized by the state (where originator was not identified), will start in 2013 after execution of survey and risk analysis.</p> <p>Act No. 409/2011 Coll. on some measures in the field of environmental burden.</p> <p>This act addresses especially the identification of burden originator, determining of liable entity if burden originator cannot be identified and definition of rights and responsibilities at environmental burden remediation.</p>	
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Implementation of the Sewage Sludge Directive (86/278/EEC)

The application of sewage sludge to land in Member States is governed by Council Directive No. 86/278/EEC (Council of the European Communities 1986). This Directive prohibits the sludge from sewage treatment plants from being used in agriculture unless specified requirements are fulfilled, including the testing of the sludge and the soil.

The progressive implementation of the UWWT Directive in the EU MS is increasing the quantities of sewage sludge requiring disposal. This increase is mainly due to the practical implementation of the Directive as well as the slow but constant rise in the number of agglomerations connected to sewers and the improvement of treatment (tertiary treatment with removal of nutrients). Full implementation will ensure that contaminated sewage sludge is no longer contributing to organic pollution via application in the agricultural sector.

The status of implementation is presented below.

Country in the Tisza Sub basin	Sewage Sludge Directive (86/278/EEC)	Status
Hungary	<p>Government Order No. 50/2001 (IV.3) on the rules of agricultural usage and treatment of wastewaters and sewage sludge</p> <p>MEPWM (Ministry of Environment Protection and Water Management) Order 23/2003. (29.12.) on the treatment of biowastes and the technical requirements of composting</p> <p>MARD Order No. 90/2008. (18.07.) on the detailed rules of the preparation of soil protection plans</p>	Ongoing
Romania	The Directive 86/278/CEE has been transposed through the Order of the Minister of Agriculture, Forests, Waters and Environment no. 344/2004 for the approval of Technical	Ongoing

	Guidelines on the protection of the environment and in particular of the soils when sewage sludge is used in agriculture(MO No. 344/2004). In accordance with the MO No 344 /2004, untreated sludge cannot be use in agriculture.	
Slovakia	The application of sludge residues on agricultural land is prohibited.	Ongoing

Implementation of the Directive on the protection of groundwater against pollution and deterioration 2006/118/EC

This directive establishes a regime which sets underground water quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. The directive establishes quality criteria that takes account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive thus represents a scientifically sound response to the requirements of the WFD as it relates to assessments on chemical status of groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States will have to establish the standards at the most appropriate level and take into account local or regional conditions.

The groundwater directive complements the Water Framework Directive. It requires:

- groundwater quality standards to be established by the end of 2008;
- pollution trend studies to be carried out by using existing data and data which is mandatory by the Water Framework Directive (referred to as "baseline level" data obtained in 2007-2008);
- pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD;
- measures to prevent or limit inputs of pollutants into groundwater to be operational so that WFD environmental objectives can be achieved by 2015;
- reviews of technical provisions of the directive to be carried out in 2013 and every six years thereafter;
- compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States).

This Directive is implemented by the Member States in the Tisza basin.

Implementation of the Council Directive 76/160/EEC of 8 December 1975 concerning the quality of bathing water

The Directive lays down rules for the monitoring, assessment and management of the quality of bathing water and for the provision of information on that quality. The aim is twofold, to reduce and prevent the pollution of bathing water, and to inform European citizens of the degree of pollution. It concerns the quality of bathing water in the Member States, and it concerns those

waters in which bathing is authorized by the national authorities and regularly practiced by a significant number of bathers. It lays down the minimum quality criteria to be met by bathing water. They relate to the limit values of substances considered to be indicators of pollution, and the minimum sampling frequency and method of analysis or inspection of such water

Based on the water quality assessment, where the waters do not conform to the parameters of the Directive, Member States may not authorize bathing in them before they have taken the necessary measures to improve the water quality. They have a period of ten years after notification of the Directive for the quality of the water to conform to the set limit values.

This Directive is implemented by the Member States in the Tisza basin.

Implementation of the EU Directive 2008/105/EC regulating priority hazardous substances (EQS) Directive

Article 5 of Environmental Quality Standard (EQS) Directive 105/2008/EC stipulates, that Member States shall establish an inventory of emissions, discharges and losses of all priority substances and pollutants listed in Part A of Annex I to this Directive. In a further step this inventory will be used for the compliance checking with the environmental objectives of the Water Framework Directive (WFD Article 4) on reduction of discharges, emissions and losses for Priority Substances (PSs) and cessation or phase out of discharges, emissions and losses for Priority Hazardous Substances (PHSs) (Article 16 of the WFD). A further objective of the WFD is the “no deterioration” requirement.

Furthermore, the preamble of the EQS Directive (recital 20) foresees the need to have an appropriate tool for quantification of losses of substances occurring naturally, or produced through natural processes, in which case complete cessation or phase out from all potential sources is impossible.

These inventories shall be compiled for every River Basin District (RBD) or the national part of International RBDs and give not only yearly inputs but also comprise, as appropriate, concentrations in sediment and biota. MSs will establish the first inventories under EQS Directive as part of the review of WFD Article 5 analysis on pressures that is scheduled for December 2013. Both point and diffuse sources should be addressed for the priority substances causing problems. When establishing the inventory, MSs will use all the relevant information in the area of surface water protection such as the WFD Article 5 and 8 Reports, European Pollutant Release and Transfer Register (E-PRTR) data, Urban Waste Water Treatment (UWWT) Directive Report.

In response to the these requirements, and based on the DRBMP findings, the ICPDR was involved in the development of the “Technical guidance on the preparation of an inventory of emissions, discharges and losses of priority and priority hazardous substances” in a joint exercise of the EU Drafting Group on Priority Substances, under the WFD Common Implementation Strategy (Working Group E). The Water Directors endorsed the guidance at their meeting on 7-9 December 2011, without amendment.

A Danube case study is under the development, based on an agreed concept and timeframe, which will serve as basis for further assessment in the TRB as well.

The final outcome of the case study is the achievement of a thorough priority substances reduction planning process at national level which will be beneficial for facilities to develop rigorous plans to reduce their use and creation of priority toxic substances and substance groupings, examine the use and creation of substances throughout their facility, and to methodically evaluate all areas where toxic substance reduction options could be implemented.

The level of the implementation of the EQS Directive in the Member States of the Tisza basin is given below.

Country in the Tisza Sub basin	EU Directive 2008/105/EC regulating priority hazardous substances Environmental Quality Standards - (EQS) Directive	Status
Hungary	Adapted through MRD (Ministry of Rural Development) Order No. 10/2010. (08.08.) on the emission limit values of surface waters.	Ongoing
Romania	GD 1038/2010 for amending and supplementing of GD 351/2005 on the approval of the Programme of phasing-out of discharges, emissions and losses of priority hazardous substances	Ongoing
Slovakia		Ongoing

Implementation of the Floods Directive (2007/60/EC)

The aim of the Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive requires Member States to first carry out a preliminary flood risk assessment by 2011 to identify areas at risk of flooding. For such areas they would then need to draw up flood risk maps by 2013 and establish flood risk management plans focused on prevention, protection and preparedness by 2015. The Directive shall be carried out in coordination with the WFD, by flood risk management plans and river basin management plans being coordinated, and through coordination of the public participation procedures in the preparation of these plans.

The level of implementation is illustrated below.

Country in the Tisza Sub basin	Floods Directive (2007/60/EC)	Status
Hungary	Government Order No. 178/2010. (13.05.) on defining the areas affected by the risk arising from the surplus of waters and on the preparation and content of flood hazard and flood risk maps and flood risk management plans. The flood risk management plans are just being prepared from EEOP support.	Ongoing

Romania	The Government Ordinance 1309/2005 established the National Programme for prevention, protection and mitigation of flood effects. The National Strategy for Flood Risk Management on mid and long-term basis was adopted by the Romanian Government in August 2010. The necessity for a long-term national strategy is considered as a top priority. In February 2010 a new and fully revised Water Law was approved.	Ongoing
Serbia	New Water law adopted in May 2010 includes provisions of Floods directive i.e. obligations to undertake PFRA, prepare flood maps and FRMPs. Preliminary flood risk assessment for the territory of Republic of Serbia started in 2009. 1 st PFRA (2011) will deal only with floods on large and smaller rivers, while torrents and internal floods will be left for the 2 nd PFRA (2017).	Ongoing
Slovakia	The EU Directive on the assessment and management of flood risks was transposed into legislation of the Slovak Republic (new Flood Protection Act Nr. 07/2010).	Ongoing
Ukraine	<p>Scheme of Integrated Flood Protection in the Tisza basin in Zakarpatska Oblast. If the Programme will be fully implemented, more than 200 thousands ha of agricultural land will be protected against floods. At present, only several feasibility studies were conducted.</p> <p>Basic measures: Partly they are envisaged by Integrated Flood Protection Program for Tisza basin in Zakarpatska Oblast for 2006-2015. In particular it is envisaged to construct 24 polders of total area of 168,1 ha for accumulating of flood waters. At present, feasibility studies are done for the two polders: on Tisza near Vary and Chetfalva villages of total area 13,0 ha and a polder near Vyshkovo and Yablunivka villages of the total area 3,2 ha.</p> <p>Recommended measures: protection of existing wetlands, limitation of economic activities at the floodplain, use of the principle “do not damage” during hydrotechnical works in the floodplain.</p>	Ongoing

Implementation of other policy developments relevant to agriculture and water management

There are several other pieces of legislation, policies or programmes, reported by the Tisza experts, that are considered as effective tools in reducing the agricultural pressures on water bodies in the TRB, such as:

Communication from the Commission to the European Parliament and the Council - Addressing the challenge of water scarcity and droughts in the European Union - COM/2007/0414 final

The Communication identified 7 main policy options to address water scarcity and drought issues:

- (1) Putting the right price tag on water
- (2) Allocating water and water-related funding more efficiently
- (3) Improving drought risk management
- (4) Considering additional water supply infrastructures
- (5) Fostering water efficient technologies and practices
- (6) Fostering the emergence of a water-saving culture in Europe
- (7) Improve knowledge and data collection

A Blueprint to safeguard Europe's water resources - Consultation document April 2012

The Blueprint sets the agenda for EU water policy for the years to come. Based on these, those set in the Blueprint are expected to be determinative in relation to the EU's water policy and the implementation instruments of the policy.

The timeframe of the Blueprint extends to 2020, since it is closely connected to the az Europe 2020 Strategy, especially to the recently published Roadmap to a Resource Efficient Europe. The Blueprint is its milestone in respect of waters. However, the analysis underlying the Blueprint covers in fact a longer period, till 2050.

The Blueprint will have three main objectives:

- First, improving the implementation of current EU water policy by making full use of the opportunities provided by the current framework;
- Second, fostering the integration of water and other policies' objectives. Trade-offs should be managed on the basis of a better understanding of the costs and benefits of both economic activities and water resources management; and
- When necessary, seeking the completion of the current policy framework, especially in relation to water quantity, efficiency and adaptation to climate change.

United Nations Framework Convention on Climate Change (UNFCCC)

The United Nations Framework Convention on Climate Change (UNFCCC) adopted in 1992 provides the basis for global action "to protect the climate system for present and future generations". The Convention entered into force in 1994. Parties to the Convention have agreed to work towards achieving the Convention's ultimate aim of stabilizing "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system".

Implementation of Best Agricultural Practice (BAP)

Within the TRB, the EU concepts of Codes of Good Agricultural Practice (GAP) under the EU Nitrate Directive and verifiable standards of Good Farming Practice (GFP) under the EC Rural Development Regulation 1257/1999 have been implemented. The level of effectiveness is depending on the level of environmental management/performance that can be expected from farmers in different countries, which is also influenced by the (i) the agronomic, environmental and socio-economic context in which they are operating, and (ii) the availability of appropriate policy instruments for encouraging farmers to adopt more demanding pollution control practices.

The implementation of BAPs in TRB, as for the DRB, should be linked to the EU CAP and Nitrates Directive implementation

Countries in the TRB reported on the status of the BAP implementation, specifically:

Hungary transposed the Nitrates Directive, and the rules of the Code of Good Agricultural Practices are obligatory on the NVZ's (2,5 million ha). Outside the NVZ's, the agri environmental measures assist the implementation of GAP on voluntary basis.

The application of Code of Good Agricultural practices in line with ND requirements (ha) - in the process of implementation of the Nitrates Directive, the Code of Good Agricultural Practices (CGAP) has been elaborated as well in **Romania**. The provisions of the CGAP are mandatory in NVZs.

Currently the process of revision of the Code of Good Agricultural Practices (CGAP) is on going. In the process of implementation of the Nitrates Directive, the Code of Good Agricultural Practices (CGAP) has been elaborated. The provisions of the CGAP are mandatory in NVZ (13,750,000 ha).

