

# The Transition to Sustainable Life on Wetlands: How the Sustainable Use of Peatlands Appears on the Political Agenda

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## 1. Introduction

This article deals with the transition to sustainable life in wetlands, a world in the “transitional position between land and water” (Rydin and Jeglum 2013, p. 2). More specifically, we examine peatlands. Peatlands are “the most widespread of all wetland types in the world” (Joosten and Clarke 2002, p. 6). The special characteristic of peatlands explains their importance for sustainability transition: due to a waterlogged, oxygen-poor environment, the rate of decay of dead plants in peatlands is slower than in all other terrestrial ecosystems worldwide (Joosten et al. 2016b, p. 64). Thus, they play a major role in the CO<sub>2</sub> concentrations in the atmosphere. Limpens et al. (Limpens et al. 2008, p. 1381) point out:

Despite covering only 3% of the Earth’s land surface, boreal and subarctic peatlands store about 15–30% of the world’s soil carbon as peat. [ . . . ] These massive deposits are the legacy of peatlands acting as sinks of atmospheric carbon dioxide (CO<sub>2</sub>) for millennia, but also illustrate the potential for large CO<sub>2</sub> and methane (CH<sub>4</sub>) fluxes to the atmosphere if peatlands were to be destabilized by global warming and changes in land use.

Next to carbon storage, peatlands have multiple other values and functions (Joosten and Clarke 2002, pp. 45–100). Wet peatlands are important for biodiversity protection (Minayeva et al. 2017) and they function as “the kidneys of the landscape” in hydrological and chemical cycles (Fraser and Keddy 2005, p. IX). As such, they play an important role in the storage of water and freshwater quality. Furthermore, they have an archive function—peatlands provide information that is “deposited and stored in the peat profile” (Chapman et al. 2003, p. 525). Sustainable land use is only possible if the peat is conserved in wet peatlands, so that the peatland can provide these ecosystem services.

Today, most human activities in wetlands are based on drainage and cause the degradation of peatlands accompanied by high CO<sub>2</sub> emissions and a loss of mires as living peatlands. Amongst others, forestry, peat extraction and urbanization destroy mires worldwide. However, at least in the non-tropical world, agriculture is the main driver for peatland degradation (Joosten and Clarke 2002, p. 33; cf. IPCC 2007). The only sustainable way of using peatlands is paludiculture, land use on wet and rewetted peatlands (Wichtmann et al. 2016). Paludicultures (Latin 'palus' = swamp) are land management techniques that cultivate biomass on peatlands under conditions that maintain the peat body, facilitate peat accumulation and sustain the ecosystem services associated with natural peatlands. A transition from the unsustainable use of drained peatlands to rewetting and use in paludicultures contributes directly to most of the United Nations Sustainable Development Goals (SDGs), including, amongst others, SDG 6 (clean water), SDG 9 (innovations) und SDG 13 (climate action) (Tanneberger et al. 2020, p. 5). Due to the disproportionately high number of the world's species that live and breed in wetlands, peatland protection is of utmost importance for SDG 15 (life on land) (RAMSAR 2018). Given the fact that agriculture is the main driver for peatland degradation, our article focuses on the question how the agricultural policy can contribute to the transition to sustainable life on (wet-)lands.

For the analysis of political agenda-setting, we focus on the European Union. Europe is one of the world regions with the largest areas of degraded peatlands (Urák et al. 2017). In the EU, agricultural policy is one of the key policies, so that the "EU's Common Agricultural Policy (CAP) is arguably the single most important policy instrument in the context of peatland degradation and conservation across the EU" (Peters and von Unger 2017, p. 10).

The analytical framework of our examination is the Multiple Streams Approach (MSA) by Kingdon ([1995] 2014)). The MSA is a universal theory and key reference in public policy studies (Cairney and Jones 2016). We use this analytical frame in order to understand the emergence of a new approach to sustainable peatland use in the policy discourse. Based on that, we discuss the chances for a large-scale implementation of paludiculture as a form of wet agriculture on peatlands.

