

THE NUTRIENTS AND DROUGHT ISSUE

POLICY PAPER **ON SUSTAINABLE** **AGRICULTURE** **IN THE DANUBE** **RIVER BASIN**

50%

More than 50% of the Danube River Basin (DRB) territory are under agricultural cultivation.

1-10%

While the agricultural sector in EU members states accounts for less than 5% of GDP, it accounts for 10% and above in many non-EU countries.

70/20%

As of 2018, 70% of the agricultural areas are determined for direct financial support, whilst 20% receive additional subsidies for implementing environmentally friendly measures (only in EU countries of the DRB).

20%

Currently, about 20% of the surface water bodies are at risk of failing good ecological status/potential by 2021 due to nutrient pollution.

1 BILLION

The estimated economic losses caused by the drought in 2017 in the Danube countries are more than 1 billion EUR.

55/15 BILLION

In the last decade, agricultural direct payments amounted to ca 55 billion EUR and support of agri-environmental measures reached ca. 15 billion EUR in the DRB.



IMPRINT

Published by: ICPDR – International Commission
for the Protection of the Danube River

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Technical coordination: Adam Kovacs
Publishing coordination: Helene Masliah-Gilkarov
Design: LMP.wien

PHOTOS

Pages 4, 27, 31, 40, 39: unsplash.com
Pages 6, 14, 18, 25, 29, 30, 33, 35, 39, 42/43: pxhere
Page 10, 26: Zoe Schaeffer
Page 13: CAP objectives, europa.eu on twitter
Pages 23, 36: iStock

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List of Abbreviations

AKIS	Agricultural Knowledge and Innovation Systems	LEADER	Liaison entre actions de développement de l'économie rurale (connection between actions to develop rural economy)
BAT	Best Available Techniques	MBPS	Management-based Payment Schemes
CAP	Common Agricultural Policy	MS	Member State
DRB	Danube River Basin	ND	Nitrates Directive
EAFRD	European Agriculture Funds for Rural Development	NGO	Non-governmental Organisation
EAGF	European Agricultural Fund	NRN	National Reporting Network
EC	European Commission	ODMM	Optimal Drought Management Model
EFA	Ecological Focus Area	RBMP	River Basin Management Plan
EIP-AGRI	European Innovation Partnership for Agricultural Productivity and Sustainability	RDP	Rural Development Programme
EU	European Union	RBPS	Result-based Payment Scheme
FAS	Farm Advisory System	R&D	Research and Development
FaST	Farm Sustainability Tool for Nutrients	SMR	Statutory Management Requirement
GAEC	Good Agricultural and Environmental Condition	SO	Specific Objective
IED	Industrial Emissions Directive	SP	Strategic Plan
IPARD	Instrument for Pre-accession Assistance in Rural Development	SPD	Sustainable Use of Pesticides Directive
		WFD	Water Framework Directive



KEY MESSAGES

In the policy context, huge opportunities can be identified in the post-2020 Common Agricultural Policy (CAP) proposal that could potentially trigger significant steps towards sustainable agriculture in the Danube River Basin (DRB) and to contribute to decoupling agricultural production from nutrient pollution and water scarcity in a cost-effective way. In order to address the environmental and sustainability challenges of agricultural production in the DRB with higher ambitions and to effectively contribute to the objectives of the European Green Deal, Danube countries are particularly encouraged to:

- 1 **Design** flexibly the obligatory measures under the CAP enhanced conditionality.
- 2 **Examine** closely the potential of the new, flexible and potentially very effective voluntary 'eco-schemes', in particular for supporting agro-economy, agro-forestry, organic farming, precision farming and carbon farming practices.
- 3 **Commit** to the development of DRB-specific approaches for voluntary agri-environment-climate interventions with particular focus on development and implementation of collective / cooperative approaches and result-based payment schemes for more sustainable soil and water management.
- 4 **Make** a significant investment in strengthening Farm Advisory Services and building an Agricultural Knowledge and Innovation Systems for sustainable agriculture in the DRB and pay much greater attention to capacity building of all actors (farmers, advisers, researchers, small and medium-sized enterprises etc.).
- 5 Strongly and actively **recommend** and promote applying nutrient management planning in the farming practices to assist farmers in an efficient use of fertilizers at field level adjusted to crop nutrient demand and soil nutrient content via information, knowledge exchange and advisory activities funded in the new CAP Strategic Plans (SPs).
- 6 **Develop** and maintain advanced regional drought monitoring and forecasting systems with special emphasis on early detection, along with drought risk and impact assessment tools.
- 7 **Elaborate** drought management plans and set up operational management models focusing on preventive and early responses in order to enhance resilience and preparedness.
- 8 **Put emphasis** on soil management practices and support farmers to properly implement erosion control, soil conservation and natural water retention measures.
- 9 **Make use** of the funding instruments to compensate certain difficulties and constraints (e.g. natural disadvantages, constraints related to WFD implementation and NATURA 2000 sites).
- 10 **Promote** community-led local developments under the LEADER programme and the concept of Smart Villages as an emerging and potentially well-suited opportunity for rural communities in the DRB making the best use of technology and social innovation.

RECOMMENDATIONS

In addition, Danube countries are advised to consider the following recommendations for policy making:

- ▶ It is crucial to establish a proper **partnership-dialogue** between the agricultural and water sector to develop a cross-sectoral and mutual understanding of needs, expectations and constraints of the two areas.
- ▶ Active and **early involvement** of environmental authorities in the preparation of CAP SPs as well as taking environmental knowledge and planning tools into closer consideration should be achieved to support the design of relevant and effective agro-environmental policies at national level. There is a huge need for finding synergies between the CAP interventions and the measures identified in the RBMPs in order to contribute to the achievement of the environmental objectives of the WFD.
- ▶ Countries should define **national standards** for obligatory measures with flexibility to tailor the implementation of these standards to specific local or regional needs and characteristics.
- ▶ Measures controlling nutrient pollution should be targeted on **emission hot-spots**, those areas where there is a significant risk of local resource loss (e.g. via soil erosion or leaching) or water pollution (due to high transfer rate of nutrients or vulnerability of water bodies) and the requirements should be adjusted to the risks accordingly.
- ▶ Specific attention should be paid to the **farming structure** in the countries, certain environmental standards and targets should be achieved everywhere, whereas the standards might be differing for different farm structures.
- ▶ Countries are encouraged to take into account **favourable and disadvantaged areas**, crop rotation, environmental impacts, water body vulnerability and potential administrative burden when designing and implementing measures.
- ▶ Voluntary measures should be attractive, practicable and **financially acceptable** for farmers, particularly those that would lead to additional costs or result in income losses for the farmers when adopting and implementing them.
- ▶ Advisory services should support **digital transition** in agriculture including modern technologies, accompanied by smart devices and digitised supporting tools.
- ▶ Countries are encouraged to acknowledge drought as a national priority. **Policy coherence**, coordinated legal approaches and harmonized implementation related to drought on the national/regional level are essential for successful drought management, supported with sufficient resources.
- ▶ It is necessary to introduce available practical tools into daily work routine (i.e. using national data sets, operational use of tools in institutions, etc.) and to **share knowledge** on good practices to better support and guide drought management activities.

The paper outlines two land management categories according to soil productivity and land conditions and recommends a set of measures for both constellations:

- ▶ **Favourable areas** with high soil productivity and good climate conditions may attract investments and sustainable intensification to increase competitiveness. This would lead to a desirable sustainable development to improve the economic situation in rural areas, would give perspectives to people to stay and live there but would also fully integrate natural resources protection. A clear legal framework and an efficient implementation of cross-compliance/conditionality and „greening“/eco-schemes should be the focus here, backed up by appropriate control schemes.
- ▶ On the other hand, **disadvantaged areas** – i.e. areas with limited productivity, natural constraints or unfavourable social conditions - are threatened by depopulation and land abandonment, which need to be counteracted by integrated rural development programs including an economic basis for site-specific, traditionally extensive agricultural systems. In these regions but also in areas of high ecologic interest (e.g. riparian zones, floodplains and wetlands) agri-environmental programmes and compensations for ecosystem services (e.g. biodiversity, landscape maintenance and biotope management) and other income options for the agricultural sector like sustainable tourism are necessary.
- ▶ In both cases, competent **advisory services**, for which recommendations are also provided, should be part of any solution.

1

INTRODUCTION AND POLICY CONTEXT

Agriculture is an important component of the economy in many Danube countries since the geographical and climatic conditions in large parts of the Danube River Basin (DRB) are favourable for agriculture. More than 50% of the basin territory are under agricultural cultivation. Agronomic conditions are especially favourable for maize (corn), soybeans, sunflowers and other thermophilic crops besides the ordinary cereals. In the Western regions agriculture plays a key role as local supplier of commodities that are further transformed into food (mainly milk and meat products, fruits and vegetables). In the Eastern regions agriculture is one of the most important employers in rural regions. Although agriculture is substantially subsidized by the European Union (EU) and the national governments, the sector is facing socio-economic challenges. Despite the high share of land being cultivated, agriculture is not among the strongest economic sectors in the DRB. The share of the agricultural sector in the total national Gross Domestic Product of the EU Member States (MSs) is not significant (less than 5%), whilst non-EU MSs have a share around and above 10%. In many regions the intensity of agricultural production is low due to the less favourable economic situation. In areas where land productivity is low, farmers are often facing difficulties, as agriculture in these regions may not be competitive at all. In many Danube countries, there is a significant number of small farms working on a few hectares, which are highly depending on EU or national subsidies and often subsistence farms and have limited capacity to comply with strict and ambitious cultivation and environmental provisions. These regions are often threatened by land abandonment, poverty and social exclusion. Only a few

countries have integrated and powerful advisory systems, which are key instruments to reach and support farmers. In addition, agricultural production highly depends on circumstances that cannot or can only be partly controlled such as weather conditions, plant diseases and market instabilities, which may make agriculture economically vulnerable.

Water-related environmental concerns are also related to agriculture. Agriculture needs large amounts of clean water to satisfy the increasing demand for high quality food. However, intensive agriculture may cause quality and quantity problems of surface- and groundwater by pollution, over-abstraction and inappropriate land management endangering the status of the water bodies but also the sustainability of its own water resources. Nutrients have been released from agricultural areas of the DRB in significant amounts during the past decades. Nutrient pollution has been identified as one of the significant water management issues in the DRB. Currently, about 20% of the surface water bodies are at risk of failing good ecological status/potential by 2021 due to nutrient pollution, for which agriculture is one of the main sources alongside other sources such as urban areas or municipal wastewater. The ultimate recipient water body of the Danube is the Black Sea, which is, being the world's most isolated sea, sensitive to eutrophication. Nutrient loads transported by the Danube to the Black Sea peaked in the late 1980's triggering a serious eutrophication problem in the north-western shelf.

Nevertheless, river loads entering the Black Sea have been significantly dropped in the last decades.

Measures have been implemented in agriculture throughout the DRB. As of 2018, on more than 60% of the areas of the DRB strict rules on manure and fertilizer application are being implemented. Out of the agricultural areas of the DRB, 70% are determined for direct financial support and 20% receive additional subsidies for implementing environmentally friendly measures (only in EU countries of the DRB). In the last decade, more than 70 billion EUR were spent to support farmers and to finance effective environmental measures and methods (best management practices). Direct payments amounted to ca 55 billion



EUR and support of agri-environmental measures reached ca 15 billion EUR. Thanks to these measures implemented in agriculture, but also as consequence of low agricultural intensity in several Danube countries, the nutrient surpluses (gross balance) of the agricultural fields are rather low or even negative in many countries indicating lack of nutrient inputs which is compensated by the soil stocks accumulated over the previous years. However, the severe eutrophic conditions of the late 1980's might arise again if wastewater treatment and agriculture are

not managed sustainably in the catchment area. Moreover, nutrient emissions frequently represent unutilised losses of soil nutrient resources, which have to be supplied by external inputs in order to sustain the required production rates.