In **Serbia**, the Code of Good Agricultural practices is developed and published in March 2011. The implementation and harmonization of the ND with Code of Good Agricultural practices is finalized, and it is expected to be adopted in 2013.

For **Slovakia**, the supplementary measures - are often linked to the provisions of direct and agri-environmental payments from EU funds, which are subject to meeting GAEC and SMR. The control of compliance of farmers with requested management practice is the matter of inspection bodies - the Slovak Environmental Inspection and Central Control and Testing Agricultural Institute, and Agricultural Payment Agency. Code of Good Agricultural practices application is obligatory in vulnerable areas – area of 1,461,646 ha (14616.46 km²) and recommended - outside of vulnerable zones (total agricultural land in the whole SR with manure application: 1,939,275 ha (19392.75 km²). Principles of the Code outside of NVZ vulnerable zones were used on voluntary base by 2.3% of farmers.

In **Ukraine**, the BAP is not a mandatory document just a set of recommendation, the BAP is used in agriculture and animal breeding. The scientific bases and technology of optimum cultivation of separate cultures are developed.

2.2 Outcomes of the ITRBM Plan / Measures to reduce pressures from agriculture and improve interlinkages between water management and agricultural sectors

According to the data and information from preliminary report „Draft storyline pressures, status, impact and measures on diffuse pollution from agriculture – deliverable 3,, produced for EC/ DG Environment (based on data reported by Member States under the Article 13 of the Water Framework Directive and the information from the assessment of the River Basin Management Plans, WISE reporting) „the diffuse pollution from agriculture remains at European level a major cause of the poor water quality, caused by nutrient and pesticide pollution (from the handling and application of the chemicals and silt from soil erosion).

At the Tisza river basin level, agriculture is an important driver which determines pressures on water resources and which generates point and diffuse sources of pollution. Agriculture is the major source of pollutants, including natural and chemical fertilizers and pesticides application as well as effluent from huge pig farms and agro-industrial units. Further, their emission and further discharge into coastal areas and the marine environment can significantly impact the status of those ecosystems.

Point source discharges are caused by single activities and are locally confined, whereas diffuse source discharges are caused by widespread activities like agriculture with multiple undifferentiated sources. The levels of diffuse pollution are not only dependent on anthropogenic factors such as land use and land use intensities, but also on natural factors such as climate, flow conditions and soil properties. These factors influence the pathways of the diffuse nutrient emissions and the retention and losses on the way from the origin to the inputs into the river system.

Table 2 shows N_{tot} and P_{tot} generated load emitted to environment (water and soil) from agglomerations $\geq 2,000$ PE for each Tisza country and the Tisza River Basin total generated load emissions (point and diffuse) for reference year 2006, as presented in the ITRBMP.

	UA	RO	SK	HU	RS	Total
Emission N_{tot} (kt/a)	1	17.9	2.2	4.2	1.8	27.1
Emissions P_{tot} (kt/a)	0.3	2.7	0.3	0.9	0.4	4.6

Table 2. N_{tot} and P_{tot} emissions from agglomerations $\geq 2,000$ PE for each Tisza country and the entire Tisza River Basin emitted through all pathways (reference year 2005/2006)

Among agricultural point sources of pollution, the pig and poultry farms are clearly the most relevant point sources of organic pollution in the TRB. As estimated in the ITRBMP, the contribution of organic pollution from agricultural sources is well below the historical estimates of approximately 30% of the overall total emissions.

The main sources of nutrient pollution in the TRB – particularly by nitrogen (N) and phosphorus (P), which can cause eutrophication of surface waters are: agriculture, inadequate municipal and industrial wastewater treatment plants.

Diffuse source pollution is caused by widespread activities such as agriculture and other sources. The levels of diffuse pollution are not only dependent on anthropogenic factors such as land use, and land use intensity, but also on natural factors such as climate, flow conditions and soil

properties. These factors influence pathways that are significantly different. For N, the major pathway of diffuse pollution is groundwater while for P it is erosion.

Figure 2 shows the MONERIS results describing that altogether 96.4 kt of N and 8.5 kt of P in total are emitted annually into the Tisza River Basin. The main contributors for both N and P emission are agglomerations not served by sewerage collection and wastewater treatment. For N pollution, the input from agriculture (fertilisers, manure, NO_x and NH_x) is the most important (totalling 39% of total emissions). For P, emissions from agriculture (area under cultivation, erosion, intensity of production, specific crops and livestock densities) are the second largest source after input from urban settlements. The share of agricultural emissions differs significantly between countries.

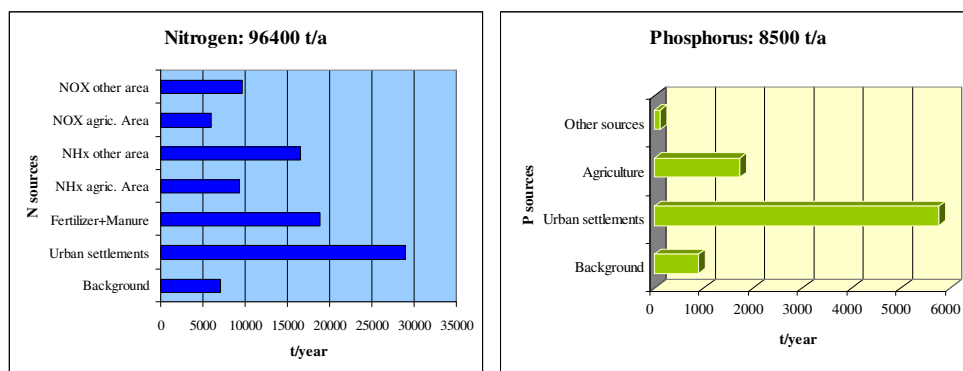


Figure 2. Sources of nitrogen and phosphorus emissions (EU Member States and Non EU Member States) in the Tisza River Basin (MONERIS results 2009)

For N pollution, the input from agriculture (fertilizers, manure, NO_x and NH_x) is the most important (totaling 39% of total emissions). For P, emissions from agriculture (area under cultivation, erosion, intensity of production, specific crops and livestock densities) are the second largest source after input from urban settlements. The share of agricultural emissions differs significantly between countries in the TRB.

Data available from the FAOSTAT database¹ (2004) shows that the use of N fertilisers (kg N/ha) by farmers in Tisza countries is far below the EU average. In addition, the density of livestock per hectare on farms in Tisza countries is below the Danube average. It can be expected that the number of livestock will increase in due course leading to an increase in nutrient emissions if it is not handled in a sustainable way.

Sources of hazardous substances in the Tisza River Basin include also the pesticides and other chemicals applied in agriculture. However, compared with the average in the Danube countries, the level of pesticide use in Tisza River Basin countries is still relatively low.

The distribution of pollution due to agricultural pressures is influenced by socio economic, geographic and climatic conditions. For instance, in **Hungary**, recent assessment shows that the main source of pollution in the case of small watercourses in hilly areas is soil washing in from ploughlands, transporting mainly plant nutrients, but also residues of plant protection products into the waters. Erosion is also problematic because of the increased load of solids. The extent of

ploughlands being a potential loading risk from the viewpoint of erosion amounts to ca. 440 thousand hectares, out of which 130 thousand hectares can be regarded in increased danger of erosion. Diffuse pollution from agricultural sources of small watercourses to be found in plains arrives mostly with the discharged excess waters. According to estimations, loads in plains split in a ratio of 50-50% between wastewater and diffuse origin, that is wastewater discharges play a greater role in the deterioration of water quality here than in hilly lands. Ploughlands are to be found nearby the bed of our small watercourses – almost along 50% of the total length–, from where nutrients – in default of natural protection zones - get into the bed directly, practically without retention. The often too narrow floodplains of the watercourses do not enable the retention of the nutrients getting into the bed either. The proximity of ploughlands and the lack of the protection zone are unfavorable from the viewpoint of the spread of weeds too.

Nitrates from agricultural sources produce as well pollution of groundwater. Intensive cultivation is carried out on 52% of **Hungary**'s territory (ploughland, vineyard, and orchard, garden). Yields of cultivated plants are enhanced by NPK fertilizing and manuring in these areas, the unused part of which loads groundwaters. Hungary's specific N fertilizer usage amounted to that of the developed western countries between 1970-90. Groundwater pollutions of the period can still be detected. The extreme drop in fertilizer usage as a result of the privatization of agriculture at the end of the '80-ies was unprecedented even during the world wars. Although there is a continuous increase since 1991, the present N fertilizer usage is only half of the characteristic amounts between 1970-90.

For **Romania** it is preliminary indicated that more than 25% (25,1-50%) of relevant river water bodies were reported as being affected by nutrient pollution from agriculture ; it was estimated that by 2015, the share of river water bodies being affected by nutrients from agricultural diffuse pollution will decrease, being under 25% (10,1-25%) (by measures application, mainly represented by reduction or modification of fertilizer application and change to low input farming- please see the information on Nitrate Directive implementation in NVZ from the current report).

Although nutrients include nitrogen and phosphorus, the story line from the report is focused on nitrates only, because agriculture is the most important source of nitrates pollution. Ammonium and phosphorus pollution is related mostly to discharges of waste water from domestic sources.

In terms of pesticide pollution from agriculture diffuse sources the key message is that in **Romania** pesticide pollution from agriculture diffuse sources is not affecting significantly (<25%) the river water bodies.

The assessment was focused mainly on pollution by priority pesticides; hence the chemical status of surface water bodies was analyzed. Other pesticide pollution could be part of ecological status or potential, but because of the structure of reported data it was very difficult to extract rivers with these types of pollution.

The proportion of river water bodies affected by nitrate and pesticides pollution from agriculture indicated that the nitrate pollution is a more important issue in relation to agricultural diffuse pollution than pesticide pollution. Diffuse agricultural pollution has increased over the last 20 years as farming methods have intensified. Current projections suggest that unless significant improvements occur in pollution control, diffuse agricultural pollution will be still the most important cause of river pollution by 2015.

The improvement of affected bodies by 2015, in terms of nutrient pollution will be achieved through the implementation of measures.

Based on the pressures analysis and the water status assessment carried out in the ITRBM Plan, the measures of Tisza basin-wide importance oriented towards visions and management objectives for 2015 were defined. The Tisza Joint Programme of Measures which follows the same concept as for the Danube basin is based on the national programmes of measures which shall be made operational by December 2012 and having the expected improvements of water status by 2015, according to the WFD requirements.

2.3 Addressing common challenges of agriculture and water management

Common interests and main conflicting fields between agricultural and water management sectors

The most relevant common interests and main conflicting fields, and the challenges of agriculture and water management highlighted by the countries in the TRB, in the national contributions are clustered on the sub basin level, with exemplification from countries, and discussed below.

Common interests

Components of sustainable development

The achievement of sustainable development could be done by balancing the goals of water resources management and agriculture management, producing synergies between these two sectors and contributing to the improvement of life conditions, especially in rural areas.

Both water management sector and agricultural sector are components of sustainable development (Romania)
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Agriculture is an important use of water resources and at the same time agriculture can impact in different ways the good ecological status, good chemical status, good quantitative status of surface waters and groundwaters.

To minimize the risk for aquatic environment towards the protection of water resources, which might be posed by agriculture development, an important tool to maintain and favor the introduction of environmental friendly farming was defined at European level and currently implemented at national level, respectively the agri-environmental measures.

In Romania, at the national level, including for the RO part of the Tisza river basin, the common interests and synergies between agriculture and water management were considered and reflected in the planning process of the 1st RBM Plan, by integrating the various agri-environmental measures defined under Axis 2 and several measures under Axis 3 of NRDP in the RBMP, with the scope of water resources protection and achieving the environmental objectives.

Thus under the Axis 2 a set of measures that can contribute to the reduction of water pollution risk (the agro-environment requirements referring to total removal of fertilizers, application of organic farming practices and of practices to prevent infiltration/leaking of nitrates in the soil by promoting green crops) and achievement of WFD objectives was defined.

With a view to water protection, agri-environmental measures of the current planning period already provide for possibilities to financial support.

Monitoring activities of water bodies for implementing water and agricultural policies

Another common interest/synergy is expressed through the monitoring activities of water bodies.

Common interest of water and agricultural sectors is to have a good quality of water for special uses – as for irrigation and for drinking water production. (Slovakia)

The water bodies monitoring, as regulated by WFD, is beneficial for the design and implementation of both the water and the agricultural policies. When designing the network of sampling points, agricultural activities need to be considered. This leads to

a close co-operation between authorities competent for water and agriculture and to a better understanding of problems/water/environmental issues identified through monitoring.

At the same time, agriculture might put pressure on water resources, mainly by diffuse pollution, the interactions between water bodies and agriculture, being expressed through the impairment of water quality which is negatively affected by the presence of pesticide residues, nutrients from fertilizers, or sediments from soil erosion (in particular if the practices are applied inappropriately).