## **2. Theoretical Background and Expectations**

John Kingdon's Multiple Stream Approach (MSA) provides the analytical frame of our investigation. Kingdon argues that an idea's time comes when a problem stream, a policy stream and a political stream come together and policy entrepreneurs push this idea on the governmental agenda (Kingdon [1995] 2014).

Since one of the main criticisms of the MSA is the lack of explicit hypotheses and the possibility of falsification, we use the theoretical refining and adaptations of the MSA by Herweg et al. (2015) and integrate their hypotheses into our analysis of the emergence of paludiculture on the political agenda.

The first stream we consider is the problem stream. This stream answers the question “[w]hen exactly [ . . . ] a problem [is] relevant enough to open policy window” (Herweg et al. 2015, pp. 436–37). According to Kingdon, a problem exists if there is a “mismatch between the observed conditions and one’s conception of an ideal state” (Kingdon [1995] 2014, p. 110). Thus, the value-based definition of an ideal state and the intersubjectively shared observation of a phenomenon determine the definition of a problem and the state of the problem stream. The crucial question is to define when exactly the problem is relevant (enough). Herweg et al. (2015) argue that this is the case when the problem puts the policymakers’ re-election at risk. Due to the global dimension of the greenhouse gas (GHG) emissions from drained peatlands, we argue that re-election is less important in this case. Instead of this, we consider the problem stream as ripe if there is not only global awareness of a problem, but legally binding mechanisms to deal with that problem exist on a global level and have an influence on policymaking on the political levels below.

The policy stream comprises the ideas for the specific design of the policy field. Analytically, the MSA takes here all proposals into account which are made to reduce the imbalance between the ideal and observed observations. Kingdon calls these ideas and proposals in sum the “policy primeval soup” (Kingdon [1995] 2014, p. 19), and they are discussed, selected and adopted in a community of specialists. Usually, a “large set” (Kingdon [1995] 2014, p. 20) of proposals exists, but, like in a natural selection process, only some ideas survive. Kingdon ([1995] 2014, pp. 131–39) identifies different criteria which determine the success of an idea in the policy stream. These criteria are the technical feasibility, the value acceptability among the specialists in the policy community (including efficiency and cost-effectiveness) and an anticipated positive reaction in the public sphere and among decision makers (cf. Jones et al. 2016, p. 16). The policy stream is ripe “if at least one viable alternative is available” (Herweg et al. 2015, p. 443) to the status quo in order to reduce the mismatch observed in the problem stream.

The third stream in Kingdon’s MSA is the political stream. Initially, it flows apart from the work of specialists in the policy stream and the public attention in the problem stream (Kingdon [1995] 2014, p. 145). To understand the stream and its status, Kingdon argues for the analysis of the public mood, the activities

of organized interests and changes in governmental and administrative structures (Kingdon [1995] 2014, pp. 146–59).

For examining the political stream, we focus on the EU. The implementation of a sustainable use of peatlands is dependent from the political stream on the levels where the political competencies for shaping and steering the policy field are. As outlined in the introduction, the EU's Common Agricultural Policy (CAP) is a crucial policy instrument for peatland protection. The flow of the political stream within political entities led to the criticism of Kingdon's original MSA to be too unprecise with respect to the different political agents. Consequently, the MSA was extended to political parties and their agenda-setting in the light of the position of interest groups and the chances for re-election (Herweg et al. 2015, pp. 438–41). This theoretical refining is convincing for parliamentary systems. However, due to the crucial role of the EU commission and the interest groups in the EU agenda-setting processes (Princen 2011), we focus on the original characteristics pointed out by Kingdon. In order to refine Kingdon's MSA, we adopt the argument of Herweg et al. (2015) with respect to the conditions and argue that a political stream is ripe if the crucial political institutions perceive the alternative proposal as (a) popular among voters, and if (b) powerful interest groups are unlikely to launch campaigns against it and (c) new key personnel are involved in the agenda-setting on an administrative level.