With regard to water quantity, water scarcity and drought situations are emerging issues in the DRB and will likely become more intense, longer and more frequent in the future. Serious drought periods hit the Danube region in 2003, 2007, 2011, 2012, 2015 and in the period of 2017-2020, affecting different water-dependent economic sectors, vegetation and the water resources. The estimated economic losses caused by the drought in 2017 in the Danube countries are more than 1 billion EUR.

1.1

Policy context

In the broader policy context, the EU Water Framework Directive (WFD)¹, aiming at achieving good status of all water bodies, obliges EU Member States to draw up River Basin Management Plans (RBMPs) describing inter alia pressures by which ecosystems and water status are perturbed and measures to be implemented in order to achieve good status/potential and to prevent further deterioration. The recent fitness check of the WFD² concluded that the WFD largely fits for purpose and has led to a higher level of protection for water bodies. Progress towards good status can be expected to be slow but steady.

In addition, other thematic Directives such as the Nitrates Directive (ND)³, the Sustainable Use of Pesticides Directive (SPD)⁴ and the Industrial Emissions Directive (IED)⁵ are of high relevance in terms of agriculture, regulating farming activities to achieve specific goals but also contributing to the WFD

1 Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy

2 https://ec.europa.eu/environment/water/fitness_check_of_the_eu_water_legislation/index_en.htm

3 Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources

4 Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides

5 Directive 2010/75/EU of the European Parliament and the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)

objectives. Moreover, the WFD is interconnected with other Directives and strategies relevant for agriculture and land management, particularly with the Habitats Directive⁶ and Birds Directive⁷, but also the Green Infrastructure Strategy⁸ and the Biodiversity Strategy⁹. These pieces of legislation put high pressure on agriculture by stipulating measures to be implemented in agricultural areas.

The new European Commission (EC) acting since December 2019 has been putting great emphasis on the environmental and climate dimension of European agricultural production. This is reflected in the Mission Letter from the President of the Commission to the Commissioner for Agriculture and the Commission Communication on the European Green Deal¹⁰. This involves a new growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where there are no net emissions of greenhouse gases in 2050 and where economic growth is decoupled from resource use. These Green Deal also highlights that the agricultural sector is both central to achieving the Union's climate-neutrality commitments and also sharply exposed to the effects of climate change. A specific focus on healthier and more sustainable food production is to become an important part of the Green Deal, the first headline target of the EC. Another key aspect is the Zero Pollution ambition for creating a toxic-free environment that needs enhanced pollution monitoring, prevention and remediation. To address these challenges, the Commission will adopt a zero pollution action plan for air, water and soil in 2021.

The 'Farm to Fork' strategy for sustainable food of the EC¹¹, one of the key elements of the Green Deal, will be looking at how the agri-food sector can improve the sustainability of food production across the food chain, including through organic production. The Zero Pollution ambition of the EC will ensure that agriculture and food production contributes to climate, environmental and biodiversity goals, notably by reducing the use of pesticides, fertilisers and chemicals in Europe and beyond (such as the Non-EU countries in the DRB). Regarding nutrients, the Commission's aim is to reduce nutrient losses by at least 50% by 2030, while ensuring that there is no deterioration in soil fertility. This will reduce the use of fertilisers by at least 20% by 2030. Moreover, at least 25% of the EU's agricultural land must be organically farmed by 2030. The Commission will put forward an Action Plan on organic farming, helping Member States stimulate both supply and demand of organic products. This policy paper is a tool for serving these EU policies and objectives.

The 'Farm to Fork' strategy will be implemented in close coherence with the other elements of the Green Deal, particularly the Zero Pollution ambition, the new Circular Economy Action Plan¹² and the Biodiversity Strategy for 2030¹³. The new Circular Economy Action Plan announces initiatives along the entire life cycle of products, targeting their design, promoting circular economy processes, fostering sustainable consumption and aiming to ensure that the resources used are kept in the EU economy for as long as possible. In relation to agriculture, the

6 Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

7 Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds

8 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Green Infrastructure (GI) – Enhancing Europe's Natural Capital - SWD(2013) 155 final

9 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Our life insurance, our natural capital: an EU biodiversity strategy to 2020 - SEC(2011) 540 final / SEC(2011) 541 final

10 COM(2019) 640 final Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - The European Green Deal

11 COM(2020) 381 final Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system

12 COM(2020) 98 final Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - A new Circular Economy Action Plan for a cleaner and more competitive Europe

13 COM(2020) 380 final Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions - EU Biodiversity Strategy for 2030 - bringing nature back into our lives

proposed Water Reuse Regulation¹⁴ will encourage circular approaches to stimulate and facilitate water reuse in agricultural irrigation. It will facilitate the use of treated urban wastewater for agricultural irrigation. Furthermore, the Commission will develop an Integrated Nutrient Management Action Plan, with a view to ensuring more sustainable application of nutrients, stimulating the markets for recovered nutrients, addressing nutrient pollution at source and increasing the sustainability of the livestock sector. The Biodiversity Strategy will put Europe's biodiversity on the path towards recovery by 2030 by protecting minimum 30% of the EU's land and sea area and setting up ecological corridors, strictly protecting at least a third of the EU's protected areas and effectively managing all protected areas, defining clear conservation objectives and measures and monitoring them appropriately. To provide space for wild animals and plants, but also to help enhance carbon sequestration, prevent soil erosion and depletion, filter air and water, and support climate adaptation, there is an urgent need to bring back at least 10% of agricultural area under high-diversity landscape features. These include, inter alia, buffer strips, rotational or non-rotational fallow land, hedges, non-productive trees, terrace walls and ponds.

The EU Common Agricultural Policy (CAP)^{15,16} provides a multi-pillar financing mechanism for farmers in EU member countries to ensure the sustainable development of agricultural and rural areas. It aims at supporting farmers and improving agricultural productivity, ensuring a stable supply of affordable food, safeguarding farmers to make a reasonable living, helping to tackle climate change and the sustainable management of natural resources (including water), maintaining rural areas and landscapes and keeping the rural economy alive. Since about 40% of the EU budget is spent for CAP

direct payments and voluntary measures of the Rural Development Programmes (RDPs), societal expectations towards the agricultural sector to comply with the CAP provisions in return for receiving financial support are high.

The recent CAP subsidies consist of two main pillars. Direct payments (Pillar I, financed from European Agricultural Fund, EAGF) are linked to compliance with compulsory measures upon basic standards on environmental sustainability, animal health and welfare and food safety. The cross-compliance mechanism includes Statutory Management Requirements (SMR) and Good Agricultural and Environmental Conditions (GAEC). In addition., the so called "Greening" measures are part of the direct payments and related to environmental friendly farming practices including crop diversification, maintenance of permanent grassland and conservation of areas of ecological interest. Funds for voluntary measures (Pillar II, financed from the European Agriculture Funds for Rural Development, EAFRD) under the RDPs aim at strengthening competitiveness, protecting environment, ensuring vitality of rural communities and modernising farms by innovations. Agri-environmental measures help farmers to overcome the challenges related to protecting soil and water quality, safeguarding biodiversity and adapting and mitigating against climate change impacts by supporting environmentally friendly practices, organic farming and sustainable innovations.

The impact of the CAP measures and instruments on water quantity and quality and the extent to which the objective of sustainable water management has been achieved was recently assessed by a specific EC study¹⁷. The evaluation report concluded that the EC should require MS to set ambitious targets for the CAP instruments and to achieve minimum

14 COM(2018) 337 final Proposal for a Regulation of the European Parliament and of the Council on minimum requirements for water reuse

15 Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy

16 Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD)

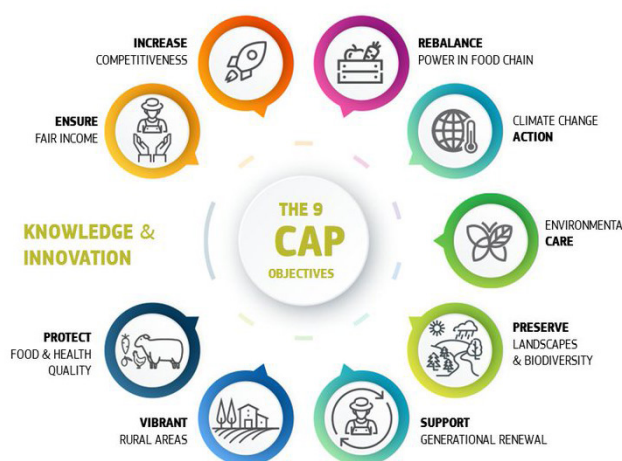
17 Evaluation of the Impact of the CAP on Water, ISBN 978-92-76-10939-6, doi:10.2762/63371, European Union, 2020

mandatory results by the CAP implementation in order to guarantee that the objective of sustainable management of water is met and to effectively reduce the agricultural pressures on water. Any exemptions lowering the level of standards required under the water-relevant CAP schemes should be avoided or carefully examined to avoid negative effects on water. Moreover, it is recommended that higher provisions in terms of minimum requirements are set and the share of budget allocated by MS to several water-relevant measures could be increased.

Within the pre-accession assistance of the EU for countries on their way to membership, the rural development section (Instrument for Pre-Accession Assistance in Rural Development, IPARD¹⁸) is highly relevant with regard to the implementation of the WFD and reduction of nutrient emissions into surface waters. IPARD includes 9 different measures, among others to prepare for implementation of actions relating to environment and the countryside.

Discussions on the post-2020 CAP have started with the proposed EC Regulation¹⁹, which details the regulatory framework for a “future-proof” CAP. The suggested regulation comprehends increased ambitions towards environmental and climate protection in response to international commitments, EU environmental challenges and societal expectations. The Mission Letter outlines these expectations towards the new CAP for the years ahead: it must be ambitious in terms of food security, sustainable food system and environmental and climate objectives and must be instrumental in strengthening the efforts of European farmers to contribute to the EU’s climate objectives and to protect the environment. In particular, CAP Specific Objectives SO 4 (Contribute to climate change mitigation and adaptation, as well as sustainable energy), SO 5 (Foster sustainable development and efficient management of natural resources such as water, soil and air) and SO 6

(Contribute to the protection of biodiversity, enhance ecosystem services and preserve habitats and landscapes) have high importance for environmental and climate protection. MS are obliged to make a greater overall contribution to the achievement of the climate- and environmental objectives compared to the previous programming period. In total, 40% of the CAP budget will have to be climate- and environment-relevant and support biodiversity objectives.



