

Carbon rich peat soils

Proposal for a new model for effective regulation and rewetting

Who is the Danish Council on Climate Change?

The Danish Council on Climate Change provides recommendations on climate initiatives in the transition to a low-carbon society. They are based on independent professional analyses, centered on the overall objective of how we can make a cost-efficient transition. The objective is a future with very low emissions of greenhouse gasses while maintaining social welfare and development.

1. Introduction, conclusions and recommendations

The open land in Denmark is dominated by agricultural production. More than half – roughly 60 percent of the landscape – is cultivated, which leads to annual greenhouse gas emissions of around 9 million tons CO₂-equivalents (hereafter CO₂e). But there are large differences across Danish agricultural soils and their effect on the climate. The majority consists of *mineral soils with low carbon contents*, which do not emit very much CO₂ when cultivated. Just under 7 percent of the cultivated area consists of *carbon rich peat soils*. Peat soils are originally formed in wetlands like bogs and wet meadows and have a high content of carbon from old plant residues. When peat soils are oxygenated by drainage and plowing, the carbon rots and emits gases, primarily as CO₂. In principle, this corresponds to the burning of fossil fuels although it happens more slowly. Hence, draining of peat soils contributes to increasing the atmospheric concentration of greenhouse gases thereby intensifying global warming.

Rewetting of peat soils can contribute significantly to achieving Denmark's climate- and environmental targets

The total area of cultivated peatlands in Denmark is currently estimated to just over 170,000 ha. In 2018, these peat soils emitted around 4.8 million tons CO₂e based on the emission factors that are presently used for the inventory of Denmark's greenhouse gas emissions reported to the EU and UN. Thereby, carbon rich peat soils contribute with more than half of the total emissions related to cultivation of the soil in Denmark, although they only constitute 7 percent of the agricultural area. The annual emissions from the peat soils correspond to the annual CO₂-emissions from roughly 1.8 million petrol- and diesel cars – corresponding to approximately 70 percent of Denmark's total, private car fleet.

If all carbon rich peat soils in Denmark were rewetted, the total Danish greenhouse gas emissions would drop by up to 4.1 million tons CO₂e annually, when calculated with the knowledge we have today. The emissions do not cease completely due to the fact that the rewetting of peat soils leads to a minor increase in the emissions of methane. Methane is also a greenhouse gas and must be reported to the UNFCCC along with other greenhouse gas emissions. Rewetting of peat soils can concretely be achieved by disconnecting existing drain pipes and -ditches, presently draining the soils. However, different environmental and technical barriers may imply that the economically attractive and environmentally sound reduction potential is somewhat less than the specified technical reduction potential of 4.1 million ton CO₂e each year. However, there is not sufficient information to calculate exactly how much smaller the economic and environmentally sound reduction potential is compared to the technical reduction potential.

If all peat soils were rewetted, a fifth of the way towards achieving the Danish goal of 70 percent reduction in total greenhouse gas emissions relative to 1990 would be reached. Denmark can thus realize a large climate gain by rewetting all, or at least a large share, of the carbon rich peat soils. It is therefore important to design effective policies and measures that give the landowners incentives to rewet the soils and at the same time are socio-economically cost-effective.

Rewetting, and with it cessation of the use of fertilizer on the peat soils, is also an effective instrument in reducing the leaching of nitrogen to the aquatic environment. If all peat soils are rewetted, the reduced nitrogen leaching will potentially be able to meet almost 2/3 of the total, mandatory reduction target, which the EU Water Framework Directive requires by 2027. Thus, rewetting benefits both the climate and the aquatic environment.

The technical reduction potentials are described in more detail in chapter 2, while the socio-economically attractive reduction potentials are discussed in chapter 3.