Integration across water and agricultural policy areas

The WFD implementation in TRB has huge potential to address the problem of pollution from agriculture, and this requires integration across policy areas

Inter-ministerial working mechanisms are established to analyze and propose solutions to both agriculture and water management problems (Serbia).

and the active involvement of all stakeholders. It is widely accepted view in all national background papers prepared for this present Case Study that EU policies that relate to water need to be integrated more effectively with the agricultural policies. It is important the need "to integrate what we are asking of farmers to help them to deliver

multiple environmental benefits" while implementing for instance agri- environmental measures. In terms of the Common Agricultural Policy (CAP) specifically, it is important to consider the fact that the scale at which it works does not correlate to river basin management plans.

Territorial water management

Challenges of the water management for agricultural purposes require the adaptation of land usage to the natural conditions and the establishment of a modern system of territorial water management. According to the original classification the later includes inter alia the management of excess waters, irrigation, amelioration of mountainous and hilly areas, regulation of the water cycle of wetlands. Territorial water management is basically located outside the settlements. The aim of the territorial water management is to reduce risks, its tasks are divided between agriculture and water management. The future tasks are basically determined by external factors

and demands: natural conditions, agricultural and rural development policy, conservation, requirements of preserving the status of waters.

A basic task is to realize an agriculture and rural development adapted better to the natural conditions.

Flood management

Flood management as a common interest between agricultural and water management as indicated in the Ukrainian contribution. Territory of Ukrainian part of the Tisza basin belongs to the one of the most floodprone areas in Europe with flood frequency in average 3-8 times per year. The floods lead to significant damages (Figure 1).

The issue of protection of population, economic objects and agriculture from floods is the most urgent for Zakarpattya. After catastrophic floods, which took place in November 1998 and in March 2001 in Zakarpattya oblast Scheme of Integrated Flood Protection in the Tisza basin in Zakarpatska Oblast and relevant Programme were prepared. As it is stated above, if the

Programme will be fully implemented, more than 200 thousands ha of agricultural land will be protected against floods. Therefore the successful implementation of the Program is of common interest between agricultural and water management sectors.

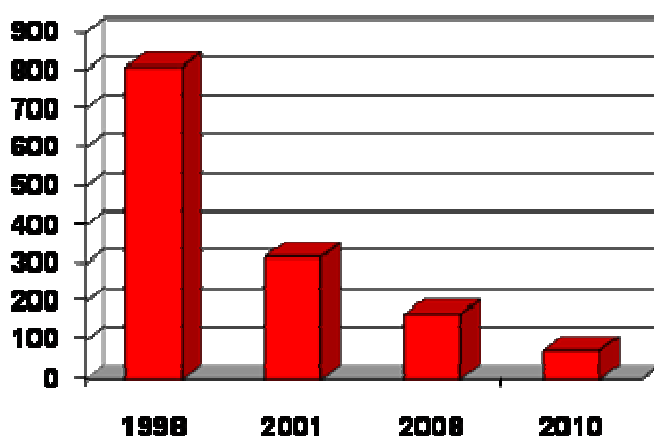


Fig 1. Damages from floods in prices of 2010 (in mln. UAH) (Ukraine)

Shared conflicts

Affordability and financing problems

Irrigation prices are so high in many regions, that the farmers cannot afford it. The prices of agricultural products often do not cover the costs of irrigation, thus making use of the irrigation

In order to achieve the objectives, the establishment of appropriate regulations and an incentive pricing system is needed (Hungary)

service problematic for the producers. Thus, the cost and price conditions of the service provided on the base of different property conditions need to be revised at the level of the society, and those forms of indirect supports are to be found, which

make the utilization of irrigation appealing (naturally only if the availability of water resources does not hinder the irrigation's becoming general in the given region).

Solving the financing of ecosystem services is very important. The establishment of pricing system of uniform approaches and contents is included in the cost recovery.

Establishing cooperation between the farmers would be essential, since effective, cheaper, affordable irrigation service can only be ensured that way.

This type of conflict is exemplified as well in the Ukrainian background paper in relation to the low priority of agricultural lands for flood protection. During last years, due to insufficiency of financing of the Flood Protection in the Tisza basin in Zakarpatska Oblast, the priority was given to protection of settlements, not of the agricultural lands. Further, due to the same financing constraints, coupled with the fragmentation of responsibilities, which caused an unsatisfactory state of the drainage system, serious damages and flooding took place in Ukraine, in the Zakarpatska Oblast. It is planned that in the period 2012-2020, 5,408 km of channels of different types should be cleaned. The total cost of the measures are around 300 mln uah (30 mln Euro). The cost of the urgent actions in 2012 is 87 mln. uah (8,7 mln. Euro).

Water management and conservation

The present practice of water management and conservation is full of contradictions. Water management considers its primary role to satisfy the water demands of the economy and the society. On the other hand, nature and conservation are more and more appreciated by the society partly as a consequence of socio-economic changes (e.g. demand for products of the Hungarian agriculture is falling back as a result of the easily accessible foreign food), partly as a consequence of realizing the finiteness of natural resources (waters cannot be polluted unlimitedly, diminishing water resources, degrading ecosystems, loss of biodiversity, climate change). Fulfilling agricultural water demand still takes priority over fulfilling ecological water demand in most cases, which is the main source of the conflict between agriculture, water management and conservation.

Agriculture needs to revise the conditions of living together with the waters (farming on floodplains, agricultural utilization of areas affected by excess waters, fitting to ecological conditions), or respectively the conditions of the adaptation to extremities need to be established (change of the branch of cultivation and land use, water retention, irrigation possibilities, water saving processes).

There are conflicts of interests such as in Ukraine, between fishery and water management sector. The amelioration system "Chorny Mochar", located in Mukachevo and Beregiv rayons includes four water reservoirs: Fornosh (Liskove village), Mochilo (Pistryalovo village), Babychka (Zaluzh village) and Roman-Potok (Gorbok village). Their main function is to accumulate flood discharge. The secondary user of the reservoirs is Zakarpattya fishery. There are conflicts regarding the use of the reservoirs, especially in spring-summer period, when reservoirs are released from the water. The task of the water management sector is to accumulate flood discharge, and then to release it and to prepare for a new accumulation, but the task of fishery is to grow as much fish as possible and for this it needs the most of water. In 2012, the sluice had to be repaired and the water reservoir was dried, and fishermen were not happy about this.

The existing technical state of the agricultural water supply in the Ukrainian part of Tisza basin is in general in bad state. Many water pipes are constructed without previous design or with deviations from design. A lot of them should be replaced and modernized due to bad sanitary conditions.

Acceptance by the farmers of agri- environmental measures to achieve good water quality

The water quality, measures for reaching environmental objectives and their acceptance by farmers present the main conflict among the two sectors. An exemplification of such conflict is presented in the national contribution of Slovakia.

The view of water management experts

Water is polluted by nutrients, dangerous substances from application pesticides and plant protection products, and in some cases water quantity can be a problem due to over abstraction of water.

From view of water management experts the main reason is in the improper land management and input management – that creates risk of soil erosion and nutrients/pesticides run off and leaching.

The view of agriculture experts

Realization of measures to maintain/improve water quality limits leads to decrease of their benefits. Many preventive measures to protect water quality, especially within NVZs they see as discriminatory or disadvantageous especially in period of deep economy stagnation of this sector in comparison to many EU countries.

Because priority of farmers is to reach economic benefit, the agricultural production is oriented to the market. In relation to receiving direct or agri-environmental payments the farmers are obliged to respect the cross-complains system or additional requirements. This is usually a maximum that they realize with regard to environment. A similar conflict was described in the Ukrainian contribution in relation to the necessity to acquire land for flood protection measures. Flood protection measures normally require land acquisition for hydrotechnical constructions (dikes, polders and dry reservoirs). Local farmers do not agree to provide their land for flood protection activities. It is especially the case in lowland fertile parts of the oblast, where each piece of land is very valuable (Zarichya, Silste, Greblya villages, Irshavsky rayon, Borzhavske village, Vinogradiv rayon).

External challenges creating significant obstacles for agricultural and water sectors

The national contributions indicate several external challenges (natural, governmental, social), which may create obstacles for both sectors to achieve balanced cooperation in reaching the good status of waters in relation to agricultural activities and practical implementation of integrated water management. The overview of these challenges are summarized in the Table 3.

	<i>Natural external challenges</i>	<i>Governmental external challenges</i>	<i>Social challenges</i>
Romania		<p>In frame of current National Rural Development Programme (NRDP), the measure 213 (payments for WFD) is not funded. In the case that this support will be allocated till 2013, area/sub-basins where these measures are needed to be implemented have been identified, an addendum to programme of measures could be done.</p> <p>In the case of the application of Art.38 in Romania, this has to take into account the need for the negotiations between water management authorities, farmers, agricultural and rural development authorities towards the acceptance of these measures.</p> <p>As regards the future NRDP (2014 – 2020), the authorities will analyse and will set the priorities for Romanian Rural Development Policy funded through EAFRD.</p> <p>Also the necessity of farmers training (training courses, professional technical training) is an important component of the process, ensuring farming advisory and implementation control. The improvement of the co-operation between authorities responsible for agricultural and rural development and river basin management plans at all appropriate levels (national, regional, local) would be</p>	<p>Measures under WFD might require changes in land use and management; this might put pressure on the agricultural sector regarding income development and may lead to discussion on the necessity to compensate. Article 38 of the Regulation 1698/2005 could play an important role in this context.</p>

		beneficial.	
Serbia	Droughts (destroying of harvest, lack of water, no irrigation); Floods (inundation of the significant area of agricultural lands, destroying of harvest, farmers blame water managers for improper water management);	Lack of funding at the national level for water management and agriculture; Changes in land use practices are under the jurisdiction of the different Ministries, and the interests of water management and agricultural sectors are sometimes neglected; Lack of fundings at the national level to support land use practices changes that would sustain balanced cooperation between two sectors	Due to poverty, rural population tries to use maximum existing land resources, which leads to unsustainable patterns in long run; Agricultural land fragmentation is listed as one of the main characteristics of the agriculture in Serbia (National Agricultural Programme 2010 -2013, Official Gazette of the RoS 320-7872/2010); and Insufficient public awareness leading to littering, illegal construction activities in floodplain etc.
Slovakia		CAP and Rural development programme 2007-2013 are first externality, which creates attitude of farmers to the soil and water protection. To find balance among measures in the next Rural Development Programme 2014 – 2020 is therefore of the highest significance. Lower financial subsidy of EU12 countries in comparison to EU15 ones, and also different national contribution to EU payments within EU12 (in correspondence to national economy development, in Slovakia the downward trend of the height of national supplement to direct payments is observed) decreases the ability of Slovak farmers to compete with foreign farmers on European as well as domestic market. Market – is a basic driving	

		<p>force.</p> <p>Soil ownership - because most of agricultural enterprises farm on rented land, the implementation of some measures on farm level (e.g. conversion of arable land to permanent grasslands, conversion of agricultural land to forest land) may be impeded by agreement of soil owners.</p> <p>Inadequate financial and thus personal / institutional capacities in both sectors, that directly and indirectly affect complexity of solution of water protection.</p>	
Ukraine	<p>Floods (inundation of the significant area of agricultural lands, destroying of harvest, farmers blame water managers for improper water management)</p> <p>Droughts (destroying of harvest, lack of water, no irrigation)</p> <p>Lack of land (providing land for hydrotechnical constructions causes conflicts with farmers)</p> <p>Hydromorphological changes (destroying of floodplain, river needs more space, and farmers limitate the space for the rivers)</p>	<p>Biased decisions at national level (for e.g., transfer of internal melioration channels into the responsibility of local authorities, who do not have means to maintain them)</p> <p>Changes in melioration system (due privatization, all the system is split into small pieces)</p> <p>Absence of relevant funding of the state programs in water management and agricultural sector.</p> <p>Absence of the state programs stimulating environmental component of agriculture (use of organic land management, reduction of the number of fertilizers, pesticides) and water management (establishment of riparian protection zones, forestation, protection of floodplains)</p> <p>Insufficient legal enforcement</p>	<p>Rural population is dominating in the population structure. Due to poverty, rural population tries to use maximum existing land resources, which leads to unsustainable patterns in long run</p> <p>Insufficient change in orientation of local population for other sources of income (tourism, recreation)</p> <p>Insufficient public awareness leading to littering, illegal construction activities in floodplain etc.</p>

Table 3. External challenges creating significant obstacles for agricultural and water sectors

Anticipated effects of the measures of the RBMPs reaching their objectives

The effects of the measures identified in the TRB will be performed and assessed by the Tisza 2012 Implementation report. Agricultural measures are reported and implemented in all Tisza countries (Annex 1). The measures addressing agricultural pressures include basic and supplementary measures, which are embedded into national legislation according to the WFD requirements. Measures were proposed on the base of analyses made according to art. 5 WFD – the second phase of the WFD implementation.