According to Kingdon, a new idea appears on the political agenda if the three streams are ripe and policy entrepreneurs become active. In times of an open policy window, policy entrepreneurs are key actors who soften up the separations between the streams. Policy entrepreneurs are "advocates for proposals" (Kingdon [1995] 2014, p. 122), and an open policy window gives them the opportunity to promote their policy proposal as a solution to a challenge defined in the problem stream.

### **3. Materials and Methods**

In the 2000s, the MSA became one of the most prominent approaches to analyze public policy (Zohlnhöfer et al. 2015). The empirical material in Kingdon's work was gathered from expert interviews and the analysis of official documents and academic writing (Kingdon [1995] 2014, pp. 4–5). Like Kingdon in his original work, the majority of the MSA studies use documentary analyses and interview methods (cf. Cairney and Jones 2016, p. 44). This qualitative access has proven itself in order to explore a new object of study. To do so, most authors do some conceptual revisions and adaptations of Kingdon's MSA (Cairney and Jones 2016, pp. 45–46). This is also the case for studies in the field of environmental policy (e.g., Brunner 2008). In our

article, we follow this methodological path and analyze the policy documents of governmental institutions and policy stakeholders (like interest groups) as well as the scientific literature on the sustainable agricultural use of peatlands. To depict the political stream and the policy window, we analyze all documents of the EU institutions on peatland protection of the last 20 years and examined the publications of the stakeholders addressed to the CAP reforms. Additionally, we conducted five interviews in 2019 with staff on the working level of the agricultural ministries in the German federal states, the Bundesländer. The interviews took place in spring 2019. In the five peatland-rich Bundesländer, there is at least one official for peatland protection in the ministries for agriculture and environment. We conducted semi-structured interviews with these officials and analyzed the interviews with qualitative methods. We use the German Bundesländer as a case study for the agenda-setting on a subnational level. The Bundesländer play a central role in the specification and administration of the European CAP (Ewert 2016). For the implementation of the CAP in Germany, the state ministries are crucial institutions.

#### **4. Results**

The MSA is a universal approach in the sense that “policymaking issues that can arise in any time or place” (Cairney and Jones 2016). Due to the global existence of peatlands and the global threat of anthropogenic climate change, the problem stream (Section 4.1) and the policy stream (Section 4.2) also have a global dimension. On the contrary, the political stream flows within political entities. In this stream, policy entrepreneurs in the field of agricultural policy have to be active on different levels, as we demonstrate with the example of the European Union (Section 4.3). We focus on the EU because, on the one hand, the problem of peatland degradation is particularly visible in Europe and, on the other hand, the pressure on the land is high due to high population density (cf. Tanneberger et al. 2020). We show that policy windows regularly open in this policy field, because the CAP functions in seven-year funding periods (Section 4.4). We agree with Brunner (2008) that it is, to some extent, complicated to analyze multi-level game structures with the MSA, but argue that the approach is nevertheless useful to explain the changes in the political agenda concerning sustainable peatland use.

##### *4.1. Problem Stream*

We first analyze the problem stream. Regarding greenhouse gas (GHG) emissions in general, there is no doubt that this problem stream is ripe. On a global level, the best evidence for this might be the creation of global organizations and

treaties. The foundation of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 is only one expression of the problem's recognition (cf. Bodansky 1993). Article 2 sets out the central objective of the convention, the "stabilization of greenhouse gas concentrations in the atmosphere". The assessment of the observable conditions for the UNFCCC is one of the main tasks of the Intergovernmental Panel on Climate Change (IPCC) (Alfsen and Skodvin 1998). The IPCC defines the indicators for GHG inventories (Hiraishi et al. 2014, p. IV) and summarizes the existing data. The IPCC's assessment reports made the mismatch between stable GHG concentrations in the atmosphere (as an "ideal state" in the sense of Kingdon) and the conditions created by human GHG emissions observable. They entered public debates and made clear that climate change is one of the biggest challenges for mankind (Brunner 2008). With the Kyoto protocol, the UNFCCC established a legally binding mechanism to act against climate change on a global level. In terms of the MSA, the problem stream became ripe.