The objectives of the post-2020 CAP

The proposal aims at strengthening the connection of CAP support to the compliance of farmers with obligations to protect the environment, public, animal and plant health as well as animal welfare established as conditions for area related payments. A new so-called “enhanced conditionality” is proposed as an integral part of the future CAP framework, which replaces the current “Greening” and cross-compliance by updating the former SMRs and GAECs and integrating the “Greening” practices into the new GAECs. The enhanced conditionality sets the baseline for more ambitious and sustainable agricultural commitments through the adoption of good farming practices and standards by farmers. The introduction of the WFD and the SPD into the conditionality would support their implementation and the achievement of their specific objectives. In addition, new GAECs

¹⁸ Regulation (EU) No 231/2014 of the European Parliament and of the Council of 11 March 2014 establishing an Instrument for Pre-accession Assistance (IPA II)

¹⁹ Proposal for a Regulation of the European Parliament and of the Council establishing rules on support for strategic plans to be drawn up by Member States under the Common agricultural policy (CAP Strategic Plans) and financed by the European Agricultural Guarantee Fund (EAGF) and by the European Agricultural Fund for Rural Development (EAFRD)

could potentially have a positive impact on water quality and carbon dioxide sequestration in the soils. Such an addition would bring a dedicated tool for optimizing on-farm nutrient management and would protect peatlands and wetlands. Moreover, on every farm at least 3% of arable land will be dedicated to biodiversity and non-productive elements. Enhanced conditionality is mandatory for MSs to implement and must be respected by beneficiaries of direct payment.



The post-2020 CAP envisages requiring all MSs to prepare a CAP Strategic Plan (SP), where specific objectives would have to be achieved through targeted actions for improving the economic, social and environmental performance of the agricultural sector and rural areas. Also, CAP SPs at the national level should pay particular attention to the benchmarks and requirements on environment- and climate-related objectives. Furthermore, the Commission will scrutinize the national SPs against robust climate and environmental criteria to ensure that the respective specific objectives of the CAP are fulfilled and the targets of the Green Deal, the 'Farm to Fork' strategy and Biodiversity Strategy for 2030 are appropriately addressed.

The SPs will combine a wide range of targeted interventions addressing specific needs at national level, therefore MSs have to produce a thorough assessment of their needs based on a strengths, weaknesses, opportunities and threats (SWOT) analysis. In addition, MSs need to prepare an intervention strategy for each of the nine specific objective including targets (result indicators) and the most appropriate interventions. Setting the targets and selecting and designing the interventions will be based on the needs assessment. At the same time, MSs are requested to set explicit national values for the different Green Deal targets. The involvement of the EC at each stage of the CAP strategic planning, setting rules, assessing plans, monitoring progress and ensuring delivery is highly important and needs to be coupled with an ambitious national planning, targeted measures and appropriate knowledge and information sharing.

According to the proposal, the new conditionality would link farmers' income support to the application of environment- and climate-friendly farming practices. Moreover, agri-environment climate commitments and eco-schemes would also be important elements of the CAP SPs and would support farmers in maintaining and enhancing sustainable farming methods going beyond mandatory requirements and relevant conditions. In this context, the focus will be

shifted from compliance to better environmental and climate performance, in terms of improved nutrient management, reduced emissions and storing carbon in soil. At least 35% of each rural development national allocation would have to be dedicated to environmental and climate measures with the possibility of higher EU contribution in the funding. The new eco-scheme measures, which are to be defined by the MSs and to be funded from national direct payment allocations, would also address the environmental and climate objectives of the CAP. MS must allocate at least 25% of their income support budget to eco-schemes.

In June 2021, a provisional political agreement on the CAP reform has been reached at the EU level, paving the way for formally approving the necessary legislation in autumn 2021. The new CAP regulation shall enter into force on the 1st of January 2023, whereas a transitional regulation²⁰ was put in place for the period 2021-2022. This transitional regulation will extend most of the existing CAP rules but will also include new elements to make a stronger contribution to the Green Deal and to ensure a smooth transition to the future framework of the CAP Strategic Plans by enabling sufficient time for MS to design and prepare these plans.

Within the new multiannual financial framework (2021-2027) a budget of ca 385 billion EUR is allocated to the CAP. First pillar funding (income support and market measures) amounts to 290 billion EUR, whereas 95 billion EUR is assigned to second pillar payments (rural development programmes and 8 billion EUR Next Generation EU recovery funds helping rural areas make the structural changes necessary to achieve modernisation and digital transition). In order to better adapt national policies to the farming priorities, EU countries will have the option to

transfer up to 25% of their CAP allocations between income support and rural development.

To further support MSs in drafting the national SPs, the EC provided MSs with tailor-made recommendations, accompanied by a communication²¹. The recommendations guide MSs on how to implement the specific objectives of the CAP in order to jointly contribute to achieve the Green Deal's targets, identify key strategic issues that need to be tackled urgently for each MS and provide guidance on how to address them in the CAP SPs.

Since the Green Deal and its associated strategies largely address issues relevant to agriculture and rural areas, it is crucial that the new CAP and the Farm to Fork and the Biodiversity Strategy work in close coordination and synergy to support the long-term sustainability of natural resources and farming. According to a current analysis of links between the CAP reform and the Green Deal²², the CAP proposal is compatible with the Green Deal and its associated strategies and it has the potential to accommodate the Green Deal's ambitions. Nevertheless, certain proposed CAP provisions should be kept ambitious also in the final version, e.g. no-backsliding and ring-fenced spending for agri-environment and climate commitments, mandatory eco-schemes, ambitious enhanced conditionality for key standards. On the other hand, the final legislation may improve some elements (e.g. ring-fencing for eco-schemes, clarifying the scope of the eco-schemes) or may include new aspects (e.g. creating a structured dialogue for preparation of CAP SPs, publicly sharing documents on CAP SP assessment, including sustainability indicators into the current data network and strengthening its links with advisory services).

20 Regulation (EU) 2020/2220 of the European Parliament and of the Council of 23 December 2020 laying down certain transitional provisions for support from the EAFRD and from the EAGF in the years 2021 and 2022

21 COM/2020/846 Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - Recommendations to the Member States as regards their strategic plan for the Common Agricultural Policy

22 SWD(2020) 93 final Commission Staff Working Document - Analysis of links between CAP Reform and Green Deal

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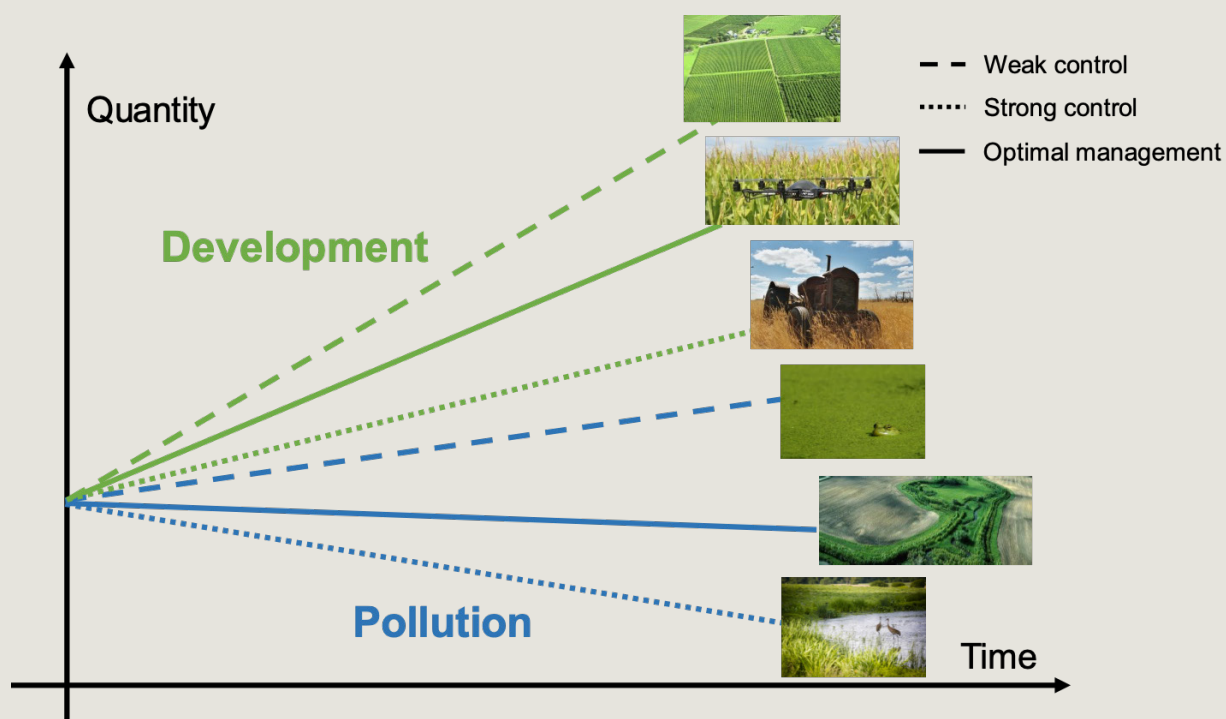
Guidance document on sustainable agriculture in the DRB

To address the above-mentioned multi-dimensional challenges and to achieve the ambitious objectives of both, the WFD and the new CAP, agriculture and water management need to be well aligned by coordinated strategies and joint actions to ensure, the protection of water resources, the economic livelihood of the farmers and the production of high quality food. However, at the regional scale of the DRB, a proper dialogue between the water and agricultural sector and coordinated policy tools have not been fully established yet. To address this shortcoming, the Danube countries agreed in 2016 to start, in close cooperation with the agricultural sector, a broad discussion process aiming at developing a sound guidance document on sustainable agriculture. The initiative is driven by the recognition that improving the socio-economic situation in the agricultural sector is a prerequisite for a successful implementation of agro-environmental policies. Water and agricultural policies should be designed and harmonised in a way that income losses for the farmers are minimised or compensated when implementing measures to protect water bodies. Policies should seek win-win solutions wherever possible. However, finding the way towards these objectives needs to change the paradigm: policies should be shifted from the traditional, purely command-control type regulative enforcement to more balanced approaches, taking into account the perspective of farmers' economic benefits. This new direction should be based on open dialogue, mutual trust and common understanding that is expected to result in willingness to make certain compromises by both sectors. With the paradigm change the initiated dialogue can have an ambitious objective: to develop a policy guidance in order to support decoupling future agricultural development from increasing nutrient pollution of surface and ground waters and

from prolonged water scarcity. In this way, it may contribute to achieving sustainable agriculture by balancing the economic, ecologic and social aspects of agriculture and rural development. The initiative is fully in line with the current political momentum of aligning water and agricultural policies at the EU level and the stronger ambitions of the proposed CAP post 2020 regarding environmental protection and climate change adaptation.

To achieve its ambitious goal the guidance paper recommends sound policy instruments, financial programs and cost-effective agricultural measures to protect water bodies for decision makers in the agro-environmental policy field. It offers Danube countries support for the preparation and implementation of their tailor-made national agro-environmental policies, CAP SPs and relevant strategies of the RBMPs in good synergy. The recommendations provide the Danube countries with a framework to adjust their national agro-environmental policies. They on one hand give specific advice on how to implement more efficiently existing legislation (e.g. ND, cross-compliance/conditionality of the CAP) and on the other hand help countries to better identify, target and finance additional measures going beyond legal obligations. Thus, the guidance should act as a strategic policy framework providing consistent approaches into which the Danube states are encouraged to integrate their individual national methods. It lays down the basis for designing cost-effective, targeted national measures according to national needs and conditions taking into account that no "one size fits all" standardisation could work in the DRB.

The primary focus of the guidance is sustainable nutrient management related to agriculture and rural



Decoupling agricultural development from pollution

land management. Nevertheless, Danube countries have recently declared that climate change effects, including water scarcity and drought is to be considered as a significant water management issue in the DRB. Bearing in mind the strong linkage of the drought issue to agricultural water management, the scope of the guidance document has been extended to the drought issue besides the nutrients. Moreover, pesticide pollution related to agriculture is also an emerging issue to be tackled. Further editions will broaden the scope towards pesticides and other harmful substances.

