AGRI-WATER-NEXUS
AGRICULTURE PRACTICES THAT PROTECT WATER

GRÜNE LIGA Netzwerk Ökologischer Bewegungen

EEB European Environmental Bureau

1. FOREWORD

Late in 2017 the European Commission published its vision for the future Common Agricultural Policy (CAP) post 2020. It entails a proposed new approach, which would transfer much of the decision on the concrete measures to be implemented by farmers to achieve environmental objectives to Member States – raising a lot of questions and bearing important risks given Member State's overall track record in not using the flexibility provided to them under the CAP to adopt the most effective measures.

However, this broader context should not prevent us from taking stock of persistent and in some cases growing environmental problems linked to the intensification of agriculture and related harmful practices. The failure of the greening in the current CAP, now irrefutably demonstrated through independent studies and a report from the European Court of Auditors, makes the promotion and adoption of effective approaches ever more crucial. In the face of climate change concrete proposals to reconcile farming with environmental objectives are even more needed than ever before.

This publication deals with a set of environmental problems linked to intensive agriculture in the field of water. This entails both serious pollution problems linked to over-fertilisation and excessive use of pesticides as well as quantitative water management problems linked to over abstraction for irrigation. Unfortunately, measures to reduce pressures on water bodies from agriculture developed under the EU's Water Framework Directive since 2000 have in general been far too modest to move towards achieving the objective of good ecological status of water bodies by 2015 – an objective that has been missed.

By illustrating recurrent problems as well as effective solutions to these problems that would benefit from being scaled up, this publication is meant to serve as a contribution to the debate on how water policy objectives can be better integrated in the CAP post-2020. The latest Implementation Report on the WFD published by the European Commission in March 2019 demonstrated that slow progress towards achieving good ecological status for all of Europe's water bodies is more due to lack of political will and courage to promote sustainable solutions than due to the absence of cost-effective solutions to reconcile farming and the protection of our environment.

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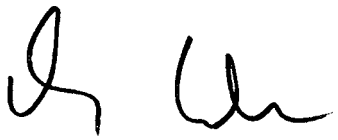


Jeremy Wates
Secretary General

2. INTRODUCTION

Rivers and streams, lakes and ponds reflect the landscape that surrounds them: they receive chemical loads and organic matter and their temperature and their habitat structures are influenced by how we manage water and soil in the catchment area.

Across a large majority of Europe's agricultural landscapes our freshwater surface water bodies and groundwater aquifers are in a worrying state. Polluted with excessive fertilisers and pesticides, many water bodies are also overexploited for irrigation, and drainage destroys carbon rich soils and wetlands.

Loss of fertile soils at alarming rates results in gravel beds of rivers and streams being filled with sand or clogged with silt from erosion from farmlands, destroying once oxygen rich spawning grounds for many fish and other aquatic species. As a result from nutrient overloading (a process also referred to as eutrophication) and pollution, freshwater fish and mollusks are among the most threatened species groups in Europe. The nutrient overloading is the result of excess slurry and manure running off fields and contaminating rivers and streams, lakes and wetlands, groundwater and the coastal waters – often resulting in an explosive overgrowth of plants and algae which depletes oxygen levels in water, poisoning and killing aquatic life.

On top of that the air is polluted with unhealthy levels of ammonia along with fine dust and methane from animal manure and synthetic fertilisers, large amounts of air-borne nutrients deposit across land, water and seas alike. The reduced quality of the water that is drawn from these polluted waters increases the costs to make water safe for us to drink.

3. THE ROLE OF INTENSIVE AGRICULTURAL AND EU CAP

One major reason why much of Europe's waters are in such worrying state is that today's predominant form of agriculture relies excessively on mineral fertilisers, slurry and pesticides, and agricultural activities have fragmented aquatic habitats. It continues to degrade and destroy natural buffers and filters, particularly river banks, floodplains, riparian zones and wetlands. Historically, agricultural subsidies have been encouraging ever higher production levels, and as a result the EU's CAP has significantly contributed to this situation and supported the rise of an industrial agricultural model which today may well be regarded as the single biggest threat to Europe's freshwater bodies and to the biodiversity they support.

The goals of the EU-environmental legislation for the protection of our waters and Europe's aquatic biodiversity are, as of now, only insufficiently integrated into the EU's CAP. The obligations to reach good status and avoid deterioration of water bodies enshrined in the Water Framework Directive are largely ignored. While at the margins today's CAP provides support to more environmentally friendly forms of farming, the bulk of the CAP continues to support ever intensifying forms of farming that cause pollution and damage to our public goods – thus contributing to a worsening of Europe's environmental crisis. In harsh contrast with the polluter-pays principle society pays the costs for cleaning the pollution from intensive farming, while agricultural holdings are not penalised for the degradation they are responsible for.