With respect to land use, the IPCC reports pointed out that the agricultural sector is responsible for a substantial part of human GHG emissions (IPCC 2007). The reports already made clear in 2007 that the decay of peat on organic soils drained for agricultural activities is a large CO<sub>2</sub> source (IPCC 2007, p. 36). Subsequently, however, it became clear that the IPCC reporting guidance for the national GHG inventories regarding drained peat soils underestimated the GHG emissions substantially (Couwenberg 2011). While living peatlands under natural, wet conditions are a net carbon sink, drained peatlands are a huge carbon source (Joosten et al. 2016b) and while the peatlands of the world are still the largest terrestrial store of organic carbon (Joosten et al. 2016b, p. 63), agriculture and forestry are the main drivers for the drainage of peatlands (Oleszczuk et al. 2008). Different research activities made the dimension of the problem observable. Joosten et al. (2012, p. C) summarized this research and clarified:

Fifteen percent of peatlands [=0.45 percent of the Earth's land surface, S.E./S.A.] are drained and used for agriculture, grazing, peat mining and forestry, especially for bioenergy plantations. Including emissions from peat fires, these drained peatlands emit almost six percent of anthropogenic CO<sub>2</sub> emissions. This represents almost 25 percent of emissions from the entire land use, land use change and forestry sector.

Based on this research, the IPCC reviewed the guidelines for reporting GHG emissions from peat soils (Hiraishi et al. 2014). It became obvious that a large mismatch between land use on drained peatlands and the aim of a sustainable use of terrestrial ecosystems exists. The problem was recognized and expressed in

figures and it was given scientific and public attention. The Kyoto protocol, which initially did not systematically take the role of peatlands into account, made several adjustments in later commitment periods (Joosten et al. 2016a). In general, the key issue of the discourse on sustainable peatland use is the general challenge of climate change mitigation. Climatic drying and drainage also increase the risk of peat fires that are a further source of greenhouse gas emissions to the atmosphere, as well as causing negative human health and socio-economic impacts (Page and Baird 2016). Wet peatlands are also important for climate change adaptation because of their resilience to gradual, long-term changes in climate and hydrological conditions, but they also respond rapidly to more profound, short-term anthropogenic disturbances (Page and Baird 2016). Drainage of peatlands leads to subsidence. As a result, some areas of peatland formerly drained for agriculture have now been abandoned or put to other land uses. Subsidence leads to high risk of flooding in coastal areas, decreasing agricultural productivity, leading to increased costs for drainage and the reconstruction of infrastructure or developments. With the amendments in the Kyoto protocol, these scientific findings formed the problem stream on a global level.

On an EU level, the current legal framework for the agricultural policy is provided by regulation No 1307 from the year 2013. The problem of the GHG emissions from drained peatlands is not named in the regulation. However, in the present reform discussion of the CAP on a European level, this issue plays an important role (see Section 4.4). In Germany, all current coalition agreements in the peatland-rich Bundesländer mention the need to protect and rewet the peatlands in order to implement GHG emission targets (Ewert and Hartung 2020). Our interviews with the agricultural ministries demonstrate that the Bundesländer have been trying to get the federal ministry of Germany to name the problem and possible solutions in the coming European CAP period (Interview No 1, No 2, No 4 and No 5).