At the national level River Basin Management Plans are in development process, so the programme of measures for particular river basins has not been defined in details in **Serbia**. Thus at the moment the results of the implementation process at the national level can not be addressed. The same situation is reported by **Ukraine**.

The implementation of the basic measures is carried out in accordance with the relevant legislation, in **Hungary**. In order to implement the National River Basin Management Plan, several supplementary measures and modifications of legislation were scheduled for 2011. However, the Government did not allocate extra costs for the implementation of these tasks in the course of the presentation of the budget and there are no additional sources for their implementation in 2012 either. This implies that some of the planned regulatory and preparatory supplementary measures could not have been started.

Modification, completion of the so-called water protection zone system is an utterly important circle of supplementary measures from the viewpoint of agriculture.

The designated areas in accordance with the Hungarian legislation are at present as follows:

- Nitrate vulnerable zones, within this the drinking water source protection zones
- Areas registered as protected by other laws (Natura 2000 areas, high conservation value areas (HCVA))

In **Romania** the programme of measures for the first river basin management planning cycle is focused on the implementation of measures from the Annex VI A of the WFD, so –called “basic measures”, as well as other European and national provisions and requirements.

For the timeframe 2010-2027 the total costs of programme of measures at national level are aprox. 20,992 billion Euro, out of which 97,8% are the costs for the implementation of basic measures and 2,8% costs for the implementation of supplementary measures.

The costs distribution on fields of activity indicates that 9,85% of the costs represents the costs of measures for agricultural activities sector (vulnerable zones, plants protection, agro-zootechnical farms), being on the second place after the costs for water services which represent 82,28% of the total costs.

The basic and supplementary measures defined for the first cycle of river basin management planning will be re-analysed in 2012, having in view the identification of their operational stage. Correlation with improvement of the water bodies status due to implementation of programme of measures could be done and the new technical tools for organic substance and hazardous substances modelling could be developed. Also the development/improvement of the integrated

water quality monitoring will contribute to the clarification of the input and the impact of pollution sources on the water bodies' status.

Moreover, in general the control and the monitoring of the measures implementation for measures related to agriculture are ensured in accordance with the environmental and water management national legislation. The control and monitoring of agricultural measures implementation is done particularly through:

- Control mechanisms already in place required by national legislation which transposed the European Directives: IPPC Directive (for agro-industrial installations), Nitrates Directive, Dangerous Substances Directive, Plant Protection Product Directive, Biocides Product Directive
- Cross compliance mechanism
- Monitoring and control mechanism of the national project on nutrient pollution control
- Water management/environmental permit issuing process
- Water quality monitoring.

Need to have more stringent regulation in national and/or basin wide scale to reach good water status

The reaching of good status of water bodies in relation to the pressures from agriculture sector is done though basic and supplementary measures.

The basic measures represent the minimum requirements stipulated by the European legislation transposed into national legislation. The need of more stringent regulation for reaching good status in relation to Nitrate Directive for example, has not been identified in **Romania**.

At the river basins level, supplementary measures are needed for agricultural activities in order to achieve the environmental objectives of water bodies.

The proposed measures refers to: application of good practices code in non-vulnerable areas, diminishing/reduction of land erosion, application of farming/cropping practices in order to reduce use of/pollution with phytosanitary products, protection of water bodies from pollution by pesticides, application of good agricultural and environmental conditions code and also of other good practices codes for farms/farming, etc., trainings for farmers, implementation and maintenance of buffer zones along water courses, maintenance of protected areas for water abstraction, converting arable land into grassland, reducing use of fertilizers and pesticides, application of organic farming.

In addition to basic and supplementary measures - more stringent measures – stringer than EU requirements were not applied in **Slovakia**. However, according to opinion of European Commission (DG ENV), existing Action Programme to Nitrates Directive valid in Slovak Republic should be revised. At present, the new AP is prepared and many EC requirements are assumed to be considered. Final version will be a product of work of experts from significant stakeholders (Ministry of Agriculture and Rural Development SR, Slovak Agricultural University in Nitra, Central Control and Testing Agricultural Institute in Bratislava, Soil Science and Conservation Research Institute in Bratislava, Animal Production Research Centre in Nitra, Slovak Agricultural and Food Chamber). The crucial areas of revision are the length of period

when application of manure and nitrogen containing substances is prohibited and storage capacities for animal manures.

Supplementary measures - are often linked to the provisions of direct and agri-environmental payments from EU funds, which are subject to meeting GAEC and SMR. The control of compliance of farmers with requested management practice is the matter of inspection bodies - the Slovak Environmental Inspection and Central Control and Testing Agricultural Institute, and Agricultural Payment Agency.

2.4 Water resources of the TRB (as common interest of agriculture and water management)

The water resources of the Tisza River Basin are mainly used for public water supply, irrigation and industrial purposes, but also for other uses, such as agriculture, fishing and recreation. The increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities.

A detailed investigation was recently carried out for developing a core chapter of the Tisza case study on agriculture and water management focusing on water management in light of present land uses and available water resources. The outcome of the investigation is a background paper “Present land uses and available water resources - Effects of irrigation on surface and groundwater” covering all Tisza countries.

The findings, the outcomes, and the recommendations are summarised in the Chapter 3 of this case study.

3. Present land uses and available water resources (effects of irrigation on surface and groundwater)

Background

The water resources of the Tisza River Basin are mainly used for public water supply, irrigation and industrial purposes, but also for other uses, such as agriculture, fishing and recreation.

The largest tributaries of the Danube River by catchment area are the Tisza River (157,186 km²) and Sava River (97,713 km²). Additionally, the population is higher in the Tisza River Basin (14 Million) than in the Sava River Basin (8.5 Million). In comparison with average discharge of the Sava River (1,559 m³/s) Tisza River has only half of it (825 m³/s). As a result, demand in water is higher in the Tisza River Basin, which raises concerns about the need to ensure a harmonised and sustainable water resource management in the Tisza River Basin. Furthermore, increase in

extreme events (severe floods and draughts) in the recent years has adverse affects on water resources, ecosystems, human health, and economy within the region.

It is recognized by ICPDR Tisza Group that good water status for Tisza region could not be reached without integrating water quantity and water quality management and dialogue among stakeholders from agricultural sector together with water managers on the inter-linkages between agriculture and water management (agriculture and environment) should be initiated.

The significant demands on water resources in the region – for drinking water, as well as for agriculture and industry – together with the impacts of anticipated climate changes, can result in water shortages or excess water that can be disastrous within the region.

Although the current reserves of water are sufficient, expected increase in water use for irrigation accompanied with fluctuating climate may have adverse affects on water quantity. Therefore, water quantity management is recognized as a significant water management issue within the Tisza River Basin.

Based on all these considerations, the necessity to organise a detailed investigation of the topics related to the land uses and the water resources availability lead to the development of a background paper “Present land uses and available water resources. Effects of irrigation on surface and groundwater”, supported by national contributions (attached to this case study), which will have the following objectives:

- To provide better comprehension of the present and future water use for irrigation
- To improve dialogue among stakeholders from agricultural sector together with water managers on the inter-linkages between agriculture and water management;
- To generate data and recommendations for the next planning cycle;
- To provide better understanding of the long term water demand for irrigation within the Tisza River Basin
- To advance synergy between water quantity and water quality management; and
- To define recommendations and emphasize gaps and uncertainties.

The findings and results of these investigations are presented in this chapter.

Outcomes of the 2007 Analysis Report – gaps and reason for further investigation

Data on water management with respect to present land uses and available water resources with incorporated update of the Tisza Analysis Report (2007) scenario, would provide important insight of the irrigation effects on surface and ground water as well as should introduces best practice examples.

The Tisza case study on agriculture and water management is a significant input to facilitate and develop suitable dialogue between the stakeholders/ players of the competent-responsible policy level of river basin, water management planning and land use planning. Furthermore,

As the main conclusion of the Tisza Analysis Report 2007 (TAR), the ICPDR Tisza Group identified that **integration of water quality and quantity in land and water planning is an essential issue** to be considered during the preparation of the Integrated Tisza River Basin Management Plan (ITRBM Plan). Significant water management pressures and inter-linkages

between water quality and quantity associated management issues within the Tisza River Basin are identified and presented schematically in the first ITRBM (Figure 3).

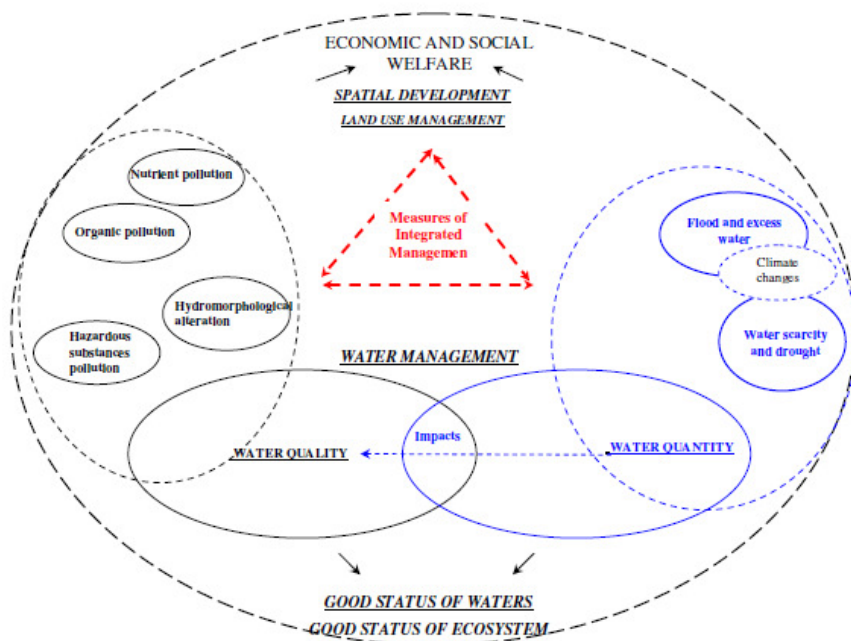


Figure 3: Inter-linkages between the water quality and quantity related management issues identified by the ICPDR Tisza Group

Key issues, challenges and solutions identified in the TAR 2007 with respect to water quantity are:

- The increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities;
- Improvement data on water uses;
- Collecting and organizing information on planned infrastructure projects
- Improving assessments regarding excessive river engineering projects
- Defining minimum flows for ecological quality and pressure criteria.

As a result of the water quantity management assessment, the key integrated water quantity management issues and the related water quantity pressures and impacts with adverse impact to integrated water quantity and water quality management of significance for two or more Tisza countries are identified and divided in subsequent categories.

Water quality assessment results from TAR	Key integrated water quantity management issues	Water quantity pressures and impacts
---	---	--------------------------------------

Issue/TRB	Floods and excess water	Hydromorphological pressures from flood protection measures Accidental pollution due to flooding Solid waste
Issue/TRB	Droughts and water scarcity	Loss of wetlands Groundwater depletion due to over-abstraction Increased irrigation and related surface water abstraction
Issue/TRB	Climate change	Impacts of climate change on low water flow.

Given the area of the Tisza River Basin and amount of water flow the water quantity issue is of great importance.

Based on the ‘average total water quantities annually used by the given users’ and the ‘percentage of the estimated consumptive use²’, calculations in the analysis report estimated consumptive uses by the various water users (million m³) with the average value for three years (2002-2004) and a scenario for 2015 was created estimating the uses of various water users. From data on planned water uses, the total annual water demand for the Tisza River Basin in 2015 is estimated at approximately 1.5 billion m³ – or 5.5% to 6% of the total annual runoff. Water use for irrigation

The sustainable water quantity management would generate multiple benefits for water quantity and quality within the region and result in:

- Good status of the waters
- Practical realization of integrated water management in the basin.

Tisza Case Study 2012:

“Present land uses and available water resources, Effects of irrigation on surface and groundwater”

will increase significantly as all Tisza countries plan to upgrade existing irrigation systems and build new ones. The increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities.

Land uses in the Tisza River Basin include: agriculture, forestry, pastures, nature reserves as well as urbanised areas. Land uses can influence

the water quality and water quantity aspects of water related ecosystems. The impacts of land uses can cause nutrient, hazardous substances and organic pollution.

According to the Tisza River Basin Analyses on available water resources and uses the water resources in region are mainly used for public water supply, irrigation and industrial purposes, but also for other uses, such as agriculture, fishing and recreation.

² **Consumptive use:** Water abstracted which is no longer available for use because it has evaporated, transpired, been incorporated into products and crops or consumed by man or livestock. Water losses due to leakages during the transport of water between the point or points of abstraction and the point or points of use are excluded. Definition source: Joint OECD/Eurostat questionnaire 2002 on the state of the environment, section on inland waters.