The lack of strict environmental obligations within the "Cross-compliance", linked to receiving subsidies from the CAP, has resulted in biodiversity loss and degradation of water resources. This represents a major missed opportunity to provide incentives to farm in ways that maximize provision of public goods and stewardship of the natural resources farming depends on – such as clean water, healthy soils and biodiversity.

3.1 The CAP post-2020

Industrial agriculture as promoted by the CAP for decades has been the main cause for a lot of drastic changes and effects for the environment and eco-system processes. It is high time for change.

Farming in Europe needs a reorientation towards a more careful management of the very foundations of agriculture: soil fertility, water cycle, climate conditions and biodiversity. Without stringent integration of water protection goals into agricultural policy and into the rules governing agricultural practices and fertiliser application, there will most likely be no significant progress towards achieving the objectives of the WFD.

As water and soil are closely linked, soil protection needs to be taken seriously and integrated into agricultural policy too. Tackling erosion, preserving and improving soil fertility, and preventing soil pollution and degradation are paramount for both water quality and agricultural productivity.

There are countless examples which show that the farming sector has enormous potential to produce high quality foods, fibres and raw materials in a much more environmentally friendly way, to protect wetlands and improve the retention of nutrients and water as well as to foster biodiversity in agrarian landscapes.

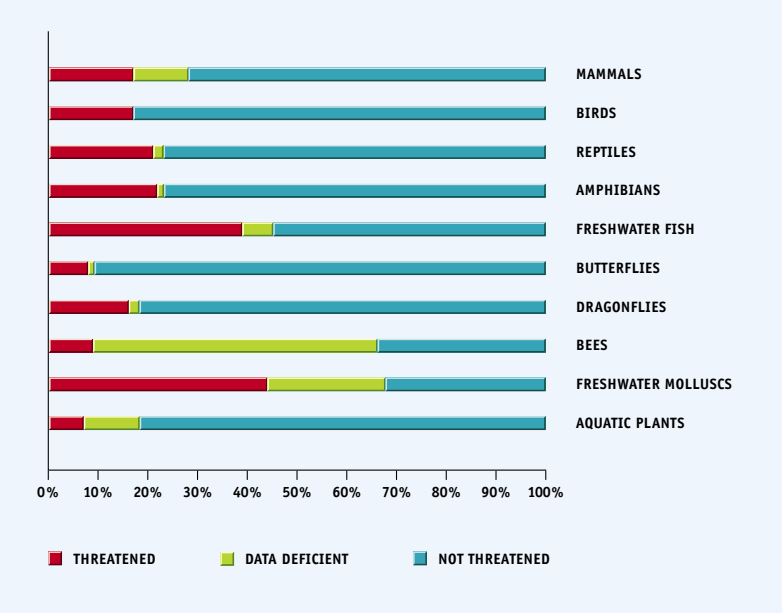
The examples in this publication illustrate how a change of agricultural practices can help solve the most urgent water related challenges posed by industrial agriculture. They showcase the way forward and illustrate the measures that need to be promoted at a much wider scale through the next CAP.

3.2 Nutrients, agricultural run-off and soil erosion

The constant overloading of our landscapes with nutrients has been one of the most serious environmental problems throughout decades for Europe. But not only terrestrial habitats are impaired by nutrient pollution resulting in degraded ecology and lost biodiversity. The same is true for aquatic habitats. Some scientists regard the extinction rate of freshwater species to be 5 times faster than terrestrial ones.[1] Most visibly this is true for Europe's rivers and lakes, coastal waters and seas, while the contamination of groundwater is a hidden, but no less serious issue as it poses a danger to our drinking water supply.

Current farming practices, the application of synthetic fertilisers, slurry, fermentation residues and manure, are accountable for the bulk of excess nutrients that spill across our lands and into our waters.

In many regions of Europe however, we are very far from reaching the environmental objectives and nutrient reduction goals that are required under the EU law. As Member States continue to miss these underpinning goals, it is largely impossible to reach the overall objective of a "good status" for all of Europe's water bodies: neither in rivers, lakes and coastal waters (as intended by the Water Framework



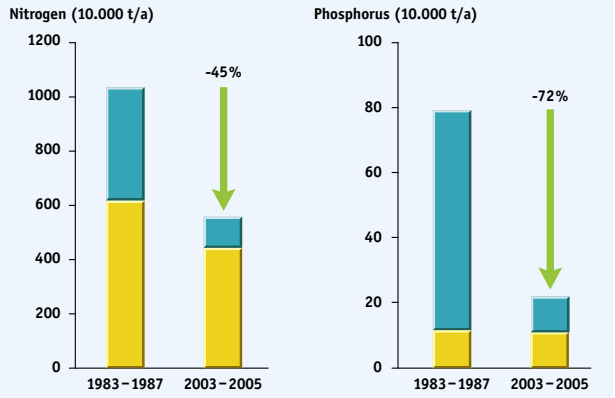
Extinction risk of different taxonomic groups in the EU: The red part of bars indicates the proportion of threatened species, the blue indicates the species that are Least Concern or Near Threatened, and the green indicates the Data Deficient species. Freshwater fish and molluscs are among the most threatened species groups in Europe.
(Source: Bird Life: "Mid-Term Assessment of Progress on the EU 2020 Biodiversity Strategy", 2015, p. 9)