#### *4.2. Policy Stream*

For the examination of the policy stream, we analyze the literature regarding the alternatives to the unsustainable use of drained peatlands. Within the policy community, there is a consensus that intact mires and bogs are—among other ecosystem services—large carbon stores (Yu et al. 2010; Crump 2017). With regard to the rewetting of drained peatlands, there is a scientific debate on the opposing effects of CO<sub>2</sub> storage and increasing methane (CH<sub>4</sub>) emissions. Current research demonstrates that, due to different radiative effects and atmospheric lifetimes of both gases, prompt rewetting has the highest climate change mitigation potential (Günther et al. 2020). However, restoration by rewetting comes into conflict with the

existing forms of agricultural and forestry uses of peatlands (Chapman et al. 2003). These conflicts called for a new approach to the wise and sustainable use of peatlands (Joosten and Clarke 2002).

The sustainable productive use of wet peatlands has—on the one hand—a long tradition. One example is the use of reed for construction and roofing. On the other hand, a systematic approach to use peatlands in a way that peat accumulation maintains or starts again is a rather new concept. It is called paludiculture (Latin ‘palus’: swamp) and defined as “the cultivation of biomass on wet and rewetted peatlands” (Wichtmann and Joosten 2007, p. 24). Since the beginning of the 2000s, the concept has been developed, tested in pilot projects and introduced into scientific discourse (for an overview e.g., Wichtmann et al. 2016; Joosten et al. 2014; Wichtmann and Joosten 2007). This made paludiculture, as an alternative to the unsustainable use of drained peatlands, visible. However, is this policy stream already ripe? To evaluate this, we look at the criteria defined by Kingdon for the success of an idea in the policy stream.

#### 4.2.1. Technical Feasibility

According to Kingdon, a proposal is technically feasible if it is “worked out” and “ready to go” (Kingdon [1995] 2014, p. 131). For paludiculture, the first step is to identify suitable crops. The ‘Database of Potential Paludiculture Plants’ (DPPP)<sup>1</sup>, records the results of pilot projects, etc., and identifies more than one thousand potential plants worldwide (cf. Abel et al. 2013). Based on this, different questions of production, harvesting and utilization have to be analyzed. Several pilot projects and practice examples demonstrate the feasibility of paludiculture (Wichtmann et al. 2016, pp. 21–78). Amongst others, the use of fen biomass in the district heating plant of Malchin from 400 ha of rewetted peatland (Mecklenburg-Western Pomerania, Germany) (Dahms et al. 2012) or the cultivation and use of *Sphagnum* (peat moss) biomass as a substitute for peat in horticulture on 17 ha on a former bog grassland (Gaudig et al. 2018) (see Figure 1). Another example are water buffalos grazing on around 300 ha of wet or rewetted peatlands (Sweers et al. 2014). The examples were scientifically monitored and the results show that the plant establishment, wet management, harvest and biomass utilization for different value chains (e.g., as fuel, substrate or meat) are feasible on a large scale. The use of wet meadows for hay production or reed cutting for thatching are

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<sup>1</sup> The DPPP is available online: <https://www.greifswaldmoor.de/dppp-109.html>.



traditional examples of paludiculture. With modern harvesting techniques, they have developed into a good source of income and have enabled the application of nature conservation measures.



**Figure 1.** (left) Peat moss harvest on rewetted bog grassland in NW Germany; (right) wet meadow harvest; Source: Greifswald Mire Centre, used with permission.

#### 4.2.2. Value Acceptability

Kingdon argues that a proposal has to be in line with the values of the specialists in a policy community (Kingdon [1995] 2014, p. 132). Regarding the question of the introduction of paludiculture on organic soils that are currently used for conventional agriculture, the policy community consists of a lot of different agricultural stakeholders. The conventional agriculture on peatlands is based on drainage, agriculture has a ‘semi-desert’ origin and heritage (Joosten 2014; Joosten et al. 2014). However, in the current discussion on a CAP reform in Europe, COPA-COGECA—as the union of farmers’ organizations and a highly influential interest group on a European level—endorses the introduction of paludiculture as an appropriate way to protect peatlands (Copa and Cogeca 2019). Our interviews with representatives of the agricultural ministries in the German Bundesländer confirm that the farmer associations do not oppose the introduction of paludiculture.