A new rewetting scheme is needed

The massive emissions from drained peat soils are not new knowledge, and for the period 2016-2020 a rewetting scheme has targeted these emissions. As of January 1st 2020 this scheme had, however, only led to rewetting of approximately 1,200 ha. The Danish Agricultural Agency estimates the climate effect to be 0.024 million ton CO₂e each year. This is less than 1 percent of the total reduction potential from peat soils. The limited effect is, in part, due to complexity, with many negative as well as positive side effects associated with rewetting. An additional DKK

2 bn has been earmarked in the Government Budget over ten years for a new peat soil scheme of which DKK 600 million is expected to be set aside for the years 2020-2022 in a new executive order about climate peat soil projects.

This analysis is to be seen as the Danish Council on Climate Change's contribution to and recommendations towards, how rewetting of peat soils in the best possible way can contribute to achieving Denmark's 70 per cent reduction target in 2030, including recommendations for the design of the new peat soil scheme.

Rewetting is cheap climate action in socio-economic terms and the risk of carbon leakage is small

Rewetting of peat soils entails different costs: It can lead to a production loss for the individual farm, affect the water drainage on the neighboring lands and lead to other negative side effects that will be described in the next section. Nevertheless, a significant share of these costs are offset by positive (non-climate) environmental side effects. In particular, much less nitrogen will be leached and much less ammonia will be emitted because rewetting, to a large extent, is expected to also lead to a stop for cultivation and fertilization. The analyses of the Danish Council on Climate Change indicate average socio-economic costs of rewetting of peat soils in the order of DKK 20-138 per ton CO₂e, depending on the socio-economic price of nitrogen reduction used. Even for peat soils with high-value crops such as potatoes, the socio-economic cost of rewetting is less than DKK 200 per ton CO₂e. Thus, rewetting of peat soils is a socio-economically cheap measure compared to other potential reduction measures in Danish climate policy, even though it is recognised that individual landowners may suffer significant losses. It is noted, however, that these are average figures, and that the figures for the individual peat soils and farms, therefore, can deviate significantly both positively and negatively.

The socio-economic calculations of the Danish Council on Climate Change include estimates of operating losses, costs to maintain the agricultural area in a state suitable for grazing or cultivation, average costs for loss of area proportioned to nitrogen and phosphorous deposits and project costs, including expenses for interruption of drainage and certain remedial measures. Furthermore, avoided costs from reductions in nitrogen leaching and ammonia emissions are included. However, costs for solving potential issues of increased phosphorous emissions or problems related to flooding of neighbouring fields are not included as no systematic estimates are available. The Danish Council on Climate Change recommends that these costs are explored in more detail. If it turns out, in connection with individual projects, that very large costs are related to mitigating negative side effects, the socio-economic reduction potential will be smaller.

At the same time, the Danish Council on Climate Change has assessed the risk of carbon leakage. In order for rewetting to be a relevant climate action, it is important that the emissions are not just displaced to other countries. Once soils are rewetted, cultivation is largely expected to stop. Hence, there is a risk that parts of the present production on the Danish peat soils move to other countries. This is, however, not expected to lead to considerable, additional emissions outside of Denmark's borders – so called carbon leakage. This is due to the fact that a potential replacement production most likely will be cheapest on mineral soils that have significantly lower emissions per ha than the ceased production on the Danish carbon rich peat soils. In other words, the carbon leakage is expected to be low, even if the production was to move outside of Denmark's borders.

Chapter 3 presents the socio-economic consequences of rewetting the peat soils, including sensitivity analyses regarding the calculations. Furthermore, the risk of carbon leakage and employment effects of rewetting are discussed.