The guidance is to be considered as a living document subject to further update and fine tuning, particularly in line with the on-going discussions on the CAP post

2020 and taking into account additional inputs of the agricultural sector. The potential amendments and implementation aspects are planned to be discussed on joint follow-up workshops of the water and agricultural sector and relevant stakeholders.

This policy paper highlights the key messages and principles of the guidance, which contains more details on the issues underlined by the paper, provides comprehensive background information on the policy context and the situation of the water and agricultural sectors and presents a number of success stories.



2

POLICY RECOMMENDATIONS

National agri-environmental policies should be based on an appropriate combination of three fundamental pillars:

- compulsory measures to ensure minimum standards for good agricultural practices also complying with basic water management and environmental obligations;
- economic incentives (voluntary measures), going beyond legal requirements by making additional environmental commitments and compensated by public money (e.g. via subsidies) and/or sponsored by private initiatives or public private partnerships (Non-Governmental Organisations, NGOs);
- advisory services and platforms for knowledge sharing, innovation and cooperation, building on agricultural research and technology development.

All these pillars are relevant for EU MSs as they are key elements of the CAP but they could be applicable also in non-EU MSs in the course of their national policy reforms and preparation to EU-accession.

Countries are encouraged to undertake an assessment on the existing gap to good water status to understand how much work needs to be done by implementing agri-environmental policies. A certain amount of it is to be achieved by compulsory actions, the focus should be on effective policy implementation and inspection procedures to ensure compliance. This could allow designing the correct structure and set of voluntary measures to achieve WFD objectives accompanied with appropriate advice and knowledge exchange.

The CAP green architecture

With the new CAP-proposal the EC aims to give MSs the support, flexibility and evidence-based tools they need to be as ambitious as possible in tailoring the design and funding of environmental and climate schemes while fostering smart and competitive agriculture, ensuring food security and strengthening socio-economic situation of the rural areas. The EC has proposed a new post-2020 **'green architecture'** for interventions that must be included in the post-2020 national CAP SPs. The key elements of the post-2020 CAP green architecture are:

- An improved system of **'enhanced conditionality'** that will merge and streamline two existing elements - 'greening' and 'cross-compliance' – from the current 2014-2020 CAP and will be mandatory for all farmers to comply with in order to receive area- and animal-based CAP support payments (whether in Pillar I or Pillar II). It will integrate elements from the WFD (controlling diffuse phosphorus pollution, abstractions and impoundments), the ND and SPD (certification of users and equipment, restriction on the use in protected areas, pesticide handling, storage and disposal rules). MSs will have to set out how conditionality will be implemented in practice within their CAP SPs.

- A new way of funding for the environment and climate in the form of so-called '**eco-schemes**' for farmers, with funds from the CAP's direct payments budget (Pillar I). At least 25% of the budget for direct payments will be allocated to eco-schemes. To receive the full payment under Pillar I, farmers will need to opt into the eco-schemes and implement their measures. These eco-schemes will be mandatory for MSs to design and implement, but voluntary for farmers to adopt.
- Continued support from the CAP's rural development budget (Pillar II) for **environment- and climate-relevant management practices**, investments, knowledge building, innovation and cooperation while also promoting sustainable use and efficient management of natural resources. This will offer an on-going wide range of support possibilities. MSs will be obliged to programme at least 35% of their CAP rural development budget on interventions of most direct value for the environment and climate. Moreover, they will be able to transfer extra funds from Pillar I to Pillar II for environmental purposes.
- Enhanced **advisory services**, support for knowledge transfer and fostering of innovation, investments and cooperation within strengthened national / regional AKIS.

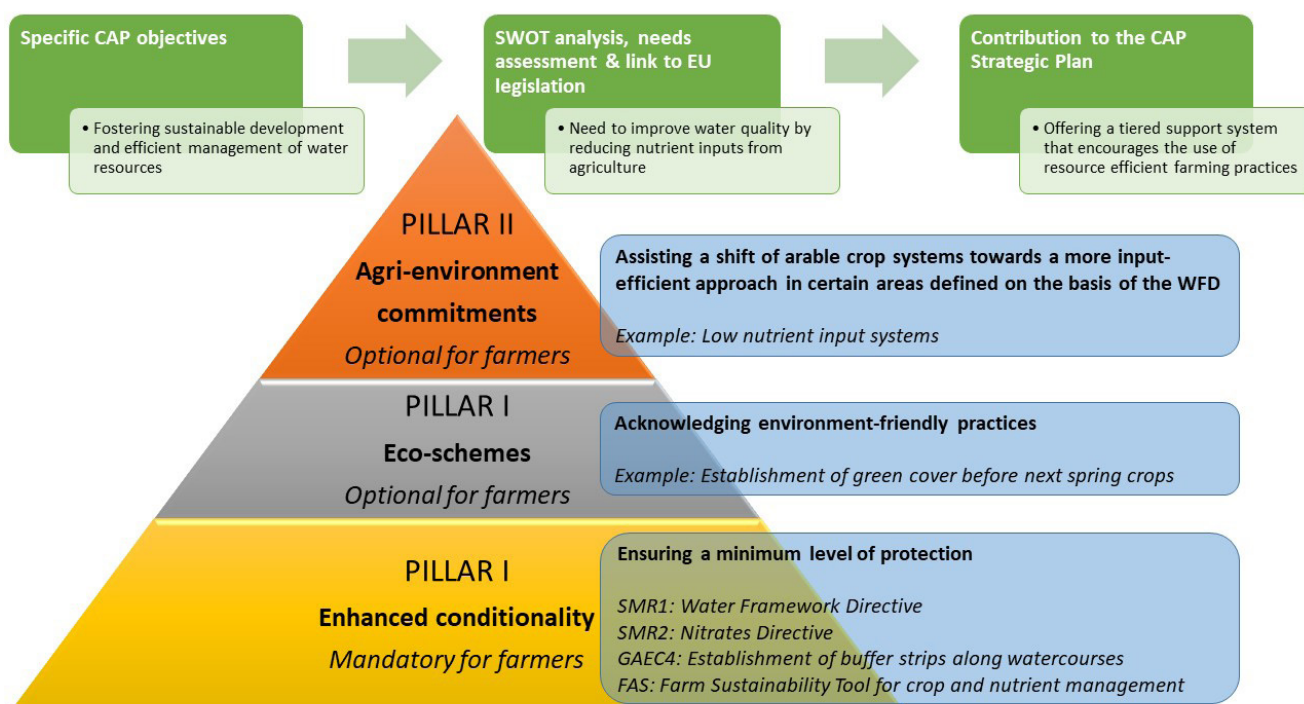
Developing effective and sustainable management options allowing to meet the objectives of both, the agriculture and water management requires strong involvement and cooperation of the agricultural and water sectors. Therefore, it is crucial to establish a proper **partnership-dialogue** between the agricultural and water sector to develop a cross-sectoral and mutual understanding of needs, expectations and constraints of the two areas. This desirable dialogue can lead to joint actions, which can be beneficial for water and the aquatic environment leading

to sustainable water management, while keeping the needs of the agricultural sector in mind.

There is a huge need for finding synergies between the CAP interventions and the measures identified in the RBMPs in order to trigger efficient nutrient management, to avoid water scarcity and to contribute to the achievement of the environmental objectives of the WFD. Therefore, **active and early** involvement of environmental authorities in EU MSs in all relevant CAP strategic planning processes is necessary using transparent procedures. This includes taking environmental knowledge and planning tools (e.g. RBMPs) into closer consideration to support the design of relevant and effective CAP SPs at national level. Partnership should be developed with other environmental departments/administration bodies (nature protection, environmental protection, climate change adaptation), the agricultural sector, economic and social partners, other relevant stakeholders as well as the civil society in order to jointly and effectively work on the CAP SP elaboration. This diverse national CAP network can enhance the contribution of the SPs to the achievement of the Green Deal targets and the CAP environmental ambitions and can facilitate efficient exchange between various actors involved.

Efforts have to be made to strengthen coordination, consistency and complementarity between all relevant EU policies and funds to ensure that they work in an integrated way and in good synergy and double funding or financing practices with adverse environmental impacts is avoided. Countries should ensure sufficient time for strategic planning how to fully utilise the green architecture under the CAP and to effectively contribute to the Green Deal objectives. Moreover, measuring and assessing the performance and results of the environmental and climate interventions will likely require significant investment in electronic information systems for data collection.

Targeted information should be provided to the policy makers on what is behind the existing (environmental) problems and what specific actions/measures may be considered from the CAP portfolio or even



An example for implementing the CAP green infrastructure

beyond it for national planning that can work in different sites/conditions. This should be ensured also for the advisory services to help farmers choosing concrete measures (e.g. which nutrient, which form of the nutrient, which place, which form of transport pathway is to be managed).

Compliance with the WFD and achieving its objectives require a wide range of **result indicators** (e.g. measures in place, areas with management commitments for environment and climate) but also need to define certain **environmental targets** and **impact indicators** that might be beyond the farm borders (e.g. nutrient concentrations in ground and surface waters, nutrient surplus in a catchment area). In the CAP SP context, a key element is a shift from a one-size-fits-all approach towards a greater focus on performance. The progress of the implementation of the plans will be monitored and evaluated by the EC using output, result and impact indicators within the Performance Monitoring and Evaluation Framework. MSs should assess how the SPs will contribute to the achievement of the targets and should harmonise the national WFD-related indicators with and link them to those of the CAP evaluation system.

2.1

Guiding principles for obligatory measures

Obligatory measures within the enhanced conditionality have to include several provisions of the relevant **water legislation**, particularly those of the WFD, ND and SPD in order to enhance the environmental and climate performance of agriculture. Including certain WFD and SPD obligations as new SMRs will provide further benefits for water management. Moreover, new GAECs have been proposed including peatland and wetland preservation, grassland preservation in NATURA 2000 sites and integrating and updating several elements of the “greening” such as maintenance of permanent pastures, crop diversification and Ecological Focus Areas (EFAs). Countries should ensure that the relevant requirements of the water legislation are appropriately translated into CAP interventions and the measures of the RBMPs and CAP SPs are coordinated, considering the potential synergy between the two plans and their measures and the advantageous timeline correlation of the development and approval of both instruments (2020-2021) and their implementation (2021-2027).

Tailor-made design of obligatory measures according to specific needs and objectives within the CAP SPs or in similar equivalent programs in non-EU MS should have a priority. Individual MS should define a **national standard** for each of the GAECs and SMRs, but have considerable flexibility to tailor the implementation of these standards to the particular situations of their farmers based on their specific local needs and characteristics. This flexibility can even extend to implementing individual standards differently for different regions. Countries are encouraged to take into account their agricultural structures, favourable and disadvantaged areas, crop rotation, environmental impacts and potential administrative burden when designing and implementing measures. In relation to the CAP SPs, the approach adopted by each MS will have to be consistent with its SWOT analysis and needs assessment results. The role of farm advisory services will be critical in helping to improve the sustainable management of agricultural holdings, with particular focus on the relationship between farm/land management and certain standards.