1 Anthony Ricciardi and Joseph B. Rasmussen, Extinction Rates of North American Freshwater Fauna: "... Using an exponential decay model, we derived recent and future extinction rates for North American freshwater fauna that are five times higher than those for terrestrial fauna. ..." – https://onlinelibrary.wiley.com/

Directive), nor in groundwater (Groundwater Directive), nor in the Baltic Sea, the North Sea, the Black Sea and coastal waters of the Atlantic (Marine Strategy Framework Directive and Regional Sea Conventions like HELCOM and OSPAR).

A strong and effective regulation on the application of fertilisers has already been established by the Nitrates Directive that came into force in 1991 and has later been listed as a basic measure under the Water Framework Directive. However, the implementation of the Nitrates Directive over the last quarter of a century has been slow, and in many regions the rules that were applied to reduce nutrient overloads from farming are still wholly insufficient. Apart from the water path, industrial farming and livestock rearing heavily pollute the air with pollutants such as ammonia, which is ultimately deposited again across terrestrial, aquatic and marine environments.

The reduction of nutrient loads (N and P) is a key task for river basin management in most of the EU. According to EEA Nitrates are the main pollutant affecting over 18 % of the area of groundwater bodies.[2]



Reduction of N and P emissions into Germany's waters: Compared to the immense reduction of N- and P-loads from urban waste water (turquoise), nutrient loads from agriculture (yellow) have barely changed and now make up the major share of N emissions. For P-loads there is a need to further reduce the load from both sources.
(Source: German Federal Office for Environment 2010, Graphic: M. Riechel, modified)

Weak implementation of WFD basic measures: Nitrates Directive case against Germany

Eutrophication had been a major issue for decades when the Nitrates Directive came into force in 1991. The central piece of regulation implementing the Directive in Germany is the by-law on good practice in the application of fertilisers (in German: "Düngeverordnung").

A quarter of a century after the Nitrates Directive came into force; the Düngeverordnung has failed to reach the goals of the Directive. Based on the 2007 version of Düngeverordnung (DÜV 2007) the European Commission opened a legal case against Germany in October 2013. On June 21, 2018, the European Court of Justice ruled that Germany had not fully implemented the Nitrates Directive.

Germany in between adopted slightly improved rules in 2017 (which were not included in the ECJ ruling). An assessment by Prof. Taube of Kiel University concluded that these do not improve the situation considerably. Environmental organisations and water suppliers have taken a clear stance in the last years and consider this amendment of Düngeverordnung as completely inadequate.

As a follow up to the ECJ ruling, the German agriculture and environmental authorities agreed on a new compromise in June 2017 that aims to reduce the nutrient load on average by 20 % in certain regions. This compromise is not a proposed legal text that would allow for a full assessment. It is clear, however, that there is still no rule on the maximum amount of livestock allowed on a certain agricultural area which would be among the most effective measures. Furthermore a nationwide regulation on phosphorus is still missing.

In a study on environmental problems from nitrogen emissions from 2015, the German Scientific Advisory Council on the Environment (SRU) concluded that in the long term, Germany will need to cut nitrogen emissions at least by half.

Groundwater, rivers, lakes and seas in Germany still lack the implementation of the most important basic measures for reducing nutrient overloading from agriculture. At the same time nutrient loads from sewage plants have been drastically reduced. Germany has fully implemented the requirements of the Urban Wastewater Directive which is also listed as a basic measure under WFD.

2 ISSN 1977–8449, EEA Report No 7/2018
European waters, Assessment of status and pressures 2018

good

bad

not valued

Due to ongoing heavy nitrate pollution from agriculture, the chemical status of groundwater in 34.8 % of the area of Germany was classified as "bad" instead of "good" in 2016.

In these groundwater bodies, contamination with nitrates exceeds the environmental quality standard of 50 mg/l which is also the standard for drinking water.
(Source: German Environment Agency "Waters in Germany. Status and Assessment", 2017, p. 15)

3.3 Chemical Pollution from agriculture

The environmental and health risks of pesticides are manifold. The alarming decline in pollinators and bees is a direct threat to agriculture itself as a large majority of our crops depend on insect mediated pollination.