Rewetting of the peat soils is a complex affair and gives rise to a number of issues

Rewetting of peat soils can potentially reduce emissions in the short term, as it does not require technological development and emissions will to a large extent cease when the soils are rewetted. But the area is complex and requires instruments designed in a way to be able to address the side effects that arise by rewetting the soils. A too rapid and uncoordinated effort can lead to a number of challenges that must be addressed, before drainage stops. Four particular issues stand out:

- **Phosphorus accumulation in peat soils:** Many years of fertilization has in some places caused an accumulation of phosphorus in the peat soils. When the peat soils are rewetted, there is a risk that the

accumulated phosphorus will be leached to the aquatic environment. This temporary phosphorus loss is problematic as the loss of phosphorus, similarly to nitrogen leaching, leads to the risk of algae bloom and oxygen depletion in the aquatic environment. The risk of loss of phosphorus to the aquatic environment, however, varies geographically and over time. In some places, rewetting of peat soils will even lead to a net overall retention of phosphorus from agriculture. This can happen, if rewetting leads to the re-establishment of a lake where phosphorus will be deposited at the bottom, rather than being washed out into creeks and streams.

- **Effects on the drainage conditions on the neighbouring soils:** Water migrates across property boundaries. Rewetting may, therefore, in some places also affect drainage of nearby fields, which will become wetter, whilst it can also affect the driveability on the local roads. Drainage is regulated by the Watercourse Act which, among other things, prohibits disconnection of common drains without regard to the neighbour. Rewetting of carbon rich peat soils in such places must, therefore, be coordinated with the neighbouring farms, in order to avoid potential negative effects for neighbours. Alternatively, an agreement must be reached about compensation for the affected neighbours.
- **EU direct payments to farmers:** EU direct payments constitute on average DKK 2,233 per ha in 2019. An important condition for the support has so far been that the soils must not be so wet that they cannot be cultivated. Therefore, the agricultural sector continues to drain peat soils, even when the soil does not have a particularly high production value. This, the EU regulation has unintentionally contributed to maintaining high greenhouse gas emissions from peat soils. Until now, it has been possible to maintain direct payments, if rewetting of the farm's peat soils is part of a project to fulfill the EU Water Framework Directive or is placed in a Natura2000 area, which complies with the Habitat- and Bird Directives. The recent agreement between the EU Ministers of Agriculture about a reform of EU's Common Agricultural Policy can supposedly improve the economic conditions for rewetting conducted exclusively for climate mitigation purposes. The agreement must be negotiated with the European Parliament, however, before it is finalized.
- **Area proportioned to nitrogen and phosphorous deposits:** In order to limit the discharge of nitrogen and phosphorus to the aquatic environment, the legislation requires that livestock farms must have a certain minimum area per animal unit for spreading livestock manure – in Danish the so-called "Harmonic Area". In some parts of the country the density of animals is so great that drainage and cultivation of the carbon rich soils is utilized to comply with this requirement.

Chapter 2 contains a further description of the side effects of withdrawal and rewetting and the opportunities in dealing with the different issues. According to new inventories from the Ministry of the Environment and Food, it is estimated that 97,000 ha of roughly 170,000 ha carbon rich peat soil, is associated with significant negative side effects (phosphorus- and neighbor problems) and/or disproportionate costs.

Emission data are uncertain

In addition to the complexity of rewetting, data on emissions are uncertain. Today emissions from peat soils are calculated on the basis of official emission factors, which have been approved by the UNFCCC. Emission factors indicate greenhouse gas emissions per ha of peat soil, and are currently differentiated between peat soils with more than 12 percent carbon content and peat soils with 6-12 percent carbon. For each of these categories, a distinction is made between permanent grass and areas where crops are grown in rotational agriculture.

Doubts have been raised, however, whether the official data on emissions are accurate. This is firstly due to the fact that certain soils may be wetter than previously assumed, which, all other things being equal, reduces the emissions from cultivation compared to the previous estimates. Secondly, no Danish measurements of emissions from soils with 6-12 percent carbon content have been conducted. Instead, it has simply been assumed that emissions from these soils constitute half of the emissions from soils with more than 12 percent carbon content. However, German measurements indicate that emissions per ha from well drained 6-12 percent soils are almost as high as emissions from well drained 12 percent soils. If this is correct, total Danish emissions from peat soils might be larger compared to the recent estimates. The category of peat soils with 6-12 percent carbon constitutes 54

percent of the peat soils and 40 percent of the emissions calculated from the current emission factors. Finally, there is uncertainty regarding the emission of methane when peat soils are rewetted. These uncertainties are described in further detail in chapter 2.

