

Identified Mitigation Measures to Reduce GHG Emissions from Horticultural Lowland Peat Soils: Descriptors and Visual Representation

Prepared as part of Defra Project SP1218: Managing agricultural systems on lowland peat for decreased greenhouse gas emissions whilst maintaining agricultural productivity

Author: David Arnott, School of Natural Sciences, Bangor University, UK.

MM1. Block ditches to raise water levels

The aim of this item is to improve the quality of peatland, moorland or lowland raised bog habitats by blocking ditches or moor grips with peat dams to slow the flow of water through grips or ditches and raise the water table back to natural levels.



MM2. Raise average water levels

Agreement holders will need to raise and maintain high water levels using suitable water control structures or maintain existing in-field wetness.



MM3. Restore cropland to native wetland vegetation

On arable land, temporary grassland or improved permanent grassland, create new areas of fen priority habitat on land with low wildlife value, particularly around existing wetland habitat.

Create new areas of reedbed priority habitat on land that is currently of low wildlife value



MM4. Avoid additional draining and cultivation

Avoid draining or cultivation on any peat soils not already being used for agriculture.



MM5. Produce food/fodder crops on high water table peatland

Shift away from dry species to growing food crops that will thrive in higher water levels.



MM6. Produce perennial reed grasses for construction material.



MM7. Maintain shallow water table for longer

Optimise ground water levels at each stage of the annual crop cycle i.e. Maintain higher water levels for longer periods of time.



MM8. Establish wetland species such as rushes, sedges and wetland.

Revert productive land by increasing water levels and establishing wetland species which can be harvested and sold as animal litter.



MM9. Produce biomass (Sphagnum moss) for restoration or as a raw material.

Sphagnum farming refers to the cultivation of Sphagnum mosses to produce Sphagnum biomass sustainably. It aims to cultivate founder material for restoration purposes, or biomass as a raw material. Some possible uses of these fibres are as ingredients in growing substrates, as floral moss, as plant packaging during transport, or as moss reintroduction material for peatland restoration projects. Because this biomass production is sustainable, Sphagnum farming should reduce human impacts on natural peatlands.



MM10. Combine solar panels with wetland habitat.

Install photovoltaic (PV) panels over wet peat, with solar arrays supported on scaffolding or rail systems above the peat surface.



MM11. Raise the groundwater table in the non-growing season

Participants would be required to raise the water table levels on land through the non-growing season.



MM12. Cultivation of high C/N ratio cover crops (e.g., rye) in combination with a raised water table.

Participants would be required to raise the water table and plant a cover crop such as Rye during the non-growing period



MM13. Raise water levels during winter when fields are fallow

Participants would be required to raise ground water levels all year round on peat soils during the fallow period



MM14. Restore/create peatland vegetation using the moss layer transfer technique

The moss layer transfer technique combines multiple interventions to restore peatlands: (1) Rewetting the peat, for example by blocking drainage ditches or building water-retaining ridges. (2) Reprofilling the peat i.e. clearing and flattening the peat surface.



MM15. Reduce nitrogen fertiliser dose

Reduce nitrogen fertiliser dose to avoid loss of excess nitrogen (e.g. avoid applying fertiliser to legumes)



MM16. Establish infrastructure to support dynamic water management

Participants would be required to install water management infrastructure to allow water tables to be actively managed to maintain optimal moisture levels.



MM17. Convert cropland to grassland with low intensity grazing.

Participants would be required to convert land currently used for crops to permanent pasture land which would then be grazed at a low intensity.



MM18. Increase the use of perennial food crops, to promote soil organic carbon retention.



Perennial crops can be divided in different groups: fruits and vegetable crops (e.g., apple trees, raspberries, blueberries and other berry bushes, asparagus, rhubarb, kale (usually grown as an annual), garlic (usually grown as an annual), radicchio (usually grown as an annual), horseradish, globe artichokes) or short rotation coppices (e.g., poplar, willow); and perennial grasses such as sugarcane, Miscanthus.

MM19. Improve timing of nitrogen fertiliser application

Improve timing of nitrogen fertiliser application to avoid loss of excess nitrogen (e.g. apply just before crop growth; avoid application for 5 days after heavy rain; use split timing application).



MM20. Eliminate tillage (i.e. zero-till)

Move to a no-tillage farming system which minimises the soil disturbance associated with the cultivation of arable crops.



MM21. Install buffer zones

Install buffer zones between fields and watercourses, and within fields, to catch leached nutrients and soil organic carbon



MM22. Produce bio-energy crops such as willow and miscanthus for the purpose of energy production

Convert land currently used for food crop production into crops for bio-energy.



MM23. Use more fuel-efficient machinery and equipment with better power ratings

Replace old, energy inefficient machinery and equipment with newer, more energy efficient items and conduct regular maintenance.



Without question,
**well-maintained farm
equipment will be more energy
efficient than
poorly-maintained machinery.**

MM24. Conduct soil and crop nutrient testing and management planning

Use frequent soil and crop nutrient status testing and nutrient management planning to optimise farm nitrogen budgeting



MM25. Optimise irrigation system efficiency to keep soil moist but not saturated

Optimise irrigation system efficiency to keep soil moist but not saturated, control soil nitrogen release, and reduce pump fuel use e.g. through the use of sensors



MM26. Avoid or shorten bare fallow periods (e.g. grow fast-growing cover crops such as green manures)

During the non-growing period, avoid leaving bare soil by planting fast growing cover crops.



MM27. Minimise avoidable use of farm machinery to reduce fossil fuel consumption

Adopt practices which require less use of fossil fuels



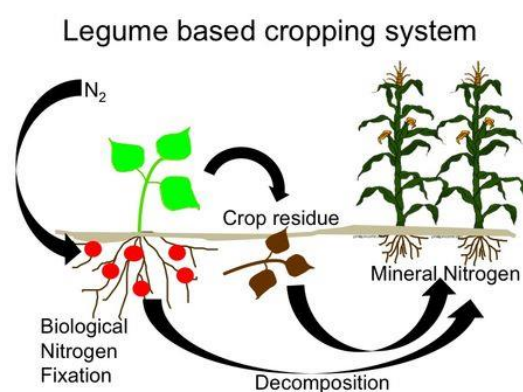
MM28. Reduce tillage

Use less frequent or shallower tillage; use direct drilling instead of transplanting



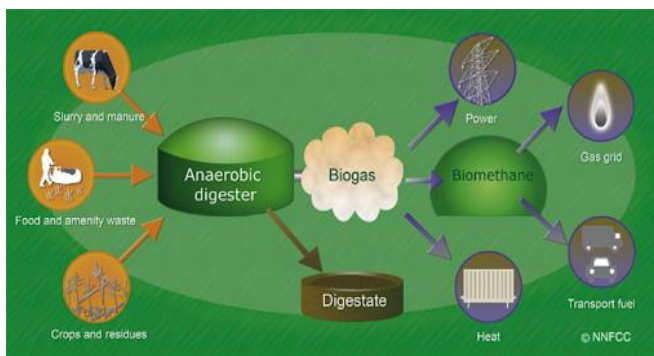
MM29. Increase reliance on nitrogen-fixing crops (legumes)

Increase reliance on nitrogen-fixing crops (legumes) to replace mineral nitrogen fertiliser



MM30. Use anaerobic digestion with energy recovery, or bio-fuel production, to process organic wastes (e.g. crop residues)

Install on farm anaerobic digestion system or identify a digester within the local area in which to process organic waste.



Further information on the mitigation measures can be found in the following publications

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Acknowledgements

Photographs were sourced from the following locations

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