Measures controlling nutrient pollution should be **targeted** especially though not exclusively at emission hot-spots. Hot-spots are areas where excess nutrients accumulate (e.g. large animal farms), fertilisers and/or manure are applied over large areas and potentially in considerable amounts (e.g. intensified agriculture) and areas which are effectively connected to surface water bodies (high transport rate of nutrients from field to water). SMR and GAEC measures related to nutrient pollution control should be targeted at areas where there is a significant risk of local resource loss (e.g. via soil erosion or leaching) or water pollution (in ecologically vulnerable or sensitive areas or fields with high nutrient transfer rates). The requirements should be adjusted to the risks accordingly (i.e. basic standards used everywhere but more advanced measures required in hot-spot/vulnerable

zones) but also to the main problems causing nutrient pollution. Identifying the pollution hot-spots and vulnerable/sensitive areas would require certain knowledge of hydrological and water quality related processes or at least of several relevant parameters such as slope, soil type, crop types, distance to and sensitivity of water bodies, etc.

Specific attention should be paid to the **farming structure** in the countries. The direct support should be transformed to a fairer and more targeted instrument. The needs of smaller and medium sized farms should be better addressed by reducing income gaps between different farm sizes by using more effective redistribution mechanisms. In many countries, there is a relatively small number of large farms (especially animal farms) and agro-industrial holdings which may represent or develop into potential pollution hot-spots if mobilisation of nutrients via precipitation, runoff or leaching occurs. For large pig and poultry farms a revised reference document on best available techniques (BAT) was recently released by the EC²³, which is binding for EU MS and may serve as a source of knowledge for the others. On the other side, too demanding new challenges and requirements for the large number of small-scale farms might be difficult to meet without appropriate financial support and might need appropriate transition periods for implementation. Generally, certain environmental standards and targets should be achieved everywhere, whereas the standards might differ for different regions or for different farm structures. Public funding and the duration of transition periods can also be kept flexible. This is extremely important for small farms, which are frequently subsistence farms facing economic difficulties and for which compliance with demanding regulations can be a huge challenge.

Countries need to establish appropriate and effective **control mechanisms** to check whether farming

²³ <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/best-available-techniques-bat-reference-document-intensive-rearing-poultry-or-pigs>

practices comply with obligations for receiving support. Strict controlling of a huge number of small farms is rather challenging, it should focus on those agro-industrial holdings, which potentially generate more pollution or are located in pollution-sensitive areas. Checking the compliance with basic standards should be ensured with as little administrative burden as possible on both, the authorities and the farmers, whereas the more demanding control schemes should be targeted at the larger holdings and pollution hot-spots.

Compliance monitoring should focus on helping farmers to identify implementation gaps and appropriate measures rather than simply issuing penalties against farmers. A flexible control system with warnings and assistance would give farmers a chance to deal with the problem without receiving a penalty but would also penalize those who do not implement the required measures in a certain amount of time.

2.2

Guiding principles for voluntary measures

Countries should examine closely the potential of the new and innovative payment system of **Pillar I** called '**eco-schemes**' that will pay farmers to protect the environment and the climate. Eco-schemes are expected to address broad environmental and climate issues, to cover a wide range of measures related to these issues and to tackle key environmental hotspots. MS will be obliged to make one or more eco-schemes available, but participation in the schemes will be voluntary for farmers. MS will be free to design the extent and content of the eco-schemes depending upon national targets and ambitions as well as on local needs and circumstances and will decide at national level how much money to spend on them. This might include agricultural practices such as enhanced management of permanent pastures and landscapes, nutrient management, food and nesting packages for pollinating species, agro-ecology and organic farming etc. The requirements of the eco-schemes must go beyond those of the baseline of 'enhanced conditionality', must be consistent



with the CAP SP and the schemes must not pay for commitments by farmers, which are paid for by other CAP tools. Moreover, they shall contribute to reach the EU Green Deal targets.

Eco-schemes will be funded from MS' direct payment budgets and based on an annual payment per eligible hectare. They can be offered as "top-up" to farmers' direct payments providing an incentive for additional income support or remunerating the provision of public goods by agricultural practices beneficial to the environment and climate, or as stand-alone schemes with environmental payments compensating income losses and extra costs incurred by farmers. They are hugely flexible and the fact that the schemes can involve annual ("one-year-at-a-time") rather than multi-annual commitments could make them particularly attractive to farmers. Since MS will also be free to set the schemes' content and budget (within their CAP SP), they should make sure that the schemes accurately match the particular needs of their farmers and territories and that they do not add a

major administrative burden for national and regional authorities. Nor should they make life complicated for farmers. Budgets for the eco-schemes should be carefully planned. On one hand, they should offer sufficient funds to ensure potential contribution to environmental targets. MS will have the option to dedicate a large percentage of the Pillar I budget to eco-schemes without the need for co-financing so that direct payments can be partly transformed to payments for ecosystem services. On the other hand, substantial lowering of basic direct payments in favour of the “top-ups” might trigger concerns on how to ensure fair income support for the farmers.

Several agricultural practices could be supported by eco-schemes²⁴. In particular, practices of organic farming (conversion, maintenance), agro-ecology (crop rotation, cover crops, winter crops, climate resilient crops, mixed grassland species), agro-forestry (establishment and maintenance of natural landscape features and silvo-pastures), high nature value farming (enhancing semi-natural habitat, biodiversity areas, low intensity agriculture, mixed cropland-pasture systems), carbon farming (soil conservation, peatland and wetland rewetting, crop residue application, grassland management, extensive grasslands), precision farming (nutrient management planning, optimizing fertilizer amounts, increasing irrigation efficiency), enhanced nutrient management (soil sampling, more stringent nitrate pollution prevention), managing crop water demand (switching to less water intensive crops, changing planting dates, optimised irrigation schedules) and erosion control (contour buffer strips, strip-cropping, terracing) may receive eco-scheme funding. Detailed guidelines on which practices could be supported through eco-schemes, how to avoid double funding with second-pillar measures, what kind of measures are the most appropriate and how to choose the

payment model are available in the report²⁵ of the European umbrella organisation for organic food and farming (IFOAM Organics Europe).

Countries should commit to the development of DRB-specific approaches for **voluntary agri-environment-climate interventions** supported by **Pillar II**. These offer a wide range of tools for compensating farmers that adopt the best possible environmental and climate practices. It remains important that all measures put in place by MS support specific national, regional, and local needs regarding the environment and the climate – with the additional requirement that, in certain cases where appropriate, they also build upon those actions funded in the new ‘eco-schemes’. The interventions remain mandatory for all MS to design and offer, but are voluntary for farmers and other eligible beneficiaries to join and adopt. Payments will be granted to those who voluntarily go beyond the baseline mandatory standards (the ‘enhanced conditionality’) for several years to maximise their actions for the environment and the climate. The multi-annual payments will be calculated as compensation for additional costs / income foregone as a result of the commitments concerned. Pillar II funds also offer the possibility to compensate certain difficulties and constraints (e.g. natural disadvantages, constraints related to WFD implementation and NATURA 2000²⁶ sites) in order to ensure that farming can continue. Countries should make use of these instruments to compensate farmers taking measures to implement the WFD. Moreover, Pillar II payments should also be used to support knowledge building, investments, innovation and cooperation.

Increasing experience is available around Europe regarding how to tailor and implement more efficient and effective agri-environment-climate measures in accordance with local and national needs and

24 EC Brochure List of potential agricultural practices that eco-schemes could support,

https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/key_policies/documents/factsheet-agri-practices-under-ecoscheme_en.pdf

25 Lampkin N, Stolze M, Meredith S, de Porras M, Haller L, Mészáros D (2020) Using Eco-schemes in the new CAP: a guide for managing authorities. IFOAM EU, FiBL and IEEP, Brussels.

26 <http://ec.europa.eu/environment/nature/natura2000/>

conditions, with increased emphasis upon collective/cooperative approaches and results-based payment schemes for more sustainable soil and water management. These can deliver actions by farmers that are significantly more effective for the environment and the climate than some of the more traditional approaches that have been rolled out in many DRB countries. Whilst there may be capacity issues in some countries regarding their development, there are forums already developed for sharing experience and recommendations, notably via the European Network for Rural Development²⁷.

Collective or cooperative approaches to agri-environmental land management by farmers are increasingly seen as important, not just for achieving environmental objectives, but also for social and economic reasons. The main added value of promoting collective action is that a much larger area potentially benefits compared to actions by single farmers. Collective approaches can take many varied forms depending on the issue to be addressed and the situation locally. They can be bottom up initiatives (the initiative coming from farmers or other local actors); community-led (bringing a variety of stakeholders together to generate action); top down (the initiative coming from public authorities); or a combination of these (where actions are coordinated between practitioners and authorities).

A result-based payment scheme (RBPS) is an agri-environmental or similar scheme in which the payment depends on achieving a threshold value of one or more environmental indicators (the 'result indicators'), which are clearly linked to specific environmental objectives. In most cases, the result indicators are verified each year by the farmer and controlled by the Paying Agency, using the same methodology. Choosing the right result indicators is a critical part in developing an effective RBPS, but once selected, farmers are free to choose how to achieve the required result. RBPS are increasingly being used as an alternative or addition to traditional



management-based payment schemes (MBPS) and a well-designed RBPS is significantly more 'environmentally cost-effective' since support is paid against the delivery of results, not the implementation of prescribed management practices. A RBPS also encourages farmers to take greater ownership of environmental resource management (e.g. improving soil and water management on their land) and, with appropriate advisory support, also develop a better understanding of the long-term benefits of good environmental management for productivity and overall profitability.

The result indicators should be carefully selected and developed from a set of discrete and measurable features and a fair evaluation system of the achievements is required for reasonable time periods. This can ensure that the progress achieved as a result of a public investment is properly recorded and that farmers are not left alone with the costs of a sustainable farming practice when the implementation is not successful for reasons beyond the farmers' control or responsibility. The methodology for measuring the result indicators must be described clearly within the legal agri-environment-climate contract, to enable

²⁷ https://enrd.ec.europa.eu/home-page_en



verification by farmers and control agencies, using the same methods. Moreover, the threshold value of the result indicator to be reached for payment should be reasonably set to achieve the desired environmental objectives or improved resource management. In this respect, more threshold values may be more effective rather than a single threshold system.

Bearing in mind that finding methods of measuring the incremental improvements in soil and water condition during an RDP programming period is a significant challenge, a 'hybrid' MBPS/RBPS approach to soil and water schemes seems to be the best way forward²⁸. In this scheme, management-based requirements are verified and paid for annually and farmers are offered a 'bonus'

results-based payment where the intended results are achieved. In addition, RBPS should include compulsory training requirements for participating farmers. For controlling diffuse nutrient pollution from farmland or in a catchment, RBPS may be effectively linked to on-farm nutrient management planning or a cooperative approach of different land managers.

Voluntary measures should be **financially attractive**, practicable and acceptable for farmers. Many of the existing measures in agri-environmental schemas are already very effective at reaching the objectives, but not sufficiently well rounded and financially attractive to farmers. Some of these measures can be economically beneficial for farmers (e.g. effective use of fertilisers and manure) so the economic interest of the farmers should be clearly demonstrated by advisory services. However, other measures would bring additional costs (e.g. erosion control measures) or income losses (e.g. landuse conversion) for the farmers when adopting and implementing them. These should be reasonably incentivised to make them attractive for farmers.