In general, there is a need for new measurements of the state of drainage for peat soils as well as of the greenhouse gas emissions from peat soils with 6-12 percent carbon content in order to improve precision and reliability of emission factors for drained peat soils. Moreover, the number of measurements of methane emission after rewetting should be increased. Clarification of these issues will give a better basis for regulation of the greenhouse gas emissions from carbon rich peat soils, and it will also improve the national emissions inventories, as reported to the EU and the UN. There is no doubt, however, that an intensively cultivated and drained peat area on carbon rich soil emits considerably more greenhouse gases than an equivalent peat area, which remains wet and with permanent vegetation. Therefore rewetting undoubtedly leads to a significant climate effect. In lack of updated data about drainage condition and emissions, the analysis of the Danish Council on Climate Change is made on the basis of the current emission factors.

A national screening map can support holistic rewetting

As described above, rewetting of peat soils may be associated with significant side effects, and it can be complicated to form an overview of all the economic, environmental- and climate related considerations that have to be taken into account in rewetting projects. Therefore, the Danish Council on Climate Change suggests that a national screening map is developed, which can be used for screening, where there is potential for rewetting and where one can expect large positive or negative side effects. The map should indicate how large peat areas each farm disposes of; where rewetting needs to be coordinated between farms; and which carbon rich peat soils may be rewetted easier and faster without side effects on the surrounding areas. The map should also contain information about side effects such as reduction of nitrogen leaching, improved biodiversity and flood prevention, thereby supporting local rewetting negotiations. The screening map can also identify peat soils which by rewetting may be included in the fulfillment of one of the EU's environmental directives, and thereby maintain the EU direct payment, as the rules are today. Finally, the map should contain other relevant area information, for example whether there are special protection requirements on the areas.

If desired, a screening map can be expanded so that it also contains information about which alternative uses the peat soils may have after rewetting. These can span from private economic interest (rental for photovoltaic farms or for hunting purposes, etc.) to public interests (landscape values, access to nature, biodiversity, or more coherent nature areas). The screening map may also contain the socio-economic values attributed to both production and side effects, which will allow comparison of different positive and negative side effects. The screening map is described in further detail in chapter 2 and chapter 5.

A general tax on greenhouse gases can be extended to include carbon rich peat soils, but requires preparation in the coming years

In the report *Known Paths and New Tracks to 70 per cent Reduction* from March 2020, the Danish Council on Climate Change proposes a general greenhouse gas tax be introduced in all sectors, including emissions from agriculture. With a uniform tax across all sectors, the cheapest reductions in the economy will be realised first. To allow for economic adjustment, a gradual phase-in is proposed. In the Climate Act which was adopted by the Danish Parliament in June 2020, there is broad consensus that a tax on greenhouse gases is an essential instrument in achieving the national 70 percent reduction target for 2030, taking into account business development, jobs, etc.

This analysis confirms that a general greenhouse gas tax may also be implemented on emissions from carbon rich peat soils. The precondition is that emission factors are updated in order to improve accuracy, and that negative side effects are dealt with. For the latter, a national screening map can be an important tool. The tax base for the individual farms can then be based on information about the farms' area with different categories of carbon-rich peat soils. A gradually increasing tax on the carbon-rich peat soils is a cost-effective instrument for rewetting the Danish peat soils, as the least productive soils will be rewetted first. At the same time, it provides an incentive to rewet the land as quickly as possible, provided major negative side-effects are mitigated.