The dramatic loss of insects and aquatic invertebrates in agricultural landscapes can largely be attributed to pesticide use, with accumulation over time and cumulative cocktail effects making things even worse. Considering the enormous hazards that most active substances pose, the high potential for inappropriate application and use of pesticides in agriculture and horticulture, and the knowledge gaps regarding their breakdown in the environment, pesticide regulation across the EU needs a much stronger precautionary approach. Given the widespread occurrence of pesticides in water bodies, regulatory policies and measures such as pesticide taxes need to be applied more effectively.

Pesticide pollution of ditches and canals in Drenthe, Netherlands

Studies, such as a WECF publication "Too many pesticides in ditches and canals" from 2017, have shown that pesticide contamination of surface waters occurs in the Northern province Drenthe that belongs to the river basins Rhine and Ems.

Drenthe – with an area of 2,683 km^2 – is a touristic province with several protected nature areas. In spite of its vulnerable sandy soils, the cultivation of flower bulbs and vegetables in greenhouses has been a fast growing sector in Drenthe. The most alarming findings by WCEF are the following:

- On average 14 pesticides and metabolites were identified in one location.
- 10 % to 20 % of the detected pesticides exceeded the established norms (maximal acceptable concentration (MAC) or the annual average of the MAC)
- Among the 74 different identified pesticides (active substances) were 28 herbicides, 19 insecticides and 28 fungicides. Some substances were multi-functional. In addition, 5 different metabolites – with unknown activity – were found.
- According to the PAN List of Highly Hazardous Pesticides (December 2016) half of the 74 different found active substances are classified as highly hazardous.
- Taking into account that many pesticides were not, or only partly, detectable, the substances found are just a part of the real pesticide contamination of the surface water in Drenthe.

Analysis and evaluation of the cost and effectiveness of implemented and on-going programs for a sustainable agriculture are absolutely necessary.

- *Contact: Margriet.Samwel@wecf.org · wecf.org*

3.4 Pesticides threaten the biodiversity in European rivers

In a recent study, the scientists from the Helmholtz Center for Environmental Research – UfZ investigated the effects of pesticides on stream invertebrates. They used data from Germany, France and Australia. The taxonomic richness was compared across groups characterized by different levels of pesticide contamination: not polluted, less polluted and highly polluted. The researchers found significant differences between the categories of pollution. In Europe they observed a loss of biodiversity of upto 42 %, in Australia a decline of 27 %. The loss of biodiversity is characterised by the disappearance of special groups of invertebrates which are very sensitive of the influence of pesticides. These are groups of stoneflies, mayflies, caddis flies and dragonflies. They belong to the inhabitants of European streams and rivers with the biggest number of individuals and species. They form an important part of the food chain, esp. for birds and fish, and are the basis for the biodiversity of aquatic habitats. These species can be used as an excellent indicator for the quality of water.

An alarming result of the study is that the scientists observed a devasting effect of pollution with pesticides in concentrations which are declared by the pesticide law as being safe. The authors emphasize two points:

1. The use of pesticides is an important reason for the loss of biodiversity.

2. The freshwater invertebrates are not protected enough through the legally established standards for the maximum concentrations of pesticides.

Glyphosate is the most frequently used herbicide in Germany and the world; it is used on 40 % of German arable land. (Photo: Arndt Müller)

As a result of bioaccumulation of toxic substances in the food chain, White tailed eagles were on the brink of extinction half a century ago. After the ban on DDT in 1972, populations recovered. (Photo: Carsten Pusch)

3.5 Over-abstraction and damming rivers for irrigation – Water for free?

Over-abstraction of water for irrigation is a major threat to aquatic environments and sustainable water use in many parts of Europe. Rivers and wetlands need an ecological flow of water, in particular in summer, to remain suitable habitats for the wildlife they host. Agricultural policies exacerbate the problem: water is mostly for free and often unauthorised. Irrigation subsidies that further expand capacity rather than forcing a more efficient and sustainable use of the limited water resources, create incentives for water abstraction. This constitutes an enormous policy failure.

Abrilongo dam (PT)

The Portuguese Government was the promoter of the Abrilongo dam project consisting in the building of a large dam inside the Campo Maior Special Protection Area (SPA) and the subsequent irrigation infrastructure. The construction of the Abrilongo dam led to negative effects on a significant area of the Campo Maior SPA. Much of the characteristic steppe habitats were lost to agriculture intensification resulting from the increased use of irrigation. No good alternatives to the irrigation project (such as an agri-environmental scheme) were evaluated. The "alternatives" to the project consisted in different locations, capacities, exploitation and embankment alignment. The implication of a non-construction of the dam was not even considered as an option.

The European Commission looked into the case but closed the infringement procedure at the end of 2004. Later, a new complaint (2005/4185) was opened regarding the situation of the above mention pivot irrigation of the "southern sector" of the Campo Maior SPA. However, the current state of the infringement action is not clear.

