

## **Executive statement**

*CConnects offers practical solutions for reducing carbon emissions and increasing carbon storage in peatlands whilst benefiting farmers, landowners and the environment. The solutions are gathered in a toolbox. The toolbox derives from pilot sites across Northwest Europe testing peatland transformation models (peatland rewetting, paludiculture and livestock on wet land). To support this transformative process, CConnects has designed financial mechanisms to monetise carbon storage and peatland restoration, and established an online collaborative learning platform. CConnects recommends practitioners to adopt a mix of management methods, and policy-makers to mainstream peatland restoration and related issues.*

## **Peatland: why we should care**

Peatland is a form of wetland, comprising swamps, mires, moors, fens, and bogs. Such wetland is waterlogged year-round, impeding dead plant material decomposition. Instead, the latter turn to peat. Peatland refers to the (up to several meters thick) layer of peat and its associated habitats.

In its natural wet state, **peatland offers an unrivalled and disproportionate contribution to tackle climate change.** Peatland constitutes the largest terrestrial organic carbon stock on the planet, far in

excess of forest biomass despite peatland covering a much smaller surface. A natural buffer against floods and droughts, peatland also purifies water and can provide a raw drinking water source. Peatland is home to a unique flora and fauna providing habitat for rare birds, insects and plants. Peatlands constitute an unusual and special environment for people to engage with nature. Peatlands are natural archives preserving the lands natural history and human artefacts in its waterlogged and oxygen-free soil for perhaps thousands of years.

**Peatland is the most degraded ecosystem in Europe<sup>1</sup>.** While healthy peatland is an exceptional carbon store, degraded peatland is an unrivalled carbon emitter. Peatland in Europe is drained for agriculture, afforestation, horticulture, and peat extraction for fuel. Drained and damaged peatland becomes inactive and emits large amounts of carbon and exacerbate flood risk.

Considering degraded peatlands impact on climate change and the environment, there is every interest **restoring peatland to combat climate change, preserve biodiversity and create new business opportunities.** The Interreg North-West Europe Carbon Connects (CConnects) project explored ways to restore peatland while creating business added value.

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<sup>1</sup> Maes, J. (2020). Mapping and Assessment of Ecosystems and their Services: An EU ecosystem assessment. Publications Office of the European Union

## **CConnects vision for net-zero carbon emission**

CConnects project gathers European partners and farmers convinced of the necessity to restore peatland in Northwest Europe to tackle carbon emissions and its negative consequences. The objective of CConnects is to **reduce carbon emissions caused by traditional practices on agriculturally converted peatland** in Northwest Europe, while **developing viable and sustainable peatland use models**. CConnects designed **local, innovative and sustainable business models** to restore peatland. CConnects also created a collaborative toolbox, to encourage farmer-to-farmer collaborative learning.

## **Living labs testing business models**

CConnects project was set by partners from Belgium, France, Germany, Ireland, the Netherlands and the UK. The objective of the project is to change peatland use to reduce the carbon footprint in Northwest Europe by introducing new bio-based business models developed for sustainable land management practices. A wide range of stakeholders such as research institutions, local authorities, farmers, and landowners were involved in the project.

CConnects worked with **11 pilot sites across Northwest Europe**, from 2018 to present day. The pilot sites served as living labs: low carbon peatland management

and restoration practices were tested. CConnects derived **business models of low carbon peatland management** from the experience and results arising from the living labs. These include livestock adapted to wet conditions, introduction of alternative 'paludicrops', and the cultivation of peat moss as an alternative to fossil peat substrate. Testing different business models safeguards the viability and sustainability of the peatland transformative process, and integrates farmers in the transformation of traditional peatland use. To ensure peatland restoration and sustainable management bring sufficient income to farmers, CConnects explored **financial means** (blue, eco, and carbon credits) to monetise the ecosystem services provided by new peatland use and management.