Even a moderate economic incentive could lead to significant rewetting of the peat soils

A potential greenhouse gas tax that gradually increases from a starting point that, for example, corresponds to the current CO₂-allowance price of around DKK 200 per ton will provide a clear incentive to rewet the carbon rich peat soils. Depending on which emission factors are used as the base for the tax payment, the Council's analyses show that tax levels in the order of DKK 360-600 per ton CO₂e will make it economically advantageous for farms to rewet most peat soils. If, as announced, EU direct payment may be retained when rewetting for climate purposes, a considerable part of the rewetting efforts will be profitable at significantly lower tax levels. This finding applies on average, but some landowners may rewet their lands at lower tax levels and others only at higher levels.

The costs to agriculture of rewetting carbon-rich peat soils mainly stem from the lost production from the soils. It is assessed that a large share of the farms are able to retain the important EU direct payments after rewetting, as rewetting contributes to reducing nitrogen leaching in areas with reduction obligations under the Water Framework Directive. Around a third of the farms risk losing the subsidy under the existing CAP-regulation. But the recent compromise between the EU Ministers of Agriculture reportedly implies that the subsidy may be maintained also when rewetting is undertaken solely for climate considerations. In some cases, it is possible to use the rewetted peat soils for other purposes, which may provide a future income to the farm. This can be, for example, cultivation of watertolerant crops or income from alternative purposes such as solar farms. Potential revenue from alternative uses are not included in the calculations behind this analysis, but they imply that income losses in such cases will be smaller and, hence, that some peat soils will be rewetted at lower tax levels.

The Danish Council on Climate Change has examined several types of policies and measures

The Danish Council on Climate Change has also analyzed other policies and measures for regulating emissions from the peat soils, namely subsidies and bans. A subsidy for rewetting can be arranged in several ways:

- A fixed subsidy per ha,
- A fixed but differentiated subsidy based on the operating loss of the farm, or
- An auction-based subsidy, where the farm itself submits a bid on the subsidy that is necessary for it to rewet its peat soils.

A fixed subsidy or a fixed but differentiated subsidy per ha is relatively simple to administer. However, there is a risk that the subsidy does not correspond to the actual operating losses. This can lead to over-compensation, thus making reductions more expensive both for the state-budget and in socio-economic terms due to the need for financing through distorting taxes. An auction-based subsidy, on the other hand, will to a greater extent reveal the actual compensation needs of the landowner, if there is sufficient competition for the subsidy funds.

Both the auction-model and the subsidy scheme may be challenged in practice: in larger connected areas of peat soils with several owners and collective drainage systems, it will be necessary for groups of landowners to agree on submitting a joint bid or applying for a subsidy for a joint project, and this may turn out to be difficult. There may also be a risk that farms in cooperation will postpone their bidding in the expectation that a higher subsidy can be obtained later, when getting closer to deadlines for climate targets or the targets of the Water Framework Directive. The larger the subsidy, the greater is the socio-economic distortion loss of having to find financing of the expenditure through other taxes. Likewise, both models are challenged in terms of handling side effects.

A drainage ban, e.g. before 2030, will be an effective instrument to ensure that all peat soils are rewetted. Again, however, one must be aware that impacts on neighboring areas will have to be dealt with. A ban is probably not cost-effective, as it is hardly possible to ensure that the least productive soils are rewetted first, while particularly productive soils remain in operation longer or are not rewetted at all. In addition, a ban may be deemed sufficiently intrusive to make it qualify as expropriation, with comparable rights for compensation. Dealing with expropriations is an administratively cumbersome process with the risk of lawsuits over compensation amounts, excluding the possibility of determining a level of compensation through political negotiations with relevant parties. A ban could therefore delay the process of rewetting the peat soils.

Overall, the Danish Council on Climate Change concludes that a tax will be the most cost-effective instrument in the long term. An auction-based subsidy model will probably work well in the short term, if it is supported by prospects of a tax in the slightly longer term. Chapter 4 contains a more detailed review of the individual

instruments. It is noted that, in this report, the tax instrument is more thoroughly elucidated than the other instruments, as this is the Council's preferred instrument in the report *Known Paths and New Tracks to 70 per cent Reduction* from March 2020 with reference to achieving a cost-effective low-carbon transition across all sectors in society.