4 GOOD PRACTICE EXAMPLES FOR THE WAY FORWARD WETLANDS AND WET BUFFER ZONES

Wetlands, which can act as buffers and filters, are indispensable for reducing leakage of nutrients into Europe's rivers and seas. Wetlands have been proven to be highly cost-effective in tackling agricultural pollution and providing a range of wider ecosystem benefits (climate mitigation, bio-diversity). Member States' agro-environmental programs under the CAP should provide support to the establishment of new wetlands in the agricultural landscape, especially in regions where tile drainage and ditches result in high nutrient leakage from farmland.

4.1 Strategies for reducing eutrophication

Reductions of nutrient inputs to the aquatic environment and a better management of nitrogen and phosphorous are crucial tasks for river basin management. There is a need for integrating this key task in agricultural policies in coordination with River Basin Management Plans and Programmes of Measures under the WFD.

Live Project Albufera (Valencia, Spain)

L'Albufera natural park is located in eastern Spain about 12 km south of Valencia. The territory was established as a protected Ramsar Site in 1986 and as Special Bird Protection Area (SPA) in 1994.

Eutrophication of the waters of the Albufera National park has been a problem since the 1960s, when the consistent population increase in the nearby urban areas of Valencia, the growth of intensive rice cultivations and industrial pressures led to the disappearance of the submerged macrophyte prairies. To contrast these pressures and improve the ecological status of the area, between 2007 and 2011, the Life Albufera project recreated three constructed wetlands, which act as water purification structures. These structures proved efficient in neutralising the excessive nutrients in the water and for improvement of the water and habitat quality contributing simultaneously to the goals of the EU Water Framework Directive (WFD), the Nitrates Directive, and the Habitat and Bird Directive. Based on the data gathered and monitoring activities conducted, over a period of two years the green filters processed 6.65 % of Albufera Lake water, contributing to the removal of: 11.2 tons of nitrogen, 0.5 tons of phosphorous, 198.2 kg of chlorophyll and 83.8 tons of suspended solids. They also contributed to the creation of zooplankton biomass, the reestablishment of submerged macrophyte prairies. Other positive outcomes extend to the improvement of the conservation status of different species of breeding birds, the successful reintroduction of native species, and the removal of 587 kg of biomass of invasive exotic species. The wetland restoration measures have been already applied in two other Spanish natural parks and are considered applicable to other NATURA 2000 sites.

- *http://www.lifealbufera.org/index.php/en/*

The area of Cassinazza (Italy) before (1996) and after (2014) realizing measures of renaturalisation. The difference is obvious! (Photo: NeoruraleHub)

Reconstruction of high biodiversity aquatic ecosystems in rice cultivation in the Po Valley (IT)

The north-western portion of the Po valley has over 200,000 hectares of rice fields, representing over 50 % of the European rice production, thanks to local conditions of abundant water resources in spring. The paddies have been heavily impoverished environments due to the high production intensity that results in monoculture over wide extensions and high use of herbicides.

Private initiatives – subsidised by intelligent use of Rural Development measures – delivered the restoration of the functionality of aquatic ecosystems on vast paddy extensions in the territory between Milan and Pavia, in Lombardy. Cassinazza's agricultural district extends over 1,400 hectares, of which 107 have been converted into wetlands and woods over 20 years. The agricultural environment has been enriched by the plantation of 110 km of hedges, and aquatic biodiversity in paddy fields has been enhanced by the creation of rice field margins, complex ecosystems that occupy 7-10 % of the cultivated area, where water levels are conserved to allow aquatic species to survive dry cultivation stages. The rice field margins are located at the edges of the fields and have a width variable between 15 and 30 meters.

Another important change is the shift from intensive to extensive cultivation following the principles of the conservation agriculture. This cultivation concept prioritizes soil management practises aimed at enhancing minimal soil disturbance, permanent soil cover and crop rotations. The fertilizers utilized come from the compost and the organic matter from nearby urban area The results include an increase in ornithological, aquatic and amphibious biodiversity, and a consequent decline of problematic insects and weeds.

Integrated buffer zones can significantly improve water quality in agricultural catchment areas. (Photo: Frank Bondgaard)

Integrated Buffer Zones (Denmark and Sweden)

Many coastal areas in Europe suffer from high nutrient loads and are heavily eutrophied. In the intensively farmed regions around the Baltic Sea, drainage water from fields with tile drainage might have loads of up to 50 mg N/l and is a primary source for nutrient inputs into surface waters. Results from testing facilities in Sweden and Denmark as well as demonstration sites in Sweden and Finland show that up to 90 % of the phosphorus and 50 % of the nitrogen can be removed by an Integrated Buffer Zone (LIFE GoodStream leaflet on IBZ, 2/2017).