Based on the average total water quantities annually used by the various users and the percentage of the estimated consumptive use³, average value for consumptive use (million m³) based on data for three years (2002-2004) is calculated.

In addition, the scenario for 2015 was developed based on planned water use. Summarized data for the existing and future water use with respect to quantity and percentage by different users within the Tisza River Basin are exhibited on Figure 4 and 5.

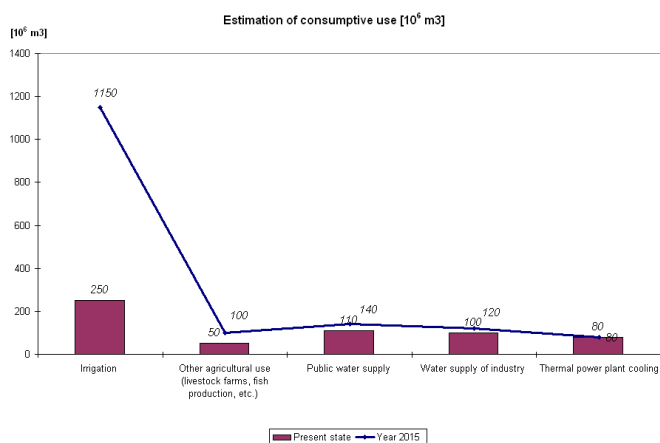
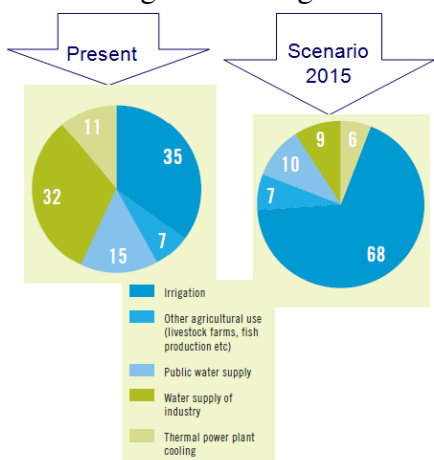


Figure 4: Quantity of consumptive water use in Tisza River Basin

It is estimated that the increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities. In river basins, sub-basins or the recharge areas of groundwater, various water uses may compete or even conflict with each



other creating management problems, particularly if water is scarce or quality is deteriorating. At the moment, the quantities of water are in generally sufficient to meet demands. However, due to the planned upgrading of the existing systems and building of the new ones, increasing in water demand for irrigation would be significant by the 2015, from 250 to 1150 (10⁶ m³).

Figure 5: Percentage of estimated consumptive use by main water users in the Tisza River Basin

³ **Consumptive use:** Water abstracted which is no longer available for use because it has evaporated, transpired, been incorporated into products and crops, or consumed by man or livestock. Water losses due to leakages during the transport of water between the point or points of abstraction and the point or points of use are excluded. Definition source Joint OECD/Eurostat questionnaire 2002 on the state of the environment, section on inland waters.

Information on the water supply sources, the current use and future demands require better knowledge and data information, associated with complete set of information about the existing /planned land used practices. Uniform data would enable integration of water quantity and quality issues and ensure equitable balances of water resources between the needs of the countries and environment.

Further, the development of the maps with irrigated areas (existing and planned) would be additional asset to integrated water quantity and water quality management and better understanding of climate change consequences within the region.

Finally, the assessment of the water use and land management within the region will improve the better knowledge of the priority pressures mentioned in the preceding sub – chapter i.e., groundwater depletion due to over- abstraction, increased surface water abstraction.

Based on the current body of knowledge and ongoing research regarding the climate change within the Tisza River Basin, the extreme events are very likely intensify and have adverse effects on water resources management. Thus, the necessity of the further investigation and better insight in the water quantity and quality management and their inter- linkage with land use practices within the Tisza region is of great importance for the population, water resources, ecosystems, economy, etc.

Based on the outcomes of the ITRBM Plan and supported by the European Commission EU Grant – DRBMP - 2012 the work overall objective is to facilitate and develop suitable communication between the stakeholders/ players of the competent-responsible policy level of river basin, water management planning and land use planning in connection with water use.

Proposed template for data collection at the national level

The data collection was organised based on the requirements of Tisza case study on agriculture and water management to ensure an update of the information and data included in the Tisza Analysis Report – 2007, and to provide information that would result in production of the irrigation systems distribution relevant map within the Tisza River Basin. The process was organised considering that the data would be delivered based on the agreed templates, and be accurate, uniform and comprehensive as much as possible.

The objective of data collection at the national is to facilitate the development of three different scenarios, which would address the following issues:

- Water quantity allocated for irrigation and areas under the irrigation systems;
- Estimated consumptive water use for irrigation;
- Source of water used for irrigation;
- Good practices at the national level; and
- Map with relevant data on irrigation systems distribution within the Tisza River Basin at the national level.

The specific objectives of the data collection cover the need to ensure (i) a better comprehension of the water quantity management issues and pressures and its inter-linkage with water quality management, (ii) development of the suitable climate change adoption policies for

the areas that are most vulnerable, (iii) facilitation of the dialogue among stakeholders from agricultural sector and water managers, and (iv) promotion of an improved synergy between agriculture and water management, and water quantity and water quality management, which would result in the good status of water resources and implementation of the integrated water resources management within the Tisza River Basin.

Data collection process was organized around 5 groups of topics, following an harmonised and agreed procedure and reporting templates:

1. Present water use for irrigation
2. Water demand for irrigation by the end of the next planning cycle (2021)
3. Long term water demand for irrigation according to the National Strategic Documents
4. Good practices at the national level
5. Map development on the distribution of irrigation areas in the TRB

Data analysis

Going through the national contributions on the requested topics, there are some issues in need of attention in the recent dialogue between the agricultural and water sectors, and especially due to the problems related to water for irrigations, which are significant for some parts of the TRB.

Firstly, the recognition of the fact that the area of arable land represents a significant share of the Tisza River Basin (Figure 6). Despite the fact that the quantities of water are in generally sufficient to meet demands, planned upgrade of the existing and development of the new irrigation systems accompanied with more frequent extreme events would have adverse effects on the available water quantities to meet water demands in the future and might increase competition among users and sectors.

Secondly, the recent investigations consolidate the statements, the challenges and the solutions identified in the TAR 2007, concerning the concern that the increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities. Further, it is important to highlight the need to improve the data and information on water uses, which would facilitate the proper water balance assessments and the definition of the minimum flows for ecological quality and pressure criteria.

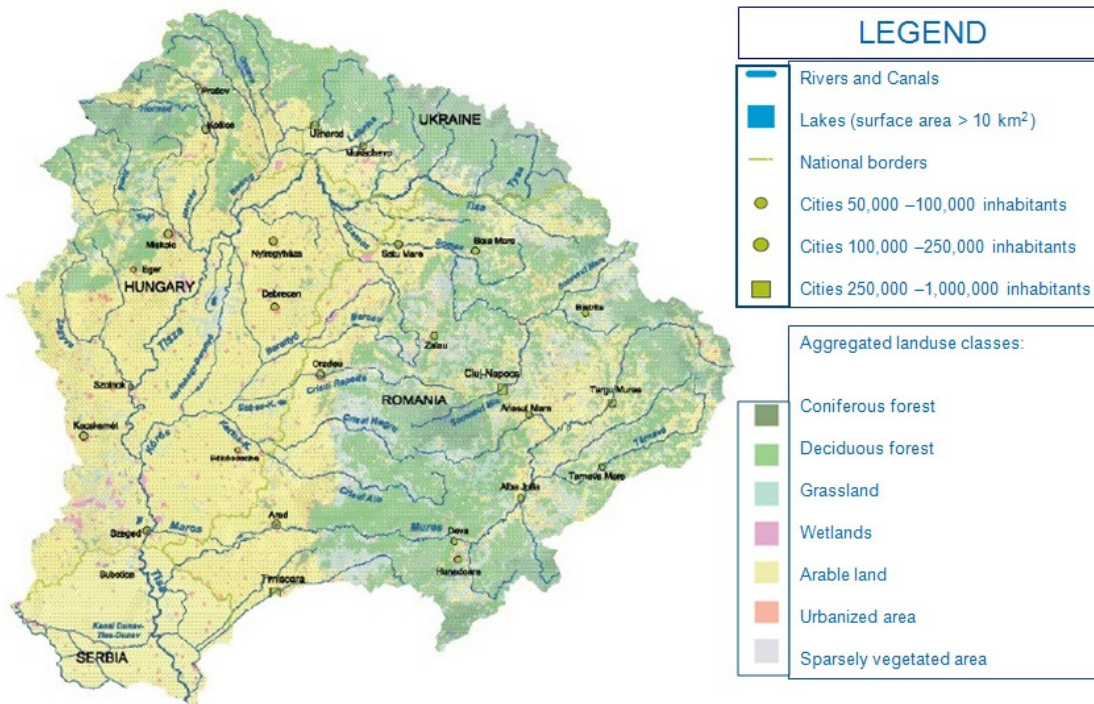


Figure 6: Existing land use within the Tisza River Basin

1. Present water use for irrigation

According to available data from nation inputs, the Tisza countries do not use the full capacities of the existing irrigation systems. In Slovakian report, comparison of the average water quantity used for irrigation in two periods (2002 – 2004 and 2008- 2010) demonstrates sharp decline in latter period. Fluctuation in the water abstraction for irrigation has been observed both in Hungary and Ukraine for the time frame proposed in the template for data collection (2009 - 2011) with more than double of quantity decrease of water use for irrigation in 2010 and significant increase in 2011. Romanian report does not provide information relevant to Tisza River or its tributaries within the Romanian part of Tisza River Basin.

With respect to water source used for irrigation it differs from country to country. While in Romania and Slovakia surface water is the only source of water used for irrigation, i.e., 100 percents, in other Tisza countries source of irrigation water includes surface and ground water. The most relevant data to this study is exhibited in Table 4 while detailed data are included in the annexes containing the national contributions. Consumptive use of water for irrigation is 100 % in Hungary and Slovakia, in Serbia this is between 80 and 85 %, while in Ukraine the consumptive use is very likely underestimated since 0.27 % is reported.

INDICATORS	COUNTRIES IN THE TISZA RIVER BASIN					
	Hungary*	Slovakia*	Serbia*	Romania*	Ukraine*	
Areas under irrigation systems (ha)	127163	40907	57871	89375	875	
Average areas annually irrigated in last 3 years (ha)	55576	2929	36484	1615	249	
Average water quantity annually used for irrigation in last 3 years per hectare (m ³ per ha)	2358	55	1.8	2180	359	
Average total water quantities annually used for irrigation in last 3 years (10 ⁶ m ³)	125,8	0,162	65,6	3,52	0.084	
Estimation of consumptive use (%)	127163	100	80-85	100	0.27	
Sources of irrigation water (%)						
Surface water	Rivers	92,96	100	10	94	70
	Canals			75		20
	Reservoirs			5		10
Groundwater	Springs	7,04%				-
	Alluvial aquifers			7	4	80
	Deeper aquifers			3		20

*Proposed reporting period, ** Reporting period 2008 – 2010

** Data 2011, Source National Institute of Statistics, 2012.

Table 4: Summary of the present water use for irrigation

2. Water demand for irrigation by the end of the next planning cycle (2021)

There is a great uncertainty about the water demand and the required water quantities abstraction for irrigation by the end of the next planning period. Limited data were provided either based on expert judgement (SK), or extrapolated based on the potential area to be irrigated in the future (RS, HU, UA).

In **Serbia**, significant increase in water use for allocation for irrigation is presented (from 65, 6 x10⁶ m³ to 473, 7 x10⁶ m³) due to the planed increase in the areas with irrigation systems, from 57.871 ha up to 473.7 ha 189 500 ha. Proposed expansion in the arable land under the irrigation system in **Ukraine** is from the existing 875 ha to 2000 ha, e.g., the water quantity abstraction for the irrigation would be 0.5 x 10⁶ m³. It is foreseen that both surface water and groundwater sources will ensure the necessary water demands in Ukraine.

There is no official irrigation demand prognosis for 2021 available in **Hungary**. However, based on some official interviews (17 July 2012), it is stated that 180 thousand hectares of areas annually irrigated is necessary, which is double from the high level of 2009 (about 90 thousand hectares). It is expected that the realization of the 180 thousand hectares irrigated area would be within 6-10 years. Still, timing can be significantly changed as a consequence of the EU subsidization of irrigation development in 2014-2020.

In **Slovakia**, in the absence of any official prognosis for demand of irrigated water, based on expert judgement, the estimates of water demand for irrigation up to 2021 were done for 2 scenarios (Table 5):

- Optimistic scenario – water demand on the level of the year 2003 (it calculates with irrigated area – with functioning system in year 2003)
- Pessimistic scenario – demand related to the same irrigated area as it is.

