Food and Agriculture Organization of the United Nations

Restoration of lands after fuel peat extraction

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Restoration progress. a: After peat harvesting; b: The same area two years after damming; c: The same area five years after damming in summer 2012; d: The same area six years after damming in May 2013. Photos: Olli Reinikainen.

Summary

After peat harvesting, the sites have no vegetation and it is very difficult for plants to survive. Blocking the ditches and building some dams quickly starts the succession towards a mire ecosystem. Excavators are needed for the work, but usually no planting or seeding is needed as the peatland plants spread spontaneously from the ditches, ditch banks or from the nearby peatlands. The areas soon start to resemble pristine mires in terms of their GHG emissions. In particular, CO_2 emissions decrease as the emissions caused by peat harvesting and burning cease. The accumulation of organic material to the developing vegetation binds CO_2 from the atmosphere. The landowners decide how to use a harvested site. Restoration is one option, but forestry and agriculture are more common. Usually no conflicts arise with other interest groups. In many areas where there is only a small amount of water, local people favour restored sites as they increase the amount of ducks and wildlife, which opens up opportunities for hunting. Berry picking also becomes a possibility. Restored sites increase biodiversity and create spaces for recreational activities.

1. Practice description

Area of the site	50 ha	
Current land cover/use	Area to be restored to a wetland	
Previous land cover/use	Peat extraction	
Origin of intervention	Research project, land user initiative	
Types of intervention used in the area	☑ Rewetting ☐ Drainage ☐ Cultivation of crops ☐ Grazing ☐ Forestry ☐ Aquaculture ☐ Fishery ☐ Other	
Duration of implementation	7 years	
Main purpose of the practice	Restoration of peat forming potential	
Level of technical knowledge	☐ Low ☑ Medium ☐ High	
Water table depth from surface	from -0.5 to -1.0 m	
Present active drainage system	Width of channels	Channels are not active in the restoration area but on the adjacent fuel peat extraction area (0.5 m width, 20 m distance)
	Distance between channels	
Subsidence	Before practice	20 cm/year
	During practice	0 cm/year

2. Implementation of activities, inputs and cost

N	Establishment of activities	Input/materials	Duration	Cost
1	Blocking drainage channels, possible construction of dams	Excavator, material is taken from the site	Blocking only takes a few days depending on the area to be restored	Excavator costs about USD 1 000 per day

Remarks:

Usually no planting or seeding is needed as there are plant propagules in nearby ditches, ditch banks or on neighbouring peatlands.

3. Environmental characteristics

Climate	☐ Tropical ☐ Temperate ☑ Boreal			
Average annual rainfall	700 mm			
Altitude	160 m.a.s.l.			
Slope	0–5 %			
Peat depth (cm)	☑ ≤ 30 ☑ 30–50 ☑ 50–100 ☐ 100–300 ☐ >300			
Peatland type based on the water source	☑ Fen ☐ Bog ☐ Undefined			
Hydrologic network	Not connected to any hydrologic network			
Main vegetation species	Before practice	No vegetation		
	During practice	Cottongrass (*Eriophorum vaginatum*), Bottle sedge (*Carex rostrata*). Peat mosses (*Sphagnum spp*.).		
	Water pH	3.9		
	Water turbidity	POC loss of 77 tonnes C/km^2/year		
	Dissolved organic carbon content	Surface water	Before practice	28
			During practice	Monitoring in progress

4. Socio-economic dimension

Local stakeholders	Land owners, local people
Land tenure	Private, state land
Land, water, and other natural resource access and use rights	It is the landowners' decision how to use a harvested site. Restoration is one option, though forestry and agriculture are more common.
Conflicts	Usually no conflicts arise. In many areas where there is only a small amount of water, local people favour restored sites as they increase the amount of ducks and wildlife, which opens up opportunities for hunting. Berry picking also becomes a possibility.
Conflict resolution mechanism	–
Legal framework	If nutrient concentrations increase some water regulations would be required.
Products derived from the peatland	Biodiversity, berries, water birds
Market orientation	Regional markets

5. Assessment of impacts on ecosystem services

1 highly decreasing/ 2 moderately decreasing/ 3 slightly decreasing/ 4 neutral/ 5 slightly increasing/ 6 moderately increasing/ 7 highly increasing

Provisioning services	Agricultural production	4
	Food security and nutrition	4
	Employment	4
	Income	4
	Non-timber forest products yield	6
	Livelihoods opportunities	4
	Resilience and capacity to adapt to climate change	5
Socio-cultural services	Level of conflicts	3
	Gender equality	4
	Learning and innovation	6
Regulating services	Waterborne carbon (DOC) loss	1
	Fire frequency	2
	Biodiversity	7
	Subsidence rate	1
	Other (OM accumulation)	7
Off-site benefits	Water quality	6
	Frequency of flooding	3

6. Climate change mitigation potential

1 highly decreasing/ 2 moderately decreasing/ 3 slightly decreasing/ 4 neutral/ 5 slightly increasing/ 6 moderately increasing/ 7 highly increasing

Impact	Rate	Estimate ($t\ ha^{-1}\ year^{-1}$, CO_2-eq)	Remarks
Net GHG emission	2	–	The areas soon start to resemble pristine mires in their GHG emissions. There is a huge variation in this respect as is in pristine mires, too.
CH_4 emission	6	–	It takes some time before the emissions are return to those of pristine mires. The organic material accumulation in sedges is high in the beginning of secondary succession.
CO_2 emission	1	–	Emissions are decreased as the emissions caused by peat harvesting and burning cease. The accumulation of organic material to the developing vegetation binds CO2 from the atmosphere.
N_2O emission	4	–	Emissions are low before and after the treatment.
Carbon sequestration/ storage abovegrounds	7	–	Values vary greatly, but the change is great as the vegetationless area –becomes fully vegetated in a few years.

7. Additional information

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