Such facilities exist in Fillerup and Sillerup (eastern Jutland), Denmark as well as at 15 sites in the province of Halland, Sweden, e.g. Lilla Böslid, Bölarp, Sannarp, Reftele, Trönningean.

Establishing an Integrated Buffer Zone includes four basic steps:

1. Finding the drain pipe and opening it before it reaches a stream
2. Demarcating an infiltration area
3. Excavating the open canal and removing soil to level the filter bed
4. Planting trees (e.g. alder)

The ratio of the area of an Integrated Buffer Zones to the drained agricultural land in its catchment should be approximately 1:1000 (0.1 %) to 1:100 (1 %) depending on soil and drain water discharge. Intelligent Buffer Zones should be established in areas between agricultural lands and water courses as well as on drained agricultural lands. They need to be placed in a way that the slope of the land leads the run-off towards the Buffer Zone.

Integrated Buffer Zones are efficient wetlands to mitigate nutrient pollution of streams throughout the year. However, the highest efficiency is observed during summer, with highest seasonal impact for the pond. Overall it was evaluated that Integrated Buffer Zones are effective enhancements to traditional buffer zones, as they (i) reduce total N and P loads to small streams and rivers, (ii) act as valuable improved habitats for aquatic and amphibian species, and (iii) offer economic benefits by producing fast-growing wetland plant biomass *(Zak et al. 2019 [3])*.

3 J. Environ. Qual. 48:362–375 (2019), doi:10.2134/jeq2018.05.0216pero

4.2 CLIMATE ADAPTATION AND MITIGATION

Natural water retention in De Onlanden (Groningen)
Photo: Paul Vertegaal

Intensive agriculture contributes to climate change: the sector is responsible for more than 10% of total greenhouse gas emissions in the EU. Drained peatlands are the hotspots of agricultural greenhouse gas emissions, followed by the conversion of permanent pasture and the degradation of organic soils. At the same time, it is farmers themselves who bear the brunt of climate change as they are particularly vulnerable to changing levels of rainfall, fluctuating temperatures, and extreme weather events.

Despite obvious benefits in terms of climate change adaptation and mitigation, existing funding schemes effectively inhibit innovation to foster paludiculture on rewetted peatlands. Under permanently wet conditions, plant residues accumulate over centuries and millennia and form peat. When drained however, peat is aerated and microbes set off to decompose it. As the peat soil shrinks (in temperate climates around 1 cm per year), the land surface sinks.

Drained peatlands, when used for conventional agriculture, cause significant emissions of up to 50 tons of CO_2 per year and hectare (in extreme cases up to 70 tons/y/ha) Decomposition of peat also leads to high nutrient losses which are washed out into surface water bodies and groundwater.

Draining peatlands for agriculture should not be funded by the CAP.

Paludiculture

Paludiculture ("palus" – lat. "mire, morass") is the wet cultivation of peatland. On the one hand it includes traditional processes of peatland cultivation (reed mowing, litter usage), on the other hand new processes, for example the energetic utilisation of biomass of the marshes, are used. In these processes the preservation of peat is always the main objective. While paludiculture is an option for seriously degraded peatlands, intact peatlands need to be protected.

Photo: Wendelin Wichtmann

Rewetted peatlands provide numerous environmental benefits, such as retaining nutrients and pollutants, improving local climate conditions and the water balance. They can be used to produce fodder, fibres for building materials and fuels. Pilot projects show that the production of high-quality wood, fibres, sphagnum and reeds can be economically viable. Paludiculture cultivates plants that are adapted to wet conditions, especially reeds but also cattail (Typha) and sedges (Carex), as well as trees like alder (Alnus glutinosa) and willows (Salix) are used. Most of these plants are characterized by enormous vigour. And as fens are often very nutrient rich, especially in river valleys and along the coasts, paludiculture cultivations can be very productive.

Research efforts and practical experience with paludiculture have grown immensely in recent years. While agricultural reed cultivation was discussed and tested in Sweden already during the oil crisis in the 1970s and various traditional uses of reeds exist throughout Europe, modern paludiculture has caught on in Germany, Poland and the Netherlands especially.