Within the topic of value acceptability, the question of the efficiency of the new approach is highly relevant (Kingdon [1995] 2014, p. 136). Within the agricultural sector, with its high level of subsidies worldwide, this question matters maybe even more. Economic studies point out that paludiculture crops can be competitive to other agricultural products, if the entitlement to agricultural subsidies is equal to conventional farming (Wichmann 2017). However, in the European Union, this is not the case. While farmers receive subsidies for drained peatland agriculture, they do not for most of the paludicultures (Joosten et al. 2014, p. 303). The question of the income of paludiculture farming—especially in comparison to farming on

drained peatlands—is crucial for its acceptability among farmers. A large-scale implementation of paludiculture could only take place if the income (incl. subsidies) is at least as high as for conventional farming on peatlands.

#### 4.2.3. Anticipated Reaction in the Public Sphere

One can find a lot of examples of the mires' perception as hostile and threatening in different cultures. As Ludwig Fischer has shown for the case of Germany, the discovery of the mire in art and literature in the 19th century was closely connected with the conquer of the mire, and with its scary and hostile nature being transformed by civilization (Fischer 2009). Thus, rewetting projects are often confronted with acceptance problems among local people (Pfadenhauer and Grootjans 1999). Rewetting is perceived as a break with traditions, also because of the great efforts that have been made to drain and reclaim the land for food security, electrification or wealth in general (e.g., Deickert and Piegsa 2016; Varkkey and O'Reilly 2019). People also fear the rising water levels because of wet basements and mosquitos. However, one might expect that the anticipated reaction in the local public sphere is considerably better when the rewetting is connected with an ongoing productive use of the peatland via paludiculture and an awareness of the problems of drainage-based use. The participation of the local people in rewetting projects is the key to the enhancement of acceptance (cf. Pfadenhauer and Grootjans 1999, p. 95; Abel et al. 2019) and paludiculture offers different opportunities for this, especially in terms of the economy and employment.

#### 4.3. *Political Stream*

The last stream we examine is the political stream. Following Kingdon, we analyze the public mood, the activities of organized interests and the changes in governmental and administrative structures.

##### 4.3.1. Public Mood

Public opinion is the first key pillar of the political stream (Kingdon [1995] 2014, pp. 146–49). Opinion polls point out that, for most Europeans, climate change is one of the most important environmental issues (Eurobarometer 2017, p. 12). Moreover, a large majority demands a stronger EU policy for climate protection.

More than four in five Europeans (85%) agree that the EU should invest more money in projects and programmes supporting the environment, nature conservation and climate action throughout the EU. (Eurobarometer 2017, p. 98)

Furthermore, a third of Europeans agree that agricultural pollution is one of the most important environmental issues (Eurobarometer 2017, p. 12). These figures demonstrate that the need for a more climate-friendly agricultural policy is clearly expressed by the majority of Europeans.

Other surveys concerning people's preferences towards peatlands show rather heterogenic and complex results. Restoration and nature conservation are commonly accepted by the public, but it was also found that a high value is placed on the agricultural use of peatlands or peat cutting (Tolvanen et al. 2013; Rawlins and Morris 2010). Obviously, there is a mismatch concerning the wish for climate protection or other ecosystem services and the preference for peatland use.

#### 4.3.2. Interest Group and Changes in Their Administration

As already shown, the most influential farmer associations on a European level do not oppose paludicultures, but consent to the view that they help reduce GHG emissions from agriculture substantially (cf. Kingdon [1995] 2014, pp. 149–53). The interviews in the agricultural ministries of the Bundesländer confirmed this interpretation (Interview No 1, No 3). According to Kingdon, another indicator for a ripe political stream is the turnover of key personnel in the government (Kingdon [1995] 2014, pp. 153–59). Currently, there is some evidence that, within the European Green Deal strategy of the European Commission, a “dilution of the sole power of DG AGRI to determine farm policy” is observable due to new working structures (Matthews 2020). This development implies new personnel in the European governmental structures concerning the CAP.