The planned sources of irrigation water would be the same as so far, surface water.

	Optimistic scenario (situation as in 2003)	Pessimistic scenario (the same as average of 2008-10)
Planned areas for irrigation in 2015 (ha)	15086 ha	2929 ha
Water quantity planned for irrigation per hectare in 2015 (m ³ per ha)	Average – 60 Maximum - 400	Average – 60 Maximum – 400
Total water quantities planned for irrigation in 2015 (10 ⁶ m ³)	0,91 – 6,0	0,2 – 1,2
Estimation of consumptive use (%)	100	

Table 5. Water demand for irrigation up to year 2021 in Slovakia

The **Romanian** Strategy for Agricultural Development on medium and long term, document of public policy which takes into consideration the new guidelines in the agricultural domain for the next eight years, anticipates a strategic vision so that, by 2020, Romania will become one of the main exporters of agricultural products from EU with an agriculture competitive, diversified and sustainable, making use of its naturally very high agricultural potential. There are not official data available on the water demand for irrigation.

3. Long term water demand for irrigation according to the National Strategic Documents

Data gaps exist for the long term water demand for irrigation within the Tisa River Basin; it is not possible to provide accurate water quantity requirements for the irrigation due to the insufficient information. **Slovakia** provided an estimate based on expert judgement in the absence of other official prognosis on the water demand for irrigation. The latest official prognosis for demand of irrigated water was published in 1995 with the outlook up to 2010. This prognosis calculated only with a very small increase of water demand in comparison with the real abstraction volume made in year 1993. This prognosis up to 2010 was not met; on the contrary a large drop in abstraction water for irrigation was registered. The estimates presented in the Table 6 for Slovakia are based on the same assumptions as in 1993. Table 6 contains as well estimates provided by **Ukraine** for the water demand until 2021. In Ukraine, the planned water sources for irrigation are both surface and groundwaters.

Indicator	Values in Slovakia	Values in Ukraine
Planned areas for irrigation (ha) by the end of the strategic document planning cycle	40907 ha	1000 ha
Water quantity planned for irrigation per hectare (m3 per ha) by the end of the strategic document planning cycle	Average – 60 Maximum - 400	250 m3 per ha
Total water quantities planned for irrigation (106 m3) by the end of the strategic document planning cycle	2.45 – 16.4	0.250 mln. m3
Estimation of consumptive use (%)	100	0.5 %

Table 6 Water demand for irrigation up to year 2021 in Slovakia and Ukraine

For the comprehensive assessment of the future water use for irrigation more uniform and accurate data are needed within the Tisza River Basin.

4. Good practices at the national level

There are several examples of the good practices with respect to irrigation at the national level. In **Slovakia** minimum soil tillage technologies as measure for adaptation of agricultural practices to available water resources were confirmed by the field experiment. There are a few examples of the good practices in **Ukraine**, e.g., installation of the automatic hydrometeorological stations at farms, application of hose pipes at cylinders and drop irrigation for irrigation, changes in agricultural practices to adapt to available water resources, and positive examples of the compensation schemes. Detailed explanations are provided in the Chapter 5 of this document.

5. Map development on the distribution of irrigation areas in the TRB

At the moment, the map that would generate relevant information on irrigation within the Tisza River Basin could not be developed due to data gaps and uncertainties.

In **Hungary**, it is expected that at the end of 2013, a map of the channel system (channels managed by the state (Regional Water Authority) and channels managed by water associations) will be delivered within the frame of an ongoing project EEOP (KEOP)-2.5.0/b). At present a shape file about the channels managed by Regional Water Authorities (excess water, -irrigation and double operational are separated) can be provided, to be delivered by the National Water Authority (OVF). This map will be actualized in the framework of the above mentioned project.

Information to be used for map production will be available in **Romania** once the Land Cadastre will be finalised (2018).

6. Scenario for the next management cycle

Given the available information and data at the moment, it is not feasible to propose long term scenario for the water quantity management in the Tisza River Basin. As a consequence, there is a risk of failure to sustain synergy among water quantity and water quality issues.

Slovakia provided estimates for two scenarios which are presented at the chapter on water demand prognosis until 2021.

7. Results, recommendations

There is a need to improve information on the planned water abstraction and land use practices changes, which are required in the integrated river basin management activities in the dialogue between agricultural and water sectors.

Supplementary data from countries will also facilitate a better perception of the need to implement agricultural measures that contribute to reach the WFD objectives in the TRB as well in the DRB.

4. Relevance of stakeholder involvement in the dialogue between water management and agriculture

Background

It has been agreed at different working levels in the DRB as well at the Tisza sub basin, on a number of important measures to boost agricultural productivity, improve water and soil quality for meeting the EU policies, in ways that are socially, economically, and environmentally sustainable. It also recognized that an integrated approach linking water and agriculture, but also capacity building at all levels and stages is of high priority. The Tisza Group explicitly recognized in the Communication Strategy papers, the importance of intensifying dialogue between policy makers, farmers from farms of all sizes, rural communities and water and environmental organizations.

This is also requested through the implementing requirements of the WFD, CAP and Nitrates Directive, which are calling for measures to (a) improve water quality, (b) enhance agriculture production, productivity and sustainability; and to (c) manage sustainably competing uses of water and land resources, all through an active and transparent stakeholder's dialogue.

As initially foreseen, this case study will also contribute to provide evidence on the stakeholders' involvement and benefits from the agricultural measures, in the context of the WFD and agricultural policies implementation in the TRB.

Highlighting some of the specific foreseen challenges from the stakeholder dialogue, ahead of us to undertake new initiatives targeting the following objectives:

- to encourage development and adoption of locally appropriate farming systems and good agricultural and environmental conditions
- to promote integrated nutrient management and control, especially to prevent degradation of vulnerable land and restore degraded land in Nutrient Vulnerable Zones;
- to support sound water management and saving in agriculture through efficient irrigation, water harvesting and storage, treatment and reuse;
- to strengthen research, education and extension that advances the practice of sustainable agriculture and rural development and ensure dissemination of information, knowledge and expertise through extension services;
- to reinforce multi-stakeholder participation and partnerships in the development and implementation of the sustainable agriculture and rural development practices in synergy with the rational water use.

The current state of capacity is different in the Tisza countries, having in mind particularly varying research and extension capacity and institutional conditions for agriculture and rural areas.

The agricultural sector in Romania includes the irrigations, livestock and fisheries. As a result, stakeholders are numerous!

However, the inputs from the countries in the TRB proved that the needed dialogue between the water and agricultural sectors is quite intense, efficient and this relates to capacity building which includes institutional, technological, and human resource dimensions.

The list of most relevant stakeholders involved in the water and agricultural dialogue in TRB is presented in the Annex 1.

Interlinkages between agriculture and water management sectors in national policy level

The dialogue between agricultural and water sectors takes place both horizontally and vertically at all levels, and it is organized around similar issues in the TRB countries, such as:

- drought effects mitigation strategy with the participation of both sectors: agriculture and water resources management (Hungary, Romania);
- Elaboration of national river basin management plan with the participation of both sectors to their implementation (Hungary, Romania, Serbia, Slovakia, and Ukraine).
- Maintenance of amelioration (drainage) system (Ukraine)
- Use of pesticides in the agricultural production (Ukraine)

Public participation serves not only the decision makers' interest but it is also an obligation ordained by several laws in Hungary.

In all countries in the TRB, the dialogue between the water and agricultural sectors focuses on the implementation of EU legislation, preparation of national legislation, development of strategic and technical documents, including the provision of advisory service to the farmers. Communication between these sectors depends on type of activity and following an agreed procedure.

The largest activities related to public participation were targeted to the development of the RBM plans. In **Hungary**, the involvement of the public had the greatest importance during the preparation of the RBMP, and which is still operational during the implementation of the plans as well and in which water users – including agriculture– are also represented.

In the frame of river basin management planning process, in **Romania**, a large number of public consultations regarding the Programme of Measures had been organised, where the measures addressing the significant pressures were subject to large debates and consultations, with the participation and active contribution of relevant stakeholders.

In each Water Basin Administration, in 2008-2009, several meetings were organised for ensuring the consultation of the programme of measures taking into consideration the specific sectors for all significant water management issues: agriculture, industry, urban agglomerations and hydromorphological activities. In relation to agricultural activities, the main purpose of these meetings was to develop the set of measures for reducing the impact of agricultural pressures. Regarding the above-mentioned process of RBM Plan development, all main stakeholders participated and provided comments that have been taken into account in general.

At national level, the number of representatives of farms and farms associations, agricultural units, local authorities, agricultural institutions, NGOs which attended these meetings was 414 out of 718 officially invited.

Management fields/issues where more dialogue between the water and agricultural sectors would be necessary to reach the objectives of the WFD

Serbia recommends the need to further develop dialogue between the two sectors considering the need to:

- Develop the River Basin Management Plans for the water districts (sub basins) at the national level and implementation of the proposed measures;
- Adopt the relevant by laws that would transpose requirements of the EU Nitrate Directive, and other directives relevant to water management and agriculture e.g., development of the water protection plans by inter- ministries working group;
- Extend the dissemination and application of the Code of Good Agricultural practices (published in March 2011);
- Implement the BAT on irrigation that would decrease agricultural adverse effects on the water resources in Serbia;
- Identify the Nitrate Vulnerable Zones at the National level;
- Develop the flood risk management plans;
- Identify climate change constrains at the national level that have adverse effects on both sectors;
- Allocate financial funds to support changes of land use practices (e.g., afforestation of the agricultural lands to decrease erosion, etc); and
- Workshops and trainings for relevant stakeholders and decision makers at the national and local level.

In **Slovakia** there is a need to foster the dialogue in the following areas:

- a) The core area is a specification of environmentally efficient and economically acceptable POMs relevant to concrete river basin.
- b) Other areas/activities, where more constructive dialogue is needed include:
 - updating the Action Program to Nitrate Directive,
 - preparation of Rural Development Programme for period 2014-2020,
 - creation of information system that will serve as a base for complex analysis of relationship between agricultural activities and status/trends of water pollution (setting objective and acceptable criteria of management practices in agriculture) and search the ways how to incorporate the positive externalities arising from agriculture (with regard to water) into existing/prepared RDP measures, and
 - training of farmers.

In **Ukraine**, it is important to increase dialogue between State Agency of Water Resources as a part of the Ministry of Environment and Natural Resources responsible for the environmental protection and water management and Ministry of Agrarian Policy at the national level, especially in the field of amendments to the current legislation and organization structure.

At the regional level it is important to establish Tisza basin council, which would serve as a platform for joint decision making for the conflict issues between water management and agriculture.

Romania suggests that the need of farmers training (training courses, professional technical training) is an important component of the process, ensuring farming advisory and implementation control. Also the improvement of the co-operation between authorities responsible for agricultural and rural development and river basin management plans at all appropriate levels (national, regional, local) would be beneficial.

Type and objectives of the stakeholder/communication activities which have already been initiated at national level

Involvement of the stakeholders appears in the **Hungarian** planning process as well. As for the preliminary steps of the water management programmes, the conciliations in connection with the problems of the Lake Tisza, that of Lake Balaton and the Vásárhelyi Plan can be mentioned. There is a long learning process from the tradition of closed decision making to the practise of open planning, both for the planners, decision makers, executors as well as for the stakeholders. Nevertheless, the experiences gained so far can be a good basis for proceeding. Another example from Hungary relates to the public consultation of the draft RBPs, especially the programmes of measures which took place in 2009, in the course of the third consultation process. Between 30 June 2009 and 29 July 2009 so-called territorial forums were organized in all the 42 river basin management planning units, to discuss (i) topics having importance at country level (agriculture, conservation, forestry, tasks of the municipalities, thermal waters, fishing, angling, regulative and overall measures, institutional development, development programming, infrastructural developments, financing), (ii) areas that could geographically be delineated and necessitating special attention, and (iii) questions arising on the level of the 4 sub-basins (Danube, Tisza, Dráva, Balaton).

Level of the communication activities and forms of dialogue

Cross-sectoral dialogue takes place between experts on following levels in **Slovakia**:

- a) Within working groups established for solution of concrete tasks/problems – technical documents, such as for water planning or reporting of directives implementation to the Commission. For water sector establishment of working group for development of Rural Development Plan for period 2014-2020 is necessary. Such working group was not established so far.
- b) Formal dialogue – for all documents that approves the Slovak government – the process is defined by legislation. There is a special created Portal belonging to the Government where documents are uploaded and commented based on an agreed procedure.
- c) Informal communication organised for ad-hoc activities. An example relates to the Farm Advisory System under the Agroinstitute Nitra, with competencies given by the MARD.