- *www.paludiculture.uni-greifswald.de/en*

Water pricing

Efficient, sustainable allocation of water will not be achieved, if access to it is not limited or an adequate price is introduced. Water pricing is a key economic instrument for sustainable water use in agriculture. Pricing water must not be confused with the commodification of water. It is an indispensable instrument where unregulated use of water creates significant environmental, economic and social harm. While regulatory and planning measures are also necessary, water pricing creates an incentive for a change in behaviour and for more efficient use of water, and it is a means of generating revenue that can help recover water bodies and aquifers affected by over-abstraction. According to the WFD, all EU member states were required to introduce a water pricing policy that is in accordance with requirements of article 9 WFD by the end of 2010. These provisions envisage that water prices should offer incentives for efficient use, consider the polluter-pays-principle, and require appropriate contributions to recover costs – including environmental and resource costs, in particular for water uses defined as "water services". Most member states of the EU however are far behind when it comes to introducing such policies. The EEB maintains that introducing effective pricing in combination with high environmental standards is an important instrument to foster innovation and achieve technological change. Economic incentives trigger innovation (e.g. water saving appliances, metering etc.) and foster the widespread use of such new technologies and services. Thus, the better use of economic instruments (tariffs, water abstraction and sewage taxes) to achieve efficient sustainable water allocation as well as minimising pollution should be strengthened.

CAP support should be made conditional on water metering and respect of water permits by farmers. Enlargement of irrigation areas shouldn't be supported by the CAP in water-stressed areas, and only under specific circumstances in predicted future water-stressed areas. The CAP should support the adaptation to a changing climate: the change of crops, production patterns and practices. This means solutions that are adapted to local ecological circumstances rather than costly technological solutions which will not work everywhere.

5. REDUCTION OF PESTICIDE USE

Recent studies have shown that in many cases application of pesticides could be significantly reduced without leading to a major fall in yields.

Pesticide tax in Denmark[4]

Denmark implemented a pesticide fee in 1972 and supplemented this with a pesticide tax in 1982 (only covering households). The fee and tax were reformed to become a general ad valorem tax covering all types of pesticide consumption (including agricultural) taking effect from 1996. In 1998, tax rates were doubled (on average). For many years Danish pesticide policies aimed at reducing the so-called treatment frequency index (TFI). In 2013 an environmental load indicator was introduced to substitute the TFI indicator, changing the pesticide tax to a tax based on environmental load.

Furthermore, tax levels were increased on average. Approximately 93 % of Danish pesticide use is agricultural. The aim of the Danish Government was to reduce environmental load by 40 % during the period from 2011 to 2016. Expected revenue of the reformed tax is DKK 650 million annually (EUR 87 million). The full revenue is reimbursed to the agricultural sector – primarily through reduced land value tax. Some main drivers for the development of the Danish pesticide tax have been the Danish green tax reforms of the 1990's and a strong norm among Danes (citizens and politicians) for having untreated tap water from groundwater sources. In general, farmers and agricultural organisations are against the pesticide tax, but the reimbursement mechanism has eased resistance.

Over the years, the pesticide tax has only had small effects on pesticide use. Expectations are that the reformed tax will have more significant effects, since those pesticides with largest environmental load now face substantially higher price levels. Replicability is possible for other Member States based on a prior assessment of which indicators are relevant for the country in question.

4 Conference draft by Anders Branth Pedersen (Aarhus University-DCE)

6. WATER AND FUTURE CAP

In light of the dramatic situation of agricultural pollution of surface and groundwater, there is an urgent need for action over the coming years if the environmental objectives set in EU legislation are to be achieved. Without more specific water-related objectives and measures in the new CAP, European waters will never reach good status, and additional environmental damage is to be expected – at unacceptably high costs for society as a whole.

The CAP subsidies continue to be largely unsuited to the promotion of environmentally friendly agricultural practices that respond to the increased need for the protection of ecosystem health on which our health and economy depend all across the EU. The last reform of the CAP did not deliver the urgently needed progress in this direction. This policy failure is the main reason (along with insufficient regulation on the application of fertilisers on the national scale) why the WFD's environmental objectives relating to nutrients have not been achieved, even though the implementation of the Nitrates Directive is a mandatory basic measure and the law has been in force since 1990s.

It is high time to fully assess the negative influences of EU and national agricultural funding in terms of their environmental damage to water. As of now, detailed analysis is missing, and without such data, a cost-effective selection of measures in order to achieve the environmental objectives of the WFD is virtually impossible. In order to ensure a reduction of the impact to the environment, there must be a credible commitment to phase out environmentally harmful subsidies.

An end must be put to the double waste of money that is currently taking place: public money in the EU's agricultural funding schemes subsidises agricultural practices that harm the environment, and more public money is spent on repairing these very same damages later. In the case of surface and groundwater pollution with nitrates, drinking water users are paying the bill. Phasing out subsidies to intensive agriculture and its environmentally harmful practices, while at the same time rewarding farmers that manage the land in a responsible way and deliver public goods, is the only cost-effective way to achieve our longstanding environmental objectives.

We believe that agricultural policy must promote farming models and practices that lead to better water protection on a much larger share of the fields and pastures in the EU, and in particular promote and support farming systems which overall cause the least environmental harm and create the highest benefits for environment and society such as organic agriculture and other approaches rooted in agro-ecology.

The policy recommendations below emerge from the Clearance research project, the work of its partners as well as the policy workshop in Brussels, 12.9.2019.