The concept of **Smart Villages**²⁹ should be promoted as an emerging opportunity for rural communities. The Smart Village is a relatively new concept, which could be particularly attractive for the DRB region. It brings renewed attention to the needs and potential of rural areas, offers the opportunity to channel multiple resources to rural communities without excessive bureaucratic burden. Smart Villages are communities in rural areas that use innovative solutions to improve their resilience, economic, social and/or environmental conditions, in particular by mobilizing solutions offered by digital technologies and by building on local strengths and opportunities.

²⁸ Result-based payment schemes (RBPS) for Soil and Water in Europe. Report of the European Network for Rural Development (ENRD) Thematic Group (TG) on sustainable management of water and soils. ENRD, 2018.

²⁹ https://enrd.ec.europa.eu/enrd-thematic-work/smart-and-competitive-rural-areas/smart-villages_en

2.3

Guiding principles for advisory services

Within the CAP SPs countries should encourage **Farm Advisory Systems (FAS)** to support farmers in improving the overall sustainable management of their holdings by ensuring knowledge transfer to farmers and thereby supporting adherence to environmental standards and commitments. The strengthened advisory services should provide appropriate education, trainings and information system to improve the economic and ecological performance of land managers especially in the context of an efficient nutrient and water management and of sustainable farm and land management. They also have to help familiarise farmers with the obligations deriving from the SMRs of the conditionality system (e.g. ND, WFD, SPD) and could help farmers to implement eco-schemes and environment and climate interventions more effectively.

FAS should recommend to consult agricultural water management experts for specific farming activities (e.g. intensive irrigation, drainage, runoff control, water retention and storage). Countries may consider to make the involvement of agricultural water management experts compulsory for particular activities or in case certain farm size or used water amount thresholds are exceeded.

Moreover, advisory services should facilitate to transfer the results of agricultural research and innovation into day to day farming practice and should be able to deliver up-to-date technological and scientific information to farmers. This can be ensured by integrating farm advisory services into the **Agricultural Knowledge and Innovation System (AKIS)**. Countries should make a significant investment in building an AKIS for sustainable agriculture in the DRB. Besides the immediate obligation to strengthen farm advisory services, it is important to keep in mind the wider objective of strengthening the AKIS. They integrate all of the people and organisations that



generate, share and use knowledge and innovation for agriculture in all interrelated fields (value chains, environment, society, consumers, etc.). AKIS should enhance knowledge flows and strengthen links between research and practice and should upgrade the technological, farm management, interactive and digital knowledge and skills of the farm advisors. They should provide sufficient capacity to more effectively link researchers, advisors and farmers and should incentivise researchers to produce outputs that are understandable by practitioners. They should organise specific training sessions for researchers in cooperation with farmers and farm advisers and should make better use of on-farm demonstrations for researchers to present their results and exchange informally with farmers and advisers.

Much greater attention should be paid on fostering and disseminating innovation and building the capacity of all actors (farmers, advisers, researchers, small and medium-sized enterprises etc.) to engage with the **European Innovation Partnership** for Agricultural Productivity and Sustainability (EIP-AGRI)³⁰. The EIP-AGRI aims to bring together all relevant actors working in agriculture as partners in agricultural innovation. They support cooperation between

³⁰ <https://ec.europa.eu/eip/agriculture/en>

research and innovation partners so that they can achieve better and faster innovative solutions and research results that can more easily be put into practice. Cooperation can be ensured by RDP funds for setting up Operational Groups to work on pilot projects, develop new products, involve actors from different regions, promote activities. RDPs can also offer support for knowledge transfer, establishing networks, funding Innovation Support Services. Another possibility is to implement Horizon Europe³¹ multinational and multi-actor innovation and research projects, particularly in the mission areas 'Adaptation to climate change including societal transformation' and 'Soil health and food'. Opportunities presented by LIFE³² funding should also be explored.

Advisory services and AKIS should support the **digital transition in agriculture**. Agriculture and rural areas are and will be changing significantly with the availability and advancement of modern technologies, accompanied by smart devices, solutions and specialization strategies as well as digitised supporting tools, their increased "intelligence", autonomous behaviour and connectivity (e.g. satellite observation, precision farming, geolocation services, autonomous farm machinery, drones). This trend will become more and more relevant for the AKIS. Farmers need to be supported with the digital transformation process (technologies and data) since many farmers may be unable to keep up with new technologies. Moreover, the AKIS itself will become more and more "digitised" with new models and decision support tools becoming rapidly available. AKIS should be linked to the Knowledge Hub on Water and Agriculture³³, which has been established by the Joint Research Centre of the EC and will ensure access to relevant EU-wide data on water and agriculture. In strong connection to the digitalization, rural areas and farmers need to be provided with the accessibility to fast and reliable internet connection and the possibility to develop digital skills.

Advisory services should strongly and actively recommend and promote **nutrient management planning** in farming. Targeted instruments and tools to assist farmers in an efficient use of fertilizers at field level adjusted to crop nutrient demand and soil nutrient content are highly beneficial. Nutrient management plans go beyond simple/classical fertiliser application recommendations by tailoring nutrient management by the farmer to the specificities of the cropping system and local context of the farm. Such plans are particularly valuable for raising awareness amongst farmers about resource efficiency and the implications of excessive or inappropriate use of chemical fertilisers or organic manures for the environment, rather than just focusing on crop requirements and yield optimisation. Nutrient management plans are to be primarily prepared at the field level within a farm or holding and may have a result indicator of reaching a certain level of nutrient surplus. However, the plans can apply to broader areas where collective action may be needed or where nutrient management is critical to achieving water quality objectives in a particular area, such as a catchment or Nitrate Vulnerable Zones.

The CAP proposal introduced a new digital tool called **Farm Sustainability Tool for Nutrients (FaST)** that has been developed with the aim of facilitating more sustainable use of fertilisers by all farmers in the EU by providing recommendations / alerts concerning fertiliser/manure application, whilst also boosting the digitisation of the agricultural sector. Using the tool as an obligatory measure in the post-2020 CAP (originally planned as GAEC) is ambitious and potentially very challenging in the context of the small and medium-sized farms and the age structure of farm holders in the DRB. However, the principle of nutrient management planning remains fundamentally important and should be promoted more actively to farmers via information, knowledge exchange and advisory activities funded in the new CAP SPs. Where

³¹ https://ec.europa.eu/info/horizon-europe_en

³² https://cinea.ec.europa.eu/life_en

³³ <https://water.jrc.ec.europa.eu/>



appropriate, due consideration should also be given to supporting their development and implementation via agri-environment-climate interventions and/or other funding sources (e.g. EU-LIFE projects).

Advisory services should also put emphasis on **soil management** and should support farmers to properly implement erosion control, soil conservation and natural water retention measures. Maintaining the soil structure, preserving its humus and water content and reducing surface run-off are key management activities that help minimise nutrient losses and hold water in the soil.

2.4

Guiding principles for managing droughts

Knowing the actual stage of drought conditions at any time is the basic prerequisite of successful drought management but knowing who is doing what and when at each respective stage is an equally important condition of success. In recent decades, great progress has been made in drought monitoring while drought management part has, unfortunately, not improved accordingly. Due to missing legislation in DRB countries that would specifically address the drought issue and give guidance on its holistic management, cooperation among relevant institutions is weak resulting in drought primarily being managed in “crisis-mode”, when its intensity is already alarming.

In the frame of the DriDanube project³⁴, a **Drought Strategy** has been developed proposing a framework for improved drought management in the Danube region and providing national authorities with clear guidance on becoming more efficient and comprehensively tackling drought management issues. The Strategy is based on an Optimal Drought Management Model (ODMM), a concept that organizes

already-existing legislation and institutional roles in a country in an optimal way of cooperating and reacting in different stages of drought. The model was built on existing knowledge and recommendations on integrated drought management that encourages drought resilience, mitigates drought risk, and addresses disaster risk reduction, climate adaptation strategies and national water policies.

The first of the three elements of the model is drought policy framework, which consists of all sectoral documentation that in any way addresses drought issues and outlines a country’s objectives related to drought. As its second element, the model proposes a structure of competent institutions and their cooperation, through which existing national drought policies are implemented. This structure should define who is involved in the implementation of drought policies as well as their roles, responsibilities and inter-institutional connections. Finally, the model’s driving force is a proposed protocol of action, which comprises the previous two elements regarding the process, i.e. when the respective activities are carried out, depending on changing drought conditions. It uses a 5-stage drought scale and specifies the corresponding actions and behaviour that institutions should adopt. Drought stages in the protocol are separated by thresholds, which are freely defined by the individual country, taking into account their national specificities and characteristics.

This way, the model acts as a tool for institutional capacity building in terms of their strengthened cooperation and support in the decision-making process. It encourages holistic drought management by linking outcomes of national drought monitoring with a cooperative response, according to the changing drought conditions. It was conceptually developed so that it can be adopted by any country, regardless of its internal organisations of national bodies.

³⁴ <http://www.interreg-danube.eu/approved-projects/dridanube>

The DriDanube Project developed several general **recommendations** for the implementation of the Danube Drought Strategy specifying how to enhance capability of the society to better cope with droughts on the long run:

- Initiate political will and call for coordinated legal approach. Policy coherence related to drought on the regional/national level is one of the key guiding principles for successful drought management. Countries are encouraged to acknowledge drought as a national priority.
- Encourage collaboration and partnerships. Strengthen existing partnerships between organizations and stakeholders and connect with other institutions and initiatives to gain extra knowledge and good practices.
- Provide sufficient resources. Countries are advised to make national efforts ensuring sustainable drought management, such as investing in data, products and tools and building human capacity.
- Develop and adopt a national strategic document on drought management. It shall provide a strategic view on the drought issue, set long-term goals and a manner of achieving them and define a matrix of drought timeline and corresponding course of institutional actions.
- Form a drought impact inventory to be managed by national authorities. Creation of regular, sectoral and centralized impact inventories enables the national authorities to have an insight into drought events and their damages and presents a basis for any further legal steps.
- Put results into practice. It is necessary to introduce available tools into daily work routine (i.e. using national data sets, operational use of tools in institutions, etc.).
- Share knowledge and help raise awareness. Continue searching for good practices to guide drought management activities, with emphasis on learning process and preventive actions.
- Establish water-related learning curriculums at all levels, especially in elementary education.



3

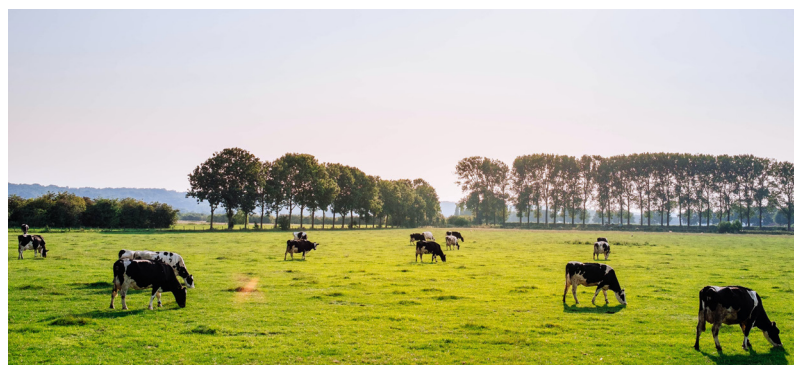
MEASURE IMPLEMENTATION

3.1

Toolbox for measures to mitigate nutrient pollution

The guidance outlines two land management categories according to soil productivity and land conditions and recommends a set of measures for both constellations. **Favourable areas** with high soil productivity and good climate conditions may attract investments and sustainable intensification to increase competitiveness. This would lead to a desirable sustainable development to improve the economic situation in rural areas, would give perspectives to people to stay and live there but would also fully integrate natural resources protection. A clear legal framework and an efficient implementation of cross-compliance/conditionality and “greening”/eco-schemes should be the focus here, backed up by appropriate control schemes.