However, none of the instruments can stand alone due to the complexity of this area. Therefore, a tax or subsidy must be combined with other policies and measures that can address the many side effects associated with the rewetting of certain peat soils.

Provisional agreements while handling negative side effects

Before carbon rich peat soils are rewetted, there is a need for preliminary studies that map and address the many side effects associated with rewetting. The current subsidy-based rewetting scheme also requires preliminary studies before a subsidy is processed.

A national screening map may be used to provide an overall presentation of many of the side effects, as described above. Just as there will be soils that are too expensive for the farmer to convert, there will also be soils where there are such large negative side effects that conversion can be undesirable also from a socio-economic perspective. The screening map and the preliminary studies can help identify these.

In addition, the Danish Council on Climate Change proposes that a binding and time-limited agreement scheme be introduced between public authorities and farms that want to rewet their carbon rich peat soils. The scheme must ensure that the wetting is well prepared and coordinated. Areas without negative side effects on neighbours, phosphorus problems etc. may quickly be rewetted after the agreement is concluded. For other areas with negative side effects, it may take time to find and coordinate solutions. The Council sees the following obvious elements in an agreement scheme:

- The authorities assist with preliminary studies of the effect of rewetting on nitrogen leaching, risk of phosphorus loss, drainage conditions and potential neighbouring problems. This is done on the basis of screening maps and local investigations.
- The authorities facilitate negotiations between different parties and multifunctional land distribution projects in case of neighbour problems or a desire for further partner involvement, for example to deal with nitrogen and phosphorous compliance requirements and similar local considerations.
- The authorities help clarify whether areas that are to be rewetted can retain EU Direct Payments after rewetting.

Through facilitation of projects, the authorities will be able to assist in optimizing positive side effects and minimizing negative side effects. In addition, the authorities may contribute to solving the technical challenges of rewetting with either advice, co-financing or by organizing the actual construction work, for example building of new dikes to avoid wetting of neighbouring non-peat soils.

In particular for larger areas of peat soils, there may be many private or socio-economic interests in the future management of rewetted soils. If so desired, such considerations may be incorporated in the agreement scheme.

The provisional agreement scheme provides time to find solutions to the negative side effects. If relevant, it may also help ensuring maximum nitrogen reduction, biodiversity, recreational values, etc. In addition, actions may be initiated against possible phosphorus losses – eg. chemical treatment or collection of leached phosphorus. To start with, subsidies for project preparation and compensation for rewetting may only be allotted to farms having joined the agreement scheme. Participation in the agreement scheme may be rewarded with a full or partial exemption from the general greenhouse gas tax until rewetting is feasible. This may protect landowners who want to rewet their land but cannot do so from day one due to negative side effects. When an agreement scheme is entered into, the time frame for the individual rewetting projects must be set ambitiously, yet realistically. It may be required that no fertilizer is used on the peat soils when the agreement has been entered into in order to obtain the nitrogen benefit as soon as possible. The exact details of an agreement scheme is left to relevant authorities. The agreement scheme is described in more detail in chapter 5.

Direct payments from the EU should be retained when rewetting for climate mitigation purposes

It is important that Direct EU payment to farmers do not inhibit rewetting of peat soils. The Danish Council on Climate Change, therefore, recommends that all landowners should be able to retain the right to Direct EU payments for rewetted peat soils even if the purpose is only for climate mitigation. In addition, when implementing the revised Common Agricultural Policy, Denmark should try to cancel the present requirement to preserve even non-cultivated soils in good agricultural condition. Until now, in order to maintain the Direct EU payments to farms, soils that are no longer cultivated must be kept ready for cultivation. This requirement is expensive for the landowners and not rational in case of permanent rewetting of peat soils. Such amendments to present EU regulations could ensure lower economic impacts on owners of peat soils in case of rewetting, see also chapter 3. Based on a Danish initiative, the recent compromise between the EU Ministers of Agriculture on the future Common Agricultural Policy may allegedly solve many of these problems, which the Danish Climate Council applauds.