In **Romania**, all the public information and consultation meetings during the development of the RBMP have been announced via local media, websites of the National Administration “Apele Romane” and its 11 branches, specially delivered letter, emails, etc.

The main body for ensuring public participation is represented by the Basin Committee created based on the provisions of the GD 1212/2000 for the mechanism for public consultation and information at river basin level. The Basin Committee organised at the level of each River Basin Water Administration ensures the public participation in the decision-making process in the water management field. It was established following the need of the creation of a consultation mechanism involving: local collectivities, water users from the river basin, beneficiaries of water management services.

In **Romania**, to ensure the link between the water management sector and agricultural sector for specific activities in national policy level, joint legislation (GD 964/2000) promoted by Ministry of Ministry of Waters, Forests and Environmental Protection, Ministry of Agriculture and Food and Ministry of Health was issued. This legislation has as scope the identification of fields of activities where common actions are needed and the establishing of a joint structure (commission and supporting group), through the approval of the Action Plan for protection of waters against nitrate pollution from agricultural sources and by establishing of the Commission for the application of the Action Plan for protection of waters against nitrate pollution from agricultural sources.

Futhermore, in year 2001 through a Joint Ministerial Order, the rules for organisation and functioning, aims and competence of the Commission and Supporting Group for the implementation of the Action Plan for the protection of waters against pollution with nitrates from agriculture sources were approved. The Commission is made up of 12 members, most of them from central water and agricultural authorities, and it is assisted by Supporting Group. For the implementation of WFD, including the implementation of programmes of measures, the Interministerial Council of Waters has been created.

In order to support the dialogue between water managers and farmers, in **Ukraine**, an Informative Advice Centre on the basis of the Tisza River Basin Authority (Tisza BUVR) was

established. The branch of the Information-advisory centre is established at the basis of the one of the best farms – farm “Konyk”, Storoznitsya village, Uzhgorod rayon.

The centre has different activities:

- provide informational-consultation and advisory services regarding BAT in the field of water management and melioration of the lands for farmers, water managers and general population.
- offer informative and consultative recommendations regarding the effective use of ameliorated lands and establishment of the watering.

The centre is preparing guidelines on:

1. Agricultural use of floodplains;
2. Improvement of the erosive and erosion prone lands;
3. Deep ploughing of meliorated lands.
4. Soil liming;
5. Conduction of culture-technical works at meliorated lands.

The forms of dialogue used in **Ukraine** include:

- Personal communication
- Round tables (Tisza BUVR often conducts “*round tables*” for all the stakeholders, media, NGOs, where the most urgent issues of the agricultural and water management are discussed, e.g. state of meliorated lands. Also Associations of Farmers are NGOs are established in each rayon of Zakarpatska oblast. They represent the interests of the farmers at different platforms and are also involved in the round tables)
- Handling of written requests.

5. Good practices/samples from national level

The Danube River Enterprise Pollution Reduction GEF Project in **Serbia** (2005 - 2011) with global environmental objective to reduce nutrient flows into water bodies connected to the Danube River from selected Republic of Serbia (ROS) enterprises.

The main project components are:

- Support to policy and regulation reform;
- Investment in Nutrient Reduction;
- Water and Soil Quality monitoring, Public Awareness Raising and Replication Strategy;
- Project Management and Project Impact Monitoring.

The project financed manure management investments on 105 livestock farms compared with 60 planned farms. The annual decrease in the amount of nutrients, which are not taken up by plants

and eventually flow into watercourses from beneficiary farms is conservatively estimated at 44% for nitrogen and 100% for phosphorus compared to the baseline levels. Additionally, the GEF Grant has funded manure management storage facilities and equipment, and nutrient management curriculum development at six agricultural high schools, which is expected to have significant long-term replication impact by exposing future farmers, agricultural advisors, and agro-industrial professionals to proper farms nutrient management practices. The project activities improved Serbia's capacity to collect and process risky animal waste generated at slaughterhouses and meat processing enterprises and thereby reduced the likelihood of inappropriate dumping of these substances and resulting water pollution.

Another success story in **Serbia** refers to the Code of Good Agricultural practices developed and published in March 2011. This document is available for free download at the web site. Finally, as a part of the project activities 150 farmers went through training for nutrient balance implementation and advisors one day training for "Farm Nutrient Management Plan Preparation for Implementation of Nitrate Directive in Serbia. The trainees for this module come from different sectors, e.g., public, private, etc, and some of them attended seminars or training courses on good agricultural practice.

The World Bank project „Integrated nutrients pollution control”(INPC) implemented in **Romania**, aims to reduce nutrient pollution of surface waters and groundwater bodies in order to achieve environmental objectives and to positively effect the quality of the drinking water, being at the same time identified as one of the lighthouse projects of the 2012 Interim Report of the Implementation of the Joint Programme of measures in the Danube River Basin District. The Project continues at national scale the "Agricultural Pollution Control" Project, the total value of which is 60,04 million EURO , funded by a Specific Investment Loan (SIL) in the amount of EUR 50 million from World Bank, complemented by a GEF grant of U.S. \$ 5.5 million plus local funds.

The overall development objective of the Project is to support the Government of Romania in meeting the EU Nitrate Directive requirements by (a) reducing nutrient discharges to water bodies, (b) promoting behavioral change at the communal level, and (c) strengthening institutional and regulatory capacity.

The Project will help promote sustainable development by promoting best agricultural practice among farmers for improving land productivity in a much more durable manner and will help improve human health by directing attention to the reduction of nitrate content in drinking water. From the global environment, the Project objective is to reduce over the long term the discharge of nutrients into water courses leading to the Danube River and Black Sea through integrated land and water management.

It includes the following four components to be implemented over five years (from 2008 to 2013): (i) Commune-based investments in about 86 Nitrate Vulnerable Zones (NVZs); (ii) Institutional Strengthening and Capacity Building; (iii) Public Awareness and Replication Strategy; and (iv) Project Management.

The Project will support a menu of investments focusing on the NVZ designated communes located in ten river basins. In the first eighteen months, the Project supported initially the creation of eleven Training and Demonstration Sites (TDS). The counties were selected based on the number of NVZs, proximity to the River Basin headquarters in order to facilitate the participation of the local authorities, and willingness of the County Council to participate in the

Project.

In addition, the NVZ communes have been selected against a number of criteria including the level and sources of nutrient pollution, willingness of the local administration and communes to finance part of the investments, proximity to major water bodies, and compatibility of the proposed project interventions with the County's plans for waste management and water supply. Subsequent project investments will be rolled out to other NVZs/communes so that the Project will support investments in a total of 86 NVZs/communes.

In the case of **Tisza river basin**, the situation is as follows:

- for Somes –Tisa hydrographical area : 9 localities have been identified for investments, out of which 1 locality for the establishing of Centers of Demonstrations and Training
- for Crisuri hydrographical area : 3 localities for investments
- for Mures river basin : 6 localities for investments, out of which 1 locality for the establishing of Centers of Demonstrations and Training
- for Banat hydrographical area (the part from the Tisza river basin): 1 locality for investment

One main component of the project is represented by the public awareness and replication strategy (2.58 MIL. EURO), in the frame of which various activities to facilitate the dialogue between agricultural and water management sectors take place. A broad public information campaign of the project's activities and benefits is undertaken at the local, river basin, national and regional levels to achieve replication of project interventions in other similar areas within Romania (NVZ designated communes in non-focus counties), as well as other Black Sea riparian countries and EU candidate countries.

In particular, this component will promote improved rural sanitation in the NVZs, implementation of good agricultural practices, such as composting, conservation tillage, crop rotation etc.

The Project provides the proper framework for the organization of: national and regional workshops, field trips and study tours where knowledge and skills on effective low-cost environmentally friendly technologies will be shared.

The project uses the media (TV, radio, agricultural and environmental journals) and activities with school children as a vehicle for disseminating the benefits of the proposed activities.

In the frame of information campaign, 11 workshops at the level of the 11 River Basin Administrations are organized. So far in 2012, 7 workshops took place according to the following calendar: April – Covasna, May –Bucharest, June- Buzau, Bacau, Iasi, July – Constanta, Craiova. Representatives from local Environmental Agencies, Agency for Payments and Intervention in Agriculture, Sanitary Veterinary Authority, local Public Health Directorates, local Environmental Guards, local Agricultural Directorates, local Water Companies and local authorities have participated.

Also as regards the on Farm Advice/Extension Services, training programs of agricultural consultants and farmers for promoting the Code of Good Agricultural Practice based on farm-level demonstrations, awareness and information campaigns take place.

During April-July 2011, 12 training sessions on implementation of the Nitrates Directive were organized in each River Basin Administration. The training sessions were addressed to the staff of the national, regional and county authorities involved in the application of the Action Program for implementation of the Nitrates Directive. Thus, a number of 401 participants have

been trained. In 2012, the county agriculture chambers has planned a series of training sessions (at least 1 per county, meaning at least 42 sessions at the national level), which will be addressed to the farmers (20-24 farmers/session) on implementation of the Action Programs elaborated in each vulnerable zone and on the application of the Code of Good Agricultural Practices. Various communication ways have been and are used during the project implementation such as publications, press releases, conferences.

The best practices highlighted in the **Slovakian** contribution, relates to the “Minimum soil tillage technologies – a measure for adaptation of agricultural practices to available water resources”.

In general, decreasing the pressure of irrigation on water and sustainable and integrated water management is often accomplished through:

- incentives/long-term compensation schemes for land owners in the event that their land is used for wider water management purposes, such as flood protection, improving natural values, water retention – this is possible through RDP 2014 - 2020,
- changes in agricultural practices to adapt to available water resources,
- introduction of BAT and improvement of irrigation efficiency,
- awareness raising, etc.

With regard to recent history of irrigation systems use on agriculture land it is necessary to stress that maintenance of the functionality of irrigation systems (at present only part of area has functional irrigation systems) and the costs for lease of pumping station (in spite of the fact – abstracted water for irrigation is exempted from fees) are main reason of relatively low use of irrigation water in Slovak agriculture. Thus, crop cultivation has rain fed character, and agriculture creates relatively low pressure on water consumption on irrigation.

Positives of application of minimum soil tillage technologies were confirmed by a field experiment realized in Slovakia (Kováč et al., 2010). The results of the experiment are summarised below.

Besides economic benefit and many positive environmental effects (e.g. decrease of GHGs emissions, stabilisation/increase of soil organic matter, decrease of soil compaction and increase of water infiltration) the minimum soil tillage technologies **contribute to decrease of non-productive evaporation and thus to better water supply to plants and crop growth**. It was found out that minimum soil tillage influences the soil water balances through:

- decrease of soil compaction;
- crop residues left on soil surface reduce evaporation by up to one half;
- utilisation of protective effect of plant cover and post harvest residues that act as a mulching material that decrease soil temperature in most warm period through that non-productive evaporation is decreased.

Thus, application of minimum soil tillage technologies helps to improve soil moisture regime and decreases demand on water for irrigation. Positive effect of minimum soil tillage was observed especially in summer period because winter period usually balances the deficit of water supply after preceding vegetation period.

After definition of soil/site parameters, in Slovak conditions these technologies can be applied on 48% of arable land.

In **Ukraine**, even there is no compensation scheme for land owners in the event that their land is used for wider water management purposes, there are some positive examples:

Individual farmers of Borzhavske, Komyaty, Zarichya and Greblya villages provided their land for construction of dike. In Rakhiv rayon (mountain rayon with lack of agricultural land), farmers in Dilove village provided half of their 10 ha fields for the dike construction, after long public consultations. In order to protect Bedevlya village, Tyachiv rayon, a farmer should have given away his land. Now the village is protected, and the farmer got a land in another part of the village.

An example of a best practice on the changes in agricultural practices to adapt to available water resources, in Ukraine relates to a farmer – Molnar - from Nitfolvo village, Beregiv rayon who after he lost his harvest due to floods from ameliorated system Chorny Mochar, started to grow corn and gardens instead of vegetables. Also, the Farm “Ranet” in Vinogradiv rayon taking into account the insufficient water resources started to grow apple garden instead of potato. The same



situation is with a farm “Berizka” which previously cultivated grain. Farm “Galla”, Tyachiv rayon, due to lack of water decided not to grow fish in the pond which was specially constructed with his purpose. The debit of Tilta river is not sufficient to keep this pond. Now he grows plums and produce sweets “plume in chocolate”. Finally, the Farm “Eco”, Vinogradiv rayon decided to grow mongolica pigs instead of grain.

Figure 7. Modern irrigation in farm “Konik”

An example of the introduction of BAT and improvement of irrigation efficiency is given for Farm “Konik” in Ukraine, which uses for irrigation hose pipes at cylinders and drop irrigation. The harvest is 35-40 centner per ha, in some years 55 centners, fruits and potato – 250-300 centners. It is considered as example for all other farms. This year, this farm obtained anti hail cover to protect the garden.