In practice, peatland farmers and owners explored alternative wet agriculture on their damaged peatland, monitored it before, during and after restoration, and shared their experience on an online platform, and farmer-to-farmer learning environment. CConnects gathered these experiences and results to produce the toolbox.

## **A toolbox useable by all**

CConnects offers practical solutions to reduce carbon emissions and store carbon in peatland while benefiting farmers, landowners and the environment. The outcome of the project is an online **toolbox** (available [here](#)).

<https://sites.google.com/view/c-toolbox/home?authuser=0> ). The aim of the toolbox is to accompany farmers and landowners in peatland restoration by developing sustainable and viable business models.

It highlights three main categories of peatland use: **restoration and conservation, paludiculture, and livestock activities on rewetted peatland**. These constitute alternatives to damaging peatland practices, such as conventional agriculture, peatland extraction for fuel, afforestation and horticulture. They address challenges and provide specific business opportunities. The toolbox also illustrates **financial schemes** to monetise peatland transformation, and an online farmer-to-farmer **learning platform**.

### Peatland use

**Peatland restoration** is a transformative management practice that returns degraded peatland to an **ecologically functional peatland**. Its core function is thus to restore and optimise peatland carbon storage and restore peatland natural habitat.

Peatland restoration consists of raising and stabilising water levels and peatland's hydrological functions at an optimal level. The pilot sites used different approaches to peatland rewetting: drain blocking and dams raised the levels of water (also called hydrological isolation); reprofiling existing ditches; creating bunds and slopes. Removing invasive vegetation (such as

trees) also turned out to be an effective solution for peatland rewetting. The reintroduction of peatland vegetation (sphagnum, cattail, peat moss, but also berries and herbs) also contributes to restoration by absorbing water and creating conditions suitable for generating peat.



*Timber weirs blocking drainage in Bundorrhaga site*

**Paludiculture** is the productive use of wet agriculture and forestry on healthy peatland. It is a sustainable alternative to drainage-based agriculture. It combines **peatland rewetting** with **biomass production**. Paludiculture shifts drainage-intensive agriculture production (e.g.: production of meat or traditional arable crops) to paludicrops (crops species that prosper under wet conditions, such as cattail, peatmoss, reed, herbs and fruits).

Well managed transformation of traditional agriculture to paludiculture is able to supply extensive amounts of biomass and **animal feed**, increasing the added value of re-vegetation.



*Sphagnum moss*

**Livestock activities on rewetted peatland** consists of introducing grazing livestock adapted to wet land. In that context, grazing serves to increase biodiversity and optimise carbon storage, on top of producing meat and dairy. Livestock density is lower on peatland than in traditional farming and requires rotational grazing (where grass is rested between grazing periods), especially adapted to changing water levels. The direct outputs for farmers may be lower than traditional livestock farming.

### **Incomes and financial schemes**

A direct source of incomes for farmers transitioning to peatland farming lies in the **production of sustainable biobased products**. Peat biomass can be used for renewable fuel, a sustainable alternative to peat burning. Paludicrops can be used for building and insulation material, animal feed, horticultural substrate and

composting. Livestock also produces meat, dairy and fertilises soils.

Yet, farmers engaging in transformative peatland use might experience lower incomes than they could get from traditional farming. To ensure they can make a living out of peatland restoration, paludiculture and livestock grazing, financial compensation measures and financial schemes must be developed. An effective business model is capital for peatland sustainability. CConnects developed several **financial models** to support farmers in their transition process.

Voluntary credits market (as opposed to subsidies-based credits) delivered for carbon absorption, ecosystem services and reduced flood risk support farmers and landowners in peatland management. **Carbon credits** are purchased to offset carbon emissions. CConnects developed a further two new credits, which potentially be included under the carbon credits umbrella. First, **Eco credits** are purchased to offset ecosystem services other than carbon storage (such as protection against erosion and protecting biodiversity). Second, **Blue credits** are purchased to offset water related services (water purification, water retention and reduced flood risk).