Compensation should not reduce the incentives for rewetting peat soils

Most farms in Denmark have no or only small areas of peat soils, or their peat soils have low productivity. For such farms, the loss of income by rewetting is modest, provided that Direct EU payment is retained after rewetting. However, even with a relatively low greenhouse gas tax applied, certain farms with large areas of highly productive peat soils may see a considerable loss of income and capital, regardless of whether they rewet their peat soils or pay the tax. There may, therefore, be a political desire to combine the tax with a compensation for the burdens that a new regulation entail. The burdens consist directly of lost operating income or tax payments, including the risk of loss of EU support, and indirectly of reduced options to use the farm's land as well as the risk of falling land prices.

If there is political desire to compensate the farms, the compensation must be designed in such a way that it does not reduce the incentives for rewetting. It must also be considered that compensation schemes have to be financed in some way, eg. paid for by other professions and / or by the general public. In addition, when calculating any compensation, account should be taken of the actual operating loss, including revenue from new, alternative uses of the rewetted land eg. rental for PV farms or from flood prevention. Finally, any compensation may set a precedent in other sectors where potential compensation for the general greenhouse gas tax will also have to be financed eg. to the industry. The distributional consequences of the rewetting of peat soils are described in more detail in chapter 4.

Carrot and stick – an auction-based short-term subsidy with the prospect of a tax

It will take time to implement a general greenhouse gas tax. This is partly due to the need for improved emission data and partly due to time needed to prepare an objective and legally sustainable tax base for carbon rich peat soils. It may take two to three years before a general greenhouse tax is in place for peat soils. But efforts to limit emissions from peat soils should not wait, as this is predominantly a cheap initiative in socio-economic terms. At the same time, lower emissions contribute both to the credibility of the Government's and the Climate Act's 2030-targets, and to reducing the overall global emissions and thus to mitigating climate change. Funds have been set aside on the Annual State Budget for a new peat soil scheme and maximum effect of these funds must be ensured. Until a tax can be implemented, the Council, therefore, recommends that an auction-based subsidy is established for rewetting. It should be incorporated into the Government's proposal for a revised rewetting scheme and the disbursement of the first DKK 600 m of the DKK 2 bn agreed for rewetting of peat soils in the coming ten years. If so, the announcement of a future tax will provide an incentive to submit bids closer to real costs than otherwise.

However, the proposed scheme will also have to deal with uncertainty regarding the actual greenhouse gas reductions and handling of negative side effects.

In the Government's recent proposal for a revised rewetting scheme, projects are selected on the basis of a number of criteria: greenhouse gas reduction, area, project readiness, whether it is included in multifunctional soil distribution project, effects on nitrogen and phosphorus emissions, biodiversity, outdoor life, etc. However, cost effectiveness only has little weight in the prioritisation between applications received. The Government's proposal suggests fixed, but differentiated compensation payments per ha for four different soil-use categories: rotation with high-value crops, rotation without high-value crops, permanent grass and natural areas.

Klimarådet.

The Danish Council on Climate Change proposes that the landowner should instead submit bids for compensation level in the project application. Concurrently, cost effectiveness should be included together with the other criteria for prioritising project applications. In this way, the largest possible reduction per awarded grant will be achieved, while projects also meet requirements regarding negative side effects in line with the existing scheme. Competitive bidding will provide a more genuine picture of the perceived costs of rewetting. In the long run, it will also ensure that peat soils with the lowest socio-economic reduction costs are rewetted first, because such areas will have smaller compensation needs per unit of greenhouse gas emissions avoided. In addition, peat soils with alternative income opportunities after rewetting from, for example, solar farms, may submit lower compensation bids than the fixed compensation amounts proposed by the government. This will provide an incentive to maximise climate benefits, and if the Government announces a tax at the same time, there will be great incentive for landowners to submit competitive bids. The Climate Council position on the draft rewetting scheme is described in more detail in chapter 5 and in the Council's formal response in the Government consultation on a new scheme.