#### 4.4. *Policy Windows and Policy Entrepreneurs*

According to Kingdon, new ideas and alternative approaches find their way on the political agenda if the three streams are ripe and a policy window opens. Windows open either predictably or rather unpredictably as a result of focused events (Kingdon [1995] 2014, pp. 168–70). Kingdon ([1995] 2014, p. 165) gives the “scheduled renewal of a program” as an example of an open policy window in the first mentioned sense.

In the European Common Agricultural Policy (CAP), such predictable open policy windows are observable every five to seven years. Two European funds, the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD) are the financial sources of the CAP. The European “Multiannual Financial Framework” (MFF) defines the framework for these funds. A new MFF period leads to new EU regulations on the agricultural funds and ongoing

reforms to the agricultural policy (Massot 2020; cf. Daugbjerg and Swinbank 2016). In the words of Kingdon: A new MFF period is a “scheduled renewal” of the European agricultural policy program. New EU regulations define a new CAP period with new specifications of new steering mechanisms, adjustments of support, funding tools and so on.

In times of an open policy window, the actions of policy entrepreneurs are a crucial factor in the MSA. Policy entrepreneurs promote their ideas regarding how to deal with the problem defined in the problem stream. The background and the placement of the entrepreneur varies from case to case and Kingdon gives the activities of academics as an explicit example (Kingdon [1995] 2014, p. 180). Regarding the sustainable use of peatlands, Chapman et al. (2003, p. 526) point out the active role of scientists in the policy field, referring to Joosten and Clarke (2002) as “a land-mark book which was the product of a joint effort by the International Mire Conservation Group [IMCG] (a group of scientists aiming to preserve peatlands)”. Hans Joosten, the general secretary of the IMCG, describes the work of academics and their achievements as policy entrepreneurs on a global level:

When—in 2006—experts and advocacy groups for the first time raised the issue of GHG emissions from degraded peatlands at the United Nations Framework Convention on Climate Change (UNFCCC), they met with negotiators, many of whom had never heard of ‘peat’ in the first place. [ ... ] After years of neglect, peatlands have gained the attention that they deserve in the face of their enormous emissions and mitigation potential. (Joosten et al. 2016a, p. 291)

As outlined in Section 4.2, academics developed the concept of paludiculture as a sustainable alternative to the unsustainable agriculture on drained peatlands and emphasize the current practice of farm subsidies as a crucial barrier to the large-scale implementation of paludicultures in Europe. The policy window on a European level opened with discussions and the preparation of a new funding period after 2020. Policy entrepreneurs became active on a European level in order to convince a decision maker in the CAP to put paludiculture on the agenda (cf. Greifswald Mire Centre et al. 2020).

Through the proposals and discussions of the European institutions on the future of the CAP, one can clearly see that the problem of the unsustainable use of peatlands and the solution of paludiculture became part of the agenda. In Annex III of the Commission’s proposal for a new CAP period, a new standard for the good agricultural and environmental condition of land (GAEC II) is defined as the “appropriate protection of wetland and peatland” in order to mitigate climate

change (European Commission 2018, p. 13). Additionally, a new brochure from the Directorate-General for Agriculture and Rural Development (DG Agri) explicitly takes paludiculture as an example to explain the new possibilities for the member states to use the conditionalities defined in the GAECs for peatland protection (DG Agri 2019, p. 12). As an amendment to the Commission's proposal, the European Parliament calls for an explicit fixation on paludicultures as being eligible for direct payments (European Parliament 2019, amendment 91).