Ukraine brings also a best practice on awareness. During 2009-2010 a pilot project “Best practices of **Fertilizers Reduction from Agricultural Lands in Upper Tisza basin, Ukraine**” in frame of the Living Water Exchange: a GEF/UNDP Project Promoting Nutrient Reduction Best Practices in Central and Eastern Europe was implemented in Silste and Zarichya villages of Irshava rayon. The selected region in Zakarpattya – Siltse and Zarichhya village are the most representative in the region because it is the center of early vegetables growing in the green houses. The settlements are located in Irshava rayon of Zakarpattya Oblast, on both sides of Irshavka river, which flows into Borzhava, Upper Tisza basin. Around 80% of the working population of the villages is involved in growing of early vegetables. Around 2/3 of area of the communities are used to grow them. The farmers collect 2-3 harvests (cabbage) per year, using different biological additives, herbicides, mineral fertilizers.

Its main achievements are as follows:

- First, a riparian protective zone was established along the Irshava River by means of planting 750 plumb trees, making it the longest such 'alley' in Zakarpattya Oblast, at some 6 kilometres in length.
- Second, nitrate measuring devices were obtained for village councils, and a sanitary-epidemiological service was placed in charge quality control of agricultural products, having been trained in the proper use of measuring devices.
- Third, organic fertilisers were introduced in Zakarpattya through a vermiculture programme.
- Fourth, a 'Strategy of Nutrient Reduction' was developed for the villages of Siltse and Zarichya, which includes chemical analysis of water in rivers and soils, relevant maps detailing soil pollution and soil fertility, and specific recommendations on fertiliser to be used in certain conditions.

Also a public campaign “**Find the most clean vegetable**” took place. The campaign included:

- 2) Children competition of drawings “**My village**”. Children were invited to make drawings regarding their village environment and its future. The best works got the prizes from the project. The selected works were be used for development public awareness materials (big boards) in frame of the project.



Figure 8. Children drawings presented at an exhibition.

- 3) Open lection for pupils made by project experts regarding the nutrients and nutrients pollution.
- 4) The public awareness campaign “**Find the cleanest vegetable!**” Children were invited to bring from their houses home grown vegetables. Then publically they could check themselves with the help of project experts the amounts of nitrates in these products using the nitratometers provided to the village councils by the project. The main goals of the action were as follows:
 - To inform public that village councils now have the devices which allow to measure very quickly nitrates contains
 - To support clean production
 - To make people aware of contains of nitrates in the products.

The results of the tests were unexpectedly good. The cleanest product (cabbage) had only 14 mg comparing to 900 mg which is MAC for this type of products. Of course these data cannot be very representative because the parents for sure selected the cleanest cabbage for their children to win. But for sure this helped to raise awareness about both children and parents of the pilot area.

The operation of the National, Sub-basin and Territorial Water Management Councils, in **Hungary**, as well as the river basin management planning committees participating in the decision making process and having a proposal making, consultative role is of uttermost importance concerning the involvement of the public. These councils strengthen the involvement of the public in the planning of river basin management in the relevant units of planning either by ensuring final social control at the end of the process or respectively making suggestions in respect of the approval of the plan.

The role of the councils and committees did not end with the finalisations of the RBMP. Quite on the contrary, in accordance with the prevailing provisions of law, the active involvement of these bodies covering the wide public is needed in the course of the detailed planning taking place till 2012 and in the course of the starting of the programme of measures. They will also have a role in the review of the river basin management plans every 6 years and in the elaboration of the further detailed plans.

The Council has a proposal making, consultative role in relation to the RBMP. The sub-basin Water Management Councils (e.g. a Tisza River Sub-basin Water Management Council) for instance share their opinion on national and regional development plans, on their fitting into the measures defined in the sub-basin river basin management plans.

The Council may make proposals to competent organs and organizations, and may ask the leaders of these organizations for information. Information of the public on the tasks of the river basin management planning and the building in of these tasks into the development planning is the duty of the Council. In practice, the councils operate with different intensity. For instance, the National Water Management Council has not assembled since the adoption of the NRBMP.

The governmental administration of waters and the environment has been significantly modified since the adoption of the NRBMP. As a consequence of the reorganizations, the role of the water management councils might decrease, or respectively there will be less capacity to operate them.

Reinforcing the organizations and ensuring the conditions of their operation in accordance with their originally defined tasks can be suggested. **These can serve as an example for other countries' public participation practices.**

Hungary has indicated several other good practices through so called cross-border co-operations, aiming at water retention.

The aim of the INTERREG project entitled "Development of a common land use and water management concept based on water retention, monitoring its feasibility and planning certain components in Bodrogköz" is the development of a single land use and water management system in the lower (Hungarian) and higher (Slovakian) Bodrogköz. Its central component is water retention, through which the danger of the appearance of floods and excess waters as well as the damages of drought decreases, the revitalization of wetlands takes place, land

management becomes possible and opportunity is also provided for eco- and sport tourism as well as for recreational use.

Up to this point, the conceptual plan for the water management system including plans licensed for certain areas have been completed.

The DRABALU Project (Drava Basin Altered Land Use Project) in Ormánság – Commanding water and land use change in the service of local economy development is a project that is part of the Old-Dráva programme financed by the Hungary-Croatia IPA Cross-Border Co-operation Programme. In the framework of the project, six studies will be produced providing solutions for water management, land use and farming problems of specific places located in the cross-border areas (one place per study). Two of the studies will specifically focus on the issue of water retention (Opportunities for water retention on the Korcsina-channel; The rehabilitation of the oxbow under Markóc settlement (Balog-meadow, Berek), the detailed study of water commanding in the area in order to create conditions for long-term water cover). The project contributes – among others – to the reversal of the process of drying out and to the increase of ground-water level.

The specific measures and developments based on water retention are financed from 2011 through a new call for applications by EEOP (Environment and Energy Operational Programme). The aim of the projects to be funded in the framework of the complex programme entitled Improvement of the Vásárhelyi Plan (IVP) is the development of water retention based (so-called flood plain) land management systems that connect water retention and the utilization of retained waters with the rehabilitation of the water systems of flood plain basins. Further aim is the development of an infrastructure (water commanding facilities, tunnels, fishponds, wetlands) that is connected to the implemented and planned flood control reservoirs, flood plains measures and related excess water basins in the Tisza basin, at the same time supporting water retention and providing opportunity for flood plains management, while also fitting to the land use plans drafted for the basins.

Beyond land management projects, EEOP also finances complex water protection applications. Specifically, it aims at water retention and artificial water supply. “Pilot project to be implemented in the two pilot areas located in the Homokhátság area of the Danube-Tisza Interfluvium in order to moderate the effects of climate change and to develop the steps for adaptation.

For further improvement, it is crucial to transform the present agricultural subsidy systems in a way that on the one hand the farmers can produce products for agriculture and on the other hand primarily through water retention provide ecological services – also acknowledged by the state. One condition for this is environmental adaptation, that is, to use the earth everywhere for that purpose and with that intensity, which it is the most suitable for and which it can take without being damaged.

All success stories presented by the countries in the TRB show practical ways of implementation of the best agricultural practices and their experiences should be further disseminated.

6. Conclusions and recommendations

The Case study draws on the following **conclusions**.

At the Tisza river basin level, agriculture is an important driver which determines pressures on water resources and which generates point and diffuse sources of pollution. Agriculture is the major source of pollutants, including natural and chemical fertilizers and pesticides application as well as effluent from huge pig farms and agro-industrial units. Further, their emission and further discharge into coastal areas and the marine environment can significantly impact the status of those ecosystems.

The role of policies is significant in the river basin management when we discuss the pollution coming from agriculture. That's why, the countries in the Tisza basin have taken great efforts to adopt, adjust and implement the EU Directives in support of implementing of measures to reduce the pressures from agricultural activities on water resources. The main initiatives are grouped around the WFD, Nitrates Directive and Common Agricultural Policy. There are also other EU legislation such as Integrated Pollution, Prevention and Control Directive applied for agro-industrial installations, or the Directive concerning the placing of plant protection products on the market which is also contributing to the achievement of the WFD objective and reduction of agricultural pressures on the water resources.

The EC Common Agricultural Policy is the single biggest driver influencing agriculture, and the Rural Development Measures implementation should be linked with the WFD to avoid the degradation of water due to agricultural activities.

The measures within the TRB addressing pressures from agricultural activities are built in the packages of measures addressing nutrient pollution, following the same concept as for the entire Danube River Basin, and contribute to the fulfillment of the agreed management objectives to enable the achievement of good ecological and chemical status in all affected surface waters.

On the Tisza basin level, basic measures (fulfilling the UWWTD and EU Nitrates Directive) for EU MS and the implementation of the ICPDR Best Agricultural Practices Recommendation for Non EU MS are the main measures contributing to nutrient reduction.

The implementation of the UWWTD by EU MS and the reported measures of Non EU MS (18 agglomerations for which wastewater treatment plants will be constructed / rehabilitated by 2015) significantly contribute to the reduction of nutrient point source pollution. An additional measure to decrease phosphates in detergents would further contribute to the P emission reduction.

The most effective synergies between the CAP and the WFD could be achieved through the co-operation among authorities responsible for rural development planning and river basin management at all appropriate levels. However, until now, policies addressing both areas have lacked co-ordination, being for the most part separately developed and implemented.

The assessment of nutrient pollution sources undertaken within the frame of the UNDP/GEF Tisza project (2009) is a valuable source of information for targeting the water resources and areas impacted by pressures from agricultural activities.

The most relevant common interests are related to the achievement of sustainable development, monitoring activities of water bodies for implementing water and agricultural policies,

integration across water and agricultural policy areas, territorial water management and flood management.

The shared conflicts include issues linked to affordability of financing, water management and conservation and acceptance by the farmers of agri-environmental measures to achieve good water quality. Farmers do not see the benefit of environmental measures in several cases. Environmental benefits are highly dependent on market factors

The water resources of the Tisza River Basin are mainly used for public water supply, irrigation and industrial purposes, but also for other uses, such as agriculture, fishing and recreation.

Integration of water quality and quantity in land and water planning is an essential issue

The increases in water use in the Tisza River Basin will be an additional pressure on already endangered aquatic ecosystems, particularly in the summer low-water period when planned irrigation can go beyond available water quantities;

Most of the countries reported that however the irrigation system is set up in larger areas in due the economic reasons they are not used/utilized

There is a great uncertainty about the water demand and the required water quantities abstraction for irrigation by the end of the next planning period. Limited data were provided either based on expert judgment or extrapolated based on the potential area to be irrigated in the future

In all countries in the TRB, the dialogue between the water and agricultural sectors focuses on the implementation of EU legislation, preparation of national legislation, development of strategic and technical documents, including the provision of advisory service to the farmers. Communication between these sectors depends on type of activity and following an agreed procedure.

A progressive implementation of the Water Framework Directive in TRB has huge potential to address the problem of pollution from agriculture. This will need integration across policy areas and the active involvement of all stakeholders.

The investigations carried out within the frame of this case study allow the formulation of **recommendations**, clustered per topics: policies, measures and implementation.

On policies

Need to have more stringent regulation in national and/or basin wide scale to reach good water status

Land use policies need to be integrated in the river basin management plans.

It should be a better coherence between farming policies and the WFD.

Integration of water quality and quantity in land and water planning is important.

On measures

The RD measures should have clearly expressed objectives and consist of clear requirements at a farm level.

The role of best agricultural practices in meeting the WFD objectives needs to be acknowledged

Agri environmental measures need to be adapted to the type of farming practice (arable, dairy), agriculture intensity, climate influence and type of soil, as well as to the organizational circumstances, and have to suit local conditions.

On implementation

At a national level there needs to be increased support for organic farming.

The role of markets at a national level, taxes on agricultural inputs that cause diffuse pollution such as pesticides and fertilizers, would encourage their more efficient use and reduce pollution.

Training and information must be made available to farmers and crofters about the impacts of their activities on freshwater ecosystems and habitats.

There is a need to improve information on the planned water abstraction and land use practices changes to sustain sustainable development in line with integrated river basin management.

The cooperation of stakeholders from agricultural sector and water managers on the inter-linkages between agriculture and water management (agriculture and environment) should be strengthened.

It is important to highlight the need to improve the data and information on water uses, which would facilitate the proper water balance assessments and the definition of the minimum flows for ecological quality and pressure criteria.

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8. Annexes

Annex 1. List of relevant Stakeholders of the Tisza River Basin in relation to Agriculture and Water management

Annex 2. Status of agricultural measures implementation

Annex 3. Baseline scenarios for Nitrates Directive and BAP

Annex 4. Study on present land uses and available water resources (effects of irrigation on surface and groundwater)

Annex 5. National background papers