In the short term, the Climate Councils proposal on a provisional agreement scheme may be considered along with the Government's draft rewetting scheme. In case a rewetting project is selected for a subsidy, the landowner may enter into an agreement on rewetting and receive a subsidy to prepare the project. If deemed feasible, the agreement may become a prerequisite for getting a subsidy to carry out construction work and receive compensation. From there, the agreement scheme may be further developed to incorporate the potential tax.

Box 1.1: The Danish Council on Climate Change's recommendations for a new model for rewetting carbon rich peat soils

The Council's recommendations for a new model for rewetting carbon rich peat soils are summarised below. The recommendations also underlie the Council's consultation response and input to the management of the DKK 2 bn set aside on the 2020 Government Budget for a new rewetting scheme for peat soils over the next ten years.

Rewetting of peat soils is complex. Therefore, an agreement scheme and development of a screening map is recommended

The Council recommends that a system be introduced with binding and time-limited agreements between public authorities and farms that want to rewet their carbon rich peat soils. The agreement scheme must ensure coordinated rewettings and provide time to investigate problems with phosphorus, flooding of neighbouring fields and possible lack of areas to ensure nitrogen and phosphorous compliance, as well as provide an opportunity to participate in larger projects that can potentially increase environmental benefits. The agreement scheme may be implemented immediately as part of the Government's new rewetting scheme for peat soils. In addition, the Council recommends that a national screening map be developed which can help provide an overview of areas with few side effects, where the rewettings may be completed quickly, as well as areas with many side effects (positive and negative), where the agreement schemes have to deal with more complex issues.

Need for new emission data

The Council recommends that work be initiated as soon as possible to calculate the general drainage conditions for peat soils and to measure the actual emissions, especially from soils with 6-12 percent carbon content, as no Danish measurements of these soils have been made before. An improved data base is the prerequisite for an effective regulation and for Denmark to calculate the true greenhouse gas emissions from carbon-rich peat soils, including the use of these in reports to the EU and UN.

A general greenhouse gas tax may be extended to cover carbon rich peat soils, but requires preparation in the coming years

The Council has examined a number of policies and measures and finds that a general greenhouse gas tax can also be applied to emissions from carbon rich peat soils, provided, among other things, an updated data base. The tax is generally the most cost-effective regulatory instrument. A tax can be announced soon and implemented as a part of a general greenhouse gas tax. In order to get the regulation in place as soon as possible, the Council recommends that work be started immediately to get the framework and model in place regarding law, tax, agreement scheme, screening map and an updated emission data base.

Principles for compensation

The Council recognises that rewetting peat soils may impose significant economic losses for certain farms, and that there may be political desire to compensate these farms. If so, it is key to design the compensation without reducing the tax-incentives for rewetting. It is also important that real operating losses of the landowner are taken into account, including opportunities for alternative sources of income from rewetted lands. However, it is beyond the scope of this analysis to recommend in detail how the compensation should be designed.

The implementation of Direct EU Payments should take into account climate considerations

The Council recommends that the Danish implementation of the EU's revised regulation on agricultural support, to the extent possible, allows direct payments also for lands exclusively rewetted for climate mitigation purposes. EU agricultural subsidies should not discourage rewetting of peat soils. In order to reduce the costs of rewetting, Denmark should also abolish the requirement to maintain rewetted peat soils in good agricultural condition.

Auction-based subsidies may be used in the short term

In the short term before a tax can be implemented, the Council recommends that an auction-based subsidy be used in the new rewetting of peat soil scheme instead of fixed subsidy rates. In combination with the prospect of a tax, this is considered to be the most appropriate and cost-effective regulation in the short term.