## 5. Discussion

Paludiculture, as a sustainable way to use peatlands, is on the agenda of the current discussions and proposals on the future of European agricultural policy. The agenda-setting process took place according to Kingdon's theoretical expectations and the refinements by Herweg et al. (2015, p. 443): "Agenda change becomes more likely if (a) a policy window opens; (b) the streams are ripe; and (c) a policy-entrepreneur promotes the agenda change".

On a European level, the window for agricultural policy reforms opens regularly every few years when a new CAP funding period is under preparation. During the current preparation time, the problem of GHG emissions from drained peatlands was already on the global climate protection agenda and found its way into global climate protection agreements and actions due to the activities of scientists. We argue that the problem stream is ripe on a European level because these global initiatives took place and the political levels below became active in putting the problem of GHG emissions from drained peatlands on the European agricultural policy agenda.

In the policy stream, the introduction of paludiculture as sustainable use of peatlands on large scale is a viable policy alternative which fulfils most of Kingdon's criteria for a successful proposal. To follow Kingdon's analogy of the biological evolutionary selection process: like the bottleneck effects in evolution which result in the decline of genetic variability (cf. Nei et al. 1975), one might interpret the question of a sustainable use of peatlands as a bottleneck policy field. The only way to protect peatlands is to keep them wet and to rewet drained peatlands. Moreover, the only way to use peatlands in a sustainable manner for agriculture and forestry is to use them wet. Thus, the concept of Paludiculture had a strategic advantage that enabled its survival in the "policy primeval soup". Yet the crucial question of paludicultures' efficiency, especially in competition with subsidized drainage-based agriculture on peatlands, remains unsolved so far. Here, the policy stream is coupled with the political stream.

On a European level, public surveys demonstrate that a large majority of European citizens support the call for a more sustainable agricultural policy. Politicians with responsibility for the structure of the new CAP might consider these figures as representative of the public mood in favor of the implementation of paludicultures on peatlands. New working structures on a European governmental level integrated new key personnel in CAP decision making and indicate changes in the political stream towards a more climate-friendly farm policy. The initiatives of the European institutions involved in the CAP reforms show that the political stream is ripe to enhance the framework conditions (eligibility for subsidies and other support schemes) for paludicultures.

## 6. Conclusions

Our analysis has shown that the agenda-setting for the large-scale introduction of paludicultures on peatlands took place on the level of the European agricultural policy. At this stage, two questions remain open, which are connected to some extent. (1) How do the different political levels interact in the agenda-setting process? (2) How does this influence the agenda-setting and the implementation of policies and changes in peatland use towards sustainability?

Brunner (2008) points out the shortcomings of the MSA in the analysis of multi-level politics. For the case of paludiculture, Ewert and Hartung (2020) show that, in Germany, the agricultural administrations in the Bundesländer do not support paludicultures directly via CAP schemes due to their unclear legal status in the European regulations. All our interview partners point out that the sustainable use of peatlands is also on the agenda of the agricultural policy stakeholders in the Bundesländer; however, for its implementation, the stakeholders are waiting for European policy changes (Interview No 1–5). Future research should analyze this interplay more systematically and integrate it into the MSA.

There are already proposals in the MSA literature on how to integrate the decision-making stage into the approach (Herweg et al. 2015, pp. 443–46). In the case of paludiculture, further research is needed to investigate “decision coupling” processes that follow the agenda-setting on an EU level, as well as its implementation on national and subnational levels. John Kingdon’s MSA can explain how the time came for the idea of paludiculture and how it appeared on the political agenda. However, the non-formal aspects of policy implementation are beyond the scope of the MSA and the important question of power in the realization of agricultural policy reforms on site (cf. Nuijten 2005) has to be investigated in future research. The transition to sustainable life on wetlands and the sustainable use of peatlands not

only needs a political agenda, but also a large-scale implementation on the ground, supported by appropriate funding schemes.

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