On the other hand, **disadvantaged areas** – i.e. areas with limited productivity, natural constraints or unfavourable social conditions - are threatened by depopulation and land abandonment, which need to be counteracted by integrated rural development programs including an economic basis for site-specific, traditionally extensive agricultural systems. In these regions but also in areas of high ecologic interest (e.g. riparian zones, floodplains and wetlands) agri-environmental programmes and compensations for ecosystem services (e.g. biodiversity, landscape maintenance and biotope management) and other income options for the agricultural sector like sustainable tourism are necessary. In both cases, competent advisory services, for which recommendations are also provided, should be part of any solution.

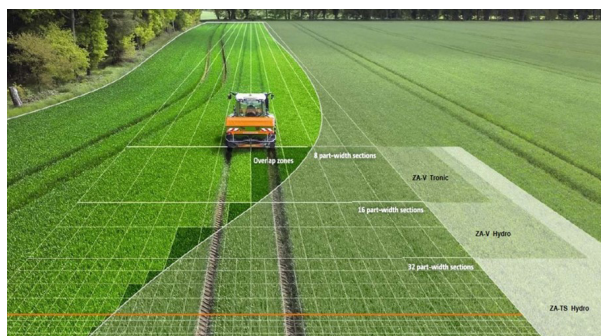


The following measures have been identified and are recommended for further consideration to reduce nutrient emissions from agriculture into water bodies and to mitigate adverse impacts of water scarcity and droughts. They should be further discussed especially with representatives from the agricultural sector and should provide a toolbox to help governments develop tailor-made programmes within the respective national framework and put funding schemes, targeted measures and actions in place in accordance with national and local needs and goals.

To allow the most efficient use of (mostly limited) available financial resources the cost-effectiveness of measures should be taken into account, which may also require additional research according to local conditions and constraints, which vary considerably in the DRB and thus do not allow generalized “one size fits all” recommendations. Other crucial issues are improved advisory services and better and faster connections between scientific research and practical farming. Thus, agriculture should ultimately be able to provide valuable contributions towards the implementation of the Danube RBMPs as well as towards meeting the targets of the WFD.

3.1.1

Favourable areas



In areas favourable for intensive agriculture the efficiency and sustainability of water, soil and nutrient management need to be enhanced. Since here agricultural production will play an important role, it is crucial to avoid high nutrient losses and significant nutrient emissions into surface waters. Measures can be grouped into source control and transport control type interventions. While source control measures reduce nutrients excess and prevent their mobilisation via precipitation, runoff and leaching, transport control measures intercept and reduce the transfer of nutrients from agricultural land into surface waters. Usually, an appropriate suite of measures is needed to reduce the risk of nutrient pollution that combines different measures according to local circumstances and needs. Many of these measures are part of the ND Action Programmes, the provisions of the Codes of Good Agricultural Practices.

Fertilizer application should only be permitted within clear and efficient regulations (e.g. ND provisions, national regulations). Correct timing and placement, the right fertilisers and their amounts should be ensured by appropriate rules and careful planning thereby avoiding application under unfortunate weather, topography and soil conditions or in vulnerable or sensitive areas. Modern and calibrated fertiliser spreaders should be promoted in order to ensure appropriate and accurate application to crops.

Animal husbandry and the necessary manure storage capacity should be correlated with the available area for manure uptake. Cooperation between neighbouring farms in manure distribution should be promoted. On the other hand, unrealistic (uneconomic) distances for manure transport that potentially increase the risk of good agricultural practices being undermined should be avoided. The correlation (stocking rate) could be specified at the municipal or sub-regional level. In regions with excess manure, transport to regions with lower stocking rates might be necessary in some cases though it is regarded as a “second best” solution. Large animal farms should need a permit for manure management related measures in order to ensure that environmental standards are met. Best Available Techniques (or equally ambitious provisions) should be applied throughout the whole region (regardless whether EU-member or not), especially for facilities located within areas prone to nutrient losses. Storage of manure should be safe and the storage capacity should be enough to overcome closed periods (periods when application is not allowed) and times when application is not possible (e.g. in case of maize). Application should occur based on plant needs and allow a high nutrient efficiency to minimize losses to the environment. Spreading devices should meet high and regularly controlled technical standards and spreading practice should minimize ammonia emissions and odours.

Nutrient balancing and management that estimates the required optimal fertilizer application rates taking into account the available soil nutrient content, the crop uptake and potential nutrient inputs into soil via atmospheric fixation and deposition, nutrients available in manure, soil organic matter mineralisation and crop residue recycling should be supported. In case of P, legacy aspects (available P soil content at



field level) should also be taken into account. Also, local climate conditions should be considered for fertilizer application (i.e. drought periods and heavy rainfalls). Precision farming techniques suitable for more accurate determination of fertiliser needs should be promoted.

Crop rotation, selection of suitable crops, growing post-harvest green manures and autumn-sown crops should be applied to protect soil surfaces, safeguard soil organic matter, water retention capacity and stability of soil structure as well as prevent nitrate leaching to ground water during autumn and winter months.

Soil management & erosion control practices such as conservation tillage, contouring, contour strip-cropping, terracing, crop cover, crop restriction on sensitive fields, crop residue mulching are important measures to reduce soil loss from the fields. They provide protection for soils against the erosivity of rainfall and runoff and also reduce the soils surface's erodibility. Moreover, they help maintaining soil structure and infiltration rate. Establishing grass cover on bare soil (e.g. between plantation rows) surfaces and avoiding over-grazing of pastures should be considered to maintain soil protection.

Buffer strips with natural perennial vegetation (trees, bushes and/or grass) and without fertilizing should be introduced along water courses to act as a filtering barrier especially against phosphate emissions via soil erosion and surface runoff; at

the same time additional actions are needed at upland erosion hot-spots (field buffers) to prevent and minimise soil (and nutrient) losses. Buffer strips may provide other ecosystem services like acting as habitats or increase the aesthetic value of landscapes. They may be regarded as EFAs, meeting the commitments of the CAP. In some circumstances, fences may be necessary to avoid riverbank erosion and damages in soil cover caused by grazed livestock.

Green and high diversity natural landscape elements that reduce evaporation losses from soils and increase infiltration into soils (vegetation barriers and field borders from trees and/or bushes, grass cover on bare soil surfaces) offer favourable interventions to improve water-holding capacity of the soil and to preserve local water balance and available soil moisture. In addition, they contribute to restore biodiversity, prevent soil erosion and depletion, filter air and water, support climate adaptation and represent carbon sinks.

Grassed depressions, vegetated waterways, inundation/sedimentation ponds, storm water reservoirs and constructed wetlands represent **transport controlling and water storing measures** that capture runoff and sediment transport. In this way, they can temporarily store excess water of wet periods for periods with lack of precipitation to compensate water deficit, retain sediment and nutrients before entering water bodies and reduce downstream soil erosion and nutrient washout.

3.1.2

Disadvantaged areas

In the disadvantaged areas (land with limited productivity, natural constraints or unfavourable social conditions) integrated rural development approaches should combine all relevant available resources in an overarching and coherent manner (e. g. integrated RDPs) to counteract depopulation of rural regions and land abandonment. Viable rural communities with economic perspectives (based on both agriculture as well as other possible income sources like small enterprises, tourism and recreation combined with innovative regional marketing strategies) should open perspectives for young people and safeguard sustainable agriculture, aesthetic landscapes, high nature value and biodiversity.

Danube states should support of preservation and development of ‘natural’ farming and traditional agricultural methods in their voluntary agri-environment schemes, e. g. **extensive grassland management and low-input agriculture**.

Land use conversions (e.g. cropland to grassland, shrub land and or forest) should be taken into account in order to optimize land use so that making rural land management better adaptable to climate change impacts, counteracting environmental degradation of water bodies and to supporting nature protection.

Organic farming should be introduced and promoted especially in areas important for drinking water supply, as organic farming in many cases has been proved as a powerful and efficient tool to safeguard groundwater quality. Organic farmers do not apply soluble mineral fertilizers and synthetic pesticides. Multiannual crop rotation and closed nutrient cycles are typical features. In organic farms nutrient balance surpluses normally are considerably lower than on comparable nearby conventional farms. Organic livestock farming should respect high animal welfare



standards. Animals should have, whenever possible, access to open air or grazing areas. Promotion strategies should act along the whole food chain “from field to fork”, i. e. include processing and retail.

Wetlands and flood plains should be protected, restored and/or reconstructed where possible to increase natural water retention capacity of landscapes (which is at the same time a measure to mitigate floods and to adapt to climate change impacts) and to promote natural resilience and assimilative capacity of water bodies against eutrophication. They also sequester considerable amounts of carbon and are habitats for a number of endangered species. They may act as rest areas for migratory birds. Thus the remaining wetlands are often protected areas,

part of NATURA 2000 networks, biosphere reserves or areas under the RAMSAR Convention³⁵.

Land care initiatives to maintain traditional forms of agriculture and its characteristic cultural landscape should be promoted (e. g. via the LEADER³⁶ method engaging local actors to design strategies and allocate resources for developing their rural areas) and integrated into rural development and WFD-implementation, based on dialogue and cooperation. Land care initiatives are grassroots (bottom up) approaches against land abandonment, land degradation and in favour of characteristic landscapes and natural resources conservation, in many cases by keeping up traditional land use patterns in agriculture. Market-linked eco-tourism and low impact recreation should be promoted that provides effective economic incentives for conserving and enhancing bio-cultural diversity, helps protect the natural and cultural heritage of the rural areas and ensures long-term perspectives for local communities.



³⁵ <https://www.ramsar.org/>

³⁶ Liaison entre actions de développement de l'économie rurale – Links between actions for the development of the rural economy

3.1.3

Cost-effectiveness of measures

Measures can have positive impacts regarding nutrient losses on both, local and regional/catchment scale. Local effectiveness of measures, i.e. how much they can reduce nutrient mobilization or losses provides important information on the technical potential of the measures on field scale. This can be helpful to achieve better resource efficiency and to optimize fertiliser application and reduce costs.

With respect to the catchment scale, the regional effectiveness of the measures depends on several catchment properties and circumstances to be considered (e.g. connectivity, distance, landscape elements, other measures already implemented). Not all of the source areas effectively contribute to the river loads and the extent of their contribution depends on the transport rate of the emitted pollutants within the catchment and towards the outlet. Thus, management efforts to reduce water pollution should be targeted to ensure cost-effectiveness. Emission reduction could conceivably be implemented with one and the same rate in the whole catchment, focussed on areas with local emissions over a certain threshold value or, alternatively targeted to the fields with the highest contribution to water pollution. It is likely that in most cases the latter would provide a more cost-effective management with respect to river water quality, though case-by-case analysis may be necessary i.e. regarding sensitivity of water bodies to nutrient pollution.

Cost-effective interventions should be concentrated on the **critical source and/or transfer areas** where the highest fluxes to the river net come from and/or where significant direct transfers of pollutants from land to water probably occur. Therefore, only a transport-based management approach can be

environmentally and economically effective. Besides this, convincing local stakeholders of the necessity of the management actions, the practical implementation of the management plans including adequate technical skills and securing sufficient financial support can probably be realized more easily by targeting a smaller proportion of the catchment area.