Brussels Declaration of 12th September 2018

Restoring Riparian Wetlands for Clean Water and Agriculture

1. Innovation for effective implementation: Make wetland restoration with wet agriculture a mission-oriented EU-innovation topic under FP9 with bottom-up demonstrations projects and experiments across Member States.

2. Wetland buffer zones are a cost-effi cient, nature-based solution to reduce nutrient load and therefore should be much more widely used.

3. Encourage member states to assess best approaches to wetland restoration and wet agriculture given their institutional

4. Meeting the WFD goals requires policy coherence, especially with the Common Agricultural Policy (CAP) and Regional Development plans.

5. Establish an EU-level expert group on wetland restoration and wet agriculture to ensure EU added value.

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Rue des Deux Églises 14| B-1000 Brussels | Belgium
Tel: +32 2 289 1090 | Fax +32 2 289 1099
E-Mail: eeb@eeb.org | www.eeb.org

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Authors: Michael Bender, Tobias Schäfer, Leonardo Mazza, Tomas Brückmann, Janko Lenz, Laura Köppen, Melanie Lindner, and the EEB's Water Working Group
With contributions provided by Legaambiente, ZERO, WECF, University of Aarhus, Goodstream and CLEARANCE partners.

Factsheets with additional information on the Restoration of Aquatic Ecosystems, Wetlands and Buffer Zones within an Intensive Farming Area in the Po Valleys, Intelligent Buffer Zones – a solution for water and phosphorous retention and nitrogen removal, Paludiculture – rewetting and farming degraded peatlands, Wetland rehabilitation strategies – the benefits of green filters in Albufera – can be found on GRÜNE LIGA WFD-Website:

- *http://www.wrrl-info.de/en/factsheets*

There are further EEB/GRÜNE LIGA factsheets available on Natural Climate Buffers in the Netherlands – learning from best practice to adapt to climate change effects, Stormwater Management in Urban Areas (Berlin) and Microplastics in our waters.

Additional factsheets in German cover the topics of Habitat restauration on National Navigation routes (Blaues Band), Downstream Fish Migration (Fischfreundliche Leitrechensysteme), the Restoration of the Emscher River, small scale river protection measures in Rheinland Palatina (Aktion Blau Plus) and Hamburg (Revitalisierung kleiner Fließgewässer) and on the sediment management concept of the International Elbecommission IKSE/MKOL.

Editor responsible Jeremy Wates (EEB Secretary General)

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EEB'S 4 ASKS FOR THE CAP	TO PROTECT WATER:
A strong baseline of compulsory environmental good practice for all CAP recipients • We need a strong and well enforced set of baseline environmental rules set at EU level that all farmers receiving public money must respect.	Compulsory buffer strips of minimum 10 m on all European Rivers and Lakes, where ploughing, fertilisers, and pesticides are not allowed. Obligation for farmers to respect EU and national laws related to irrigation for agriculture. CAP support should be made conditional on water metering and respect of water permits by farmers.
Subsidies to promote and support farming methods that benefit the environment and climate • Half of the CAP budget should be ringfenced for measures that achieve environmental objectives. • Eco-schemes in Pillar 1 should be set up so farmers are incentivised and rewarded for the delivery of public goods. • The budget in Pillar 2 for rural development should provide sufficient funding for an holistic approach and aim to mainstream agroecological practices.	Support the creation of wider Buffer Strips and allow for more space for the rivers. Introduction of Integrated Wet Buffer Zones and Wetlands targeted at the reduction of agricultural nutrient runoff. Funding for wetland restoration and wet agriculture.
No subsidies that cause environmental degradation or contribute to climate emissions • Coupled Payments should be phased out to stop incentivising intensification and oversupply in the meat and dairy sectors. • Investment aid should only be used to assist farmers to move towards ecological farming systems, not for further intensification. • CAP money should not support factory farming.	No funding for so-called "river maintenance" and "dredging" under Rural Development. No CAP money for draining peatlands.
A truly performance-oriented CAP with strong governance and accountability • Quantitative targets should be set at EU level for all MS to work towards, which contribute to achieving existing targets in EU environmental law.	Set targets for better nutrients management under the CAP and use CAP instruments to fully implement the Nitrates Directive in all Member States.

EEB/GRÜNE LIGA factsheets on WFD Implementation (2019)

Paludiculture – Rewetting and farming degraded peatlands

Microplastics in our waters

Wetland rehabilitation strategies: The benefits of green filters in Albufera

Natural Climate Buffers in the Netherlands – learning from best practise to adapt to climate change effects

Intelligent Buffer Zones – a solution for water and phosphorous retention and nitrogen removal

Restoration of Aquatic Ecosystems, Wetlands and Buffer Zones within an Intensive Farming Area in the Po Valley