**Peatland monitoring** during all phases of peatland restoration and sustainable use is required to underpin these ecosystem credits. CConnects built a **Site Emission Tool (SET)**, a user-friendly way to quantify carbon balance. SET is scenario-based. It enables farmers and landowners to

calculate and monitor the carbon balance of their peatland before and after rewetting. The SET tool is available on the CConnects website.



*'Closed chamber' carbon measurement*

### Learning platform

Farmer-to-farmer contact and exchange is key for understanding, refining, and disseminating practices of peatland restoration best practice. Peat Experience Activity Territory and Peat Experience Activity Town (PEAT) is an online learning environment designed to **engage young farmers and stakeholders in regenerating peatland**. The collaborative platform should trigger interest and foster exploration of new business models, based on shared knowledge and experience. The platform encourages young farmers and stakeholders to invest in peatland.

### Recommendations

Peatland restoration and sustainable management has great potential to achieve several objectives simultaneously. The business models within CConnects toolbox are not designed to be used

separately. CConnects advocates farmers and landowners to **use a mix of several business models**. For instance, peatland rewetting for restoring carbon capture is an objective, but not necessarily an end in itself. It can be adopted to reach concomitant objectives (for instance creating biomass or energy and livestock feed).

**Peatland ownership should be consolidated**. In many parts of Europe, peatlands are under complex ownership and land use rights. **Adapting land planning** will clarify peatland use and simplify restoration actions.

To support farmers and landowners to restore peatland, local, national, and European legislation should support their endeavours in a clear legal framework. CConnects strongly recommends **peatland restoration and sustainable management is regarded as key mainstream environmental objectives**. Peatland restoration should be included in appropriate local, national, and European strategies and regulations. Including peatland restoration and wet agriculture in national and European agriculture, rural development, climate, water and biodiversity legislation and strategies is essential to effectively address peatland challenges and opportunities. Without a clear framework and tangible objectives, damaged peatland will be restored in an incomplete and suboptimal manner.

The **creation of a common framework for carbon balance calculation** will naturally follow up on peatland restoration

mainstreaming. It should be developed consistently with international and European carbon accounting systems and will underpin EU carbon credits schemes. **Effective reporting on carbon emissions and ecosystem services** should be prioritised.

The development of **payments should be streamlined**. For instance, peatland credits could be integrated to CAP payments, and carbon, eco and water credits could be harmonised at EU level. **Streamlining financial resources** should increase the clarity and stability of incomes for farmers and landowners, in turn ensuring sustainability for a viable and long-term peatland use.

Mainstreaming peatland restoration will benefit **economic incentives**. Current carbon credits do not effectively encourage restorative peatland management. Including peatland in existing carbon credits, and establishing voluntary carbon, eco and blue credits frameworks will allow farmers to restore peatland.

**Reliable funding and business models** should be further developed. This includes **upscaling of the business model**. Alternative peatland uses are still underdeveloped because of the limited access to economies of scale. Making CConnects business models scalable will support farmers and landowners not expecting them to bear all transformative costs and make peatland restoration economic activities lively and sustainable.

**Building reliable business models supported by the peatland market ecosystem** will ensure the long-term viability of peatland sustainable use. In this regard, **bridging the gap between hesitant farmers and investors** is key.

## What's next?

Despite its key role in carbon storage and ecosystem services, peatland is still misunderstood and disregarded. This is why we must **make peatlands added value visible** by actively disseminating experience and expertise. The PEAT learning platform will be developed to foster peatland restoration and investments in peatland.

Building on CConnects outputs, our **actions on peatland restoration and sustainable use should be upscaled**. Effective peatland restoration is still challenging as it requires broad changes in business management and land management machinery. This is why technical barriers to peatland restoration should also be addressed. For instance, **quantifying carbon balance** (through SET) should be consolidated and be readily available, and will help to address the risk of non-permanence.

Peatland restoration and sustainable use by other farmers and landowners should also enrich the CConnects toolbox. The more experience we capture, the most accurate and fit-for-purpose and user-friendly business models we will be able to provide.