Before applying measures, an analysis is necessary to determine what the main problem is in the particular area (e.g. intensive livestock production, point source pollution, diffuse pollution due to the fertilization of arable land, dense network of drainage systems, etc.). Catchment scale **water quality modelling** can support the efforts of identifying emission hot-spots, assessing potential impacts of measures and elaborating cost-effective management strategies. A high number of modelling tools and case studies able to support catchment and water resources management are available in the scientific literature. In addition, detailed information is needed on the local technical effectiveness and the implementation cost of the individual measures, e.g. how much nutrient emission reduction (kg/ha) can be achieved by applying a measure and how much costs the implementation of this measure would have (EUR/ha). Policy-making should make better use of these tools and information when designing and implementing river basin management plans.

Besides identifying the hot-spots and effectively contributing areas, the **farmers' participation quota** and the technical implementation quality are decisive factors for achieving cost-efficient nutrient management in catchments. Farmers need to be engaged to contribute to achieving environmental objectives and to appreciate and endorse the proposed measures. Interventions should be economically attractive and



should not cause excessive administrative burdens for those who apply them. Advisory services should provide appropriate information on the measures, should support farmers in the administrative processes and should provide training and consultancy for implementation to strengthen capacity and to build appropriate skills.

3.2

Toolbox for measures to mitigate water scarcity and droughts

Because of possible increase of water shortage in agriculture due to droughts and unfavourable climate change effects, the following strategic aims need to be achieved³⁷:

- increase of local water resources and their availability,
- increase of water use efficiency,
- decrease of crop water need of,
- sustainable intensification of irrigation over large soil surfaces.

To achieve these goals, five main actions can be identified:

- increasing water retention on the field and in surface waters,
- increasing soil water retention and water availability for plants,
- maintaining existing drainage systems,
- modernising water use and irrigation technologies applied on field,
- applying modern and smart technologies, enhanced monitoring and digital data.

Measures **increasing surface water retention** on the field and in open waters includes construction of small water retention reservoirs on streams, establishment of hydraulic structures to regulate water outflow from fields and application of different small water retention measures. They help adapting the potentially available water resources to the requirements of agriculture by ensuring more water available in reservoirs for irrigation and capturing and storing runoff water in local depressions and field reservoirs during wet periods. Countries may consider to use recycled wastewater for irrigation purposes instead of discharging it to surface water bodies.

Increasing soil water retention and its availability for plants can be achieved by soil conservation technologies (e.g. soil loosening, deep ploughing, manure application), growing selected plant species in crop rotation (e.g. drought resistance plants, plants with a shorter vegetative period and lower water requirements) and introducing deep-rooted plants with low water requirements. These measures improve the soil structure and the physical and hydrologic properties of the top soil layers, increase the infiltration rate, enlarge the active root zone with water uptake, increase soil moisture and the amount of water available for plants and increase water use efficiency of the plants.

Drainage systems must be in line with the WFD objectives, i.e. they should not jeopardise the quantitative status of groundwater bodies and the ecological status/potential of surface water bodies. Where they are necessary, existing systems deployed to control groundwater level and soil moisture of agricultural soils with poor draining conditions should be renovated, upgraded and well maintained to ensure that the water retention and draining capacity of these soils are functioning. Nutrient concentrations in drainage water at the outlets to recipient waters should be minimized by e.g. sedimentation traps where possible. To avoid unnecessary water and nutrient losses, new drainage systems should be applied smartly, targeted to soils with draining problems and combined with natural water retention measures.

Irrigation of crops constitutes a considerable use of water, especially in southern Danube states. Irrigation practices have to be in line with the WFD, i.e. groundwater abstraction for irrigation purposes should not put good quantitative status of groundwater bodies

37 Labedzki, L. 2016. Actions and measures for mitigation drought and water scarcity in agriculture. Journal of Water and Land Development. DOI: 10.1515/jwld-2016-0007

in jeopardy and surface water abstractions do not deteriorate the ecological status. Irrigation and water distribution systems, their operation and management should be modern, efficient and sustainable. Irrigation timing and the irrigated water amounts should be adjusted to crop water demand and soil moisture deficit. In addition, water and energy saving methods and precision techniques should be used for water distribution and irrigation. Water saving in agriculture will become increasingly important as climate change effects become more pronounced, increasing the risk of water scarcity and droughts in parts of Central and Eastern Europe. Properly scheduled and efficient irrigation schemes also increase nutrient efficiency and thus minimize the risk of leaching. Irrigation should be part of a catchment-scale, dynamic and flexible water resources management system that is based on multi-criteria optimization of water uses, adjusted to climate change effects and linked to automatized monitoring and forecasting systems. In this respect, greater emphasis should be put on conjunctive use of groundwater and surface water resources and artificial and controlled aquifer recharge, closely linked to monitoring of groundwater and surface water levels³⁸. Promoting the reuse of treated wastewater for irrigation, in particular during severe droughts, is an option, which can reduce the risk of water shortages for irrigated crops and contribute to reaching and maintaining good status of water bodies.

Smart **digital technologies** and devices, meteorological, soil moisture and hydrological **monitoring data**, drought mapping and forecasting, remote sensing information and GIS data should support in practice the sustainable irrigation systems. Support in early detection of drought signals can be provided in the DRB by the Drought Watch³⁹ tool, developed within the DriDanube project. Drought Watch represents

an advanced regional tool for drought monitoring as it combines information on drought risk areas in the historical and climatological sense, regular monitoring through drought indices and weekly information on drought impacts as detected in the field. It was designed as an open, user-friendly yet feature-rich tool mainly for national authorities and drought experts to strengthen their operational work in drought characterisation and early warning. It is a web-based interactive tool that provides spatial and temporal information on soil moisture and vegetation using various drought indices. They are based on satellite and modelled data, updated daily, weekly or 10-daily, and therefore enable a harmonized view on changing drought conditions in near real-time across the whole Danube region. Danube countries are highly encouraged to ensure the long-term operability and maintenance of the Danube Watch at the basin-wide scale.

In addition to regularly updated drought indices, Drought Watch also offers a set of informative drought risk maps, prepared according to a harmonized approach across the Danube region. They indicate areas where risk of yield loss for 4 main agricultural crops (maize, wheat, rape and barley) can be considered high, medium or low and show the longest expected rainless period during the summer half-year in the observed region. Moreover, additional drought information is provided by National Reporting Networks (NRNs), mostly consisting of farmers and technicians with agricultural and forestry backgrounds. The purpose of the reporting is to validate and complement drought indices using information on the exact drought impacts in the field, e.g. observations on soil moisture and drought damage to vegetation or even loss of yield on their specific location on a weekly basis.

³⁸ The 2015 Droughts in the Danube River Basin. ICPDR, 2017

³⁹ <https://droughtwatch.eu/>

3.3

Multi-purpose measures

Besides effective pollution controlling interventions, **multi-beneficial measures** should be promoted which can ensure that relevant aspects other than nutrient pollution (e.g. water scarcity and droughts,



hydromorphology and biodiversity) are also addressed. These measures offer win-win solutions to mitigate multiple pressures. Precision irrigation, soil conservation, natural water retention enhancement, managing and operating reservoirs to mitigate excess water via runoff, floods and inland inundation, artificial groundwater recharge, riparian buffer zones, controlled and restored wetlands and floodplain restoration are examples for these interventions.

3.4

Soft measures

Advisory services, knowledge exchange and other “soft” instruments should be made available for all farmers. A farmer receiving personal advice is more likely to understand e. g. the cross-compliance/ conditionality obligations, and will thus more readily comply with them. In the same way farmers might be more open to opportunities and possible advantages of (voluntary) agri-environment programmes and thus will more readily participate in them. Advisory services should work in the sense of cooperation with farmers and in an overarching manner, i. e. improve both the farmer’s professional skills and economic performance as well as (among others) aim at improve nutrient management and efficiency, minimize emissions to the environment and safeguard water quality. Establishing an appropriate advisory system may help farmers to make management decisions, to understand environmental aspects and to adjust the production technologies to the special local conditions of each individual farm. Appropriate combination of top-down (consultation with advisors or facilitators) and bottom-up (exchange of practices among farmers and cooperation) systems should be developed and supported.



Knowledge transfer among decision making authorities to present and exchange up-to-date knowledge and experiences should be organized on annual basis. Tailored international workshops/conferences might be a good platform to stimulate knowledge transfers among the Danube countries.



Research and development to provide solutions for agri-environmental problems should play an important role in the implementation of the WFD. Enhanced and accelerated dissemination of results and knowledge among farmers as well as other stakeholders should be facilitated efficiently and use all available modern technologies (including internet and digital technologies). Best practice examples could be communicated e.g. by demonstration farms and/or regional and local “field days”.

Advisory services should be accompanied and supported by proper **education and curricula**. Professional education should integrate agri-environmental aspects in an appropriate manner. High-level education institutes (universities, colleges) should organise and offer education in the field of agricultural water management, integrating knowledge of

traditional water management, agricultural sciences and environmental engineering.

Awareness raising and public dialogues should be fostered and pave the way to acceptable solutions and necessary compromises in the spirit of cooperation.



4

HOW TO MAKE IT WORK

4.1

National coordination and communication

Danube countries are encouraged to establish a specific water-agriculture working group and cooperation platform at national level to support policy making on sustainable agriculture. Partnership should be developed between the environmental departments/administration bodies (water management, nature protection, environmental protection), the agricultural sector and other relevant stakeholders in order to jointly and effectively work on the elaboration of agricultural strategic plans. Such platform would be able to advise policy making how to transform RBMP measures into agricultural measures and how to translate and coordinate result and impact indicators. It is also recommended to conduct a stakeholder analysis and to develop a national implementation plan for aligning water and agricultural policies.

Countries are also encouraged to organise a sort of roadshow for information dissemination on the national agricultural strategic plans, the measures to be implemented and the available funding schemes. This may include consultation events for the public supported by information materials, thematic workshops for relevant stakeholders and field demonstration events for farmers and land managers. The roadshow could pave the road towards common understanding and cooperation between the water and agricultural sector and efficient implementation of the strategic plans. Moreover, it could prepare the ground for the FAS and AKIS activities during the implementation phase of the agri-environmental policies.

4.2

Follow-up activities at transboundary level

The established dialogue and cooperation with the agricultural sector and the joint discussions on common goals and win-win solution should remain high on the agenda after the finalisation of the guidance document.



Building on the experiences gained during the elaboration of other guiding principles (e.g. inland navigation or hydropower), a coordinated follow-up process is recommended to be carried out in an integrative manner with involvement of representatives from administrations, the agricultural sector, river basin organisations, NGOs and other interested parties, allowing to bring in expertise from various backgrounds. (Bi)annual workshops and thematic technical meetings would allow to exchange knowledge on good agricultural practices and case studies and to share the experiences with the implementation of the guidance document. Such events would also provide a common platform for

potential updates, amendments and fine-tuning of the guidance. This exchange could also be supported by joint pilot projects on specific issues, based on regional collaboration and/or co-funding of research and development (R&D) projects.

Based on the example of Helsinki Commission, it is also considered to establish a sort of Danube farmer's prize, which would reward some of those farmers from the DRB who have been implementing good agricultural practices. This would reinforce that good practices are recognized and appreciated and also would facilitate the demonstration of good examples.



**MAKE IT
WORK!**



PUBLISHED BY

ICPDR – International Commission
for the Protection of the Danube River
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For more details and data please consult the
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