Peatland restoration and paludiculture for clean and safe water

Or why alternative peatland use is bogged down in the Netherlands

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Thanks: Hans Joosten, Christian Fritz
Peat soils in NL:
290,000 ha

Agriculture: 223,000 ha
Nature areas: 67,000 ha

After: Van de Akker (2007)
First the good news: Drentsche Aa: large scale rewetting

- Landscape park: 30,000 ha
- Nature reserve: 10,000 ha
- Hay meadows: 2,500 ha

Restoration of marshes and hay meadows since 1965
After 10 years of discussion it was decided to eliminate all former agricultural ditches in an area of > 500 ha, thus preventing emissions of c. 400 ton CO2 eq./yr (Hoetz 2013); carbon credits up to 5-10,000,- €/yr.)
Comment of one of our nature managers:

• That is very nice!!
• But so much administrative work, make a plan, monitor the effects, try to sell the carbon credits... etc. In order to get money for nature management and rewetting projects I just have to fill in some simple forms;
• ----→ no need to change!!!

-----→ The high subsidies for Nature Conservation prevent alternative use of peatlands in nature areas
Experiments with rewetting and top soil removal

Drentsche Aa, Lage Maden after 13 years
Development of ‘new’ nature on former agricultural areas

- Immigrants from Egypt
- Planted trees
- Artificial stream
- Storks from breeding stations
- *Juncus effussus* a recent invasive species (native, but rare in natural mires)
Experiments with no-management (wilderness concept)
Experiments with no-management

Elperstroom

2007

Cost of digging the drainage channels in 1974: 1 million Dutch guilders

2008

Cost of closing all the ditches again: 1 million Euro’s, most of the area was never used by farmers
Experiments with no-management
Still more good news: promoting ecosystem services

Water conservation areas;

creating flood meadows
Sommerset Levels 2014

Record January rainfall in some areas

Rainfall Jan 2014*
% of 1981-2010 average

- More than 225
- 200-225
- 175-200
- 150-175
- 125-150
- 80-125
- 60-80
- 40-60

Data from 1-28 January 2014
Source: Met Office

Only twice the average rainfall → flooding at high costs
It took 3 months to pump dry leaving a multi billion £ bill
Oeps!!!

Sommerset Levels 2014
Like a thief, flood water comes through the backdoor or the windows.

Water level rise was only 20-30 cm due to one intensive summer shower, predicted by our weather service.
Water conservation south of the city of Groningen
Creating water conservation areas is not always very difficult.
Lippe in Germany 2007:
a lot, of fairly clean surface water

Remove a little dike
20

Just leave the road

Make a nice view point
Call it a protected area

Provide a nice seat
Ready!
Then the bad news: large scale subsidence of the peat

Original mires in the Netherlands
c. 8 km$^3$ peat has been cut; and not without consequences.

Source: A.J. Schilstra naar: de Zeeuw 1978

Areas below sea water level
bogged down by 1000 yr of peatland drainage and subsidence

Peat soil subsidence in NL

Cattle breeding on peat soils in NL

8 m subsidence
Nature areas in polder areas

Low lying polder area causes infiltration in the whole wetland area
Polder area Friesland; Attempt to restore fen meadows

Complete failure!

![Wyldlannen graph showing the comparison between mowing, reference, and sod cutting methods over 14 years, with a decline in the number of target species after 8 years.](image-url)
Drainage of peat causes subsidence; a lot!!!

1939

........ and increases possibilities to store wood!!!

2013
What is the problem?
The „Gouda“ problem

Ban on Gouda cheese: too expensive!!!

After: Joosten 2016, (Putin 2013)
Government goals for agricultural peat areas

- Arresting or considerable reduction of soil subsidence;
- Perspectives for agriculture/cattle breeding must remain;
- Conservation and development of the cultural landscape;

red; not a solution, but increasing the problems

After: Joosten 2016
Under water drains: solution!!

Laag slootpeil

Drains at every 8 m

Winter 2003/2004

Zomer 2004

Estimated cost for the Netherlands ca. 400 million Euro = 6 km of new high way (v.d. Akker 2007) = total annual budget of the Dutch Nature Conservation
Under water drains: solution?

- **Conclusion Researchers:** decrease in summer water levels 0-50% (but on average less then 15%), Advantage also drainage in wet periods increases, so more intensive agricultural is possible (v.d.Akker 2007).

- **Conclusion Water Board (Stowa):** speed of peat oxidation and soil subsidence can be reduced by 50%.

- **Conclusion Politician Province of Friesland:** problems of subsidence in peatland can be solved, no need to change!!!
Under water drains: who will pay the bill?

- National Government: not us!! (standing policy since 1980-ties).
- Water Boards: It is our duty to maintain existing water levels, so we tax all inhabitants of our region.
  → City people pay the bill.
- Provincial Government and European Union. Yes this is innovative, we will give subsidies.
- Financial problems can be solved….. no need to change!!!
- → So, new investments in maintaining old problems
Under water drains: solution?
Lessons in the Dutch language and culture

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IK MAG DE LAATSTE DRIE MAANDEN VAN Mijn leven weer roken van de dokter

EIND GOED, AL GOED!

Kaaskop = Cheese head
Drastic changes are needed

• But it does not have to be done in 1 year.
• We have time (see Paris agreements), but within the next 3-8 years concrete steps have to be announced
• But these compromises with present agricultural practices have to stop
Back to 0 emissions in 2050 and starting the decrease within the coming few years.
Conclusions

• In many EU countries the continuation of agricultural use in peatland areas is driven by subsidies.
• Costs of maintaining agricultural use in drained peatlands are steeply increasing due to subsidence of the peat (damaging both rural and urban infrastructure)
• Citizens that do not directly profit from the intensive drainage of peatlands are paying the bills.
• Paludiculture is by far the most sensible thing to do;
• → Ban on Gouda cheese produced on drained peat soils.
• However, new investments in infrastructure and in modern equipment to harvest these areas are urgently needed.
• Money that is now spend on continuing the degradation of peat soils (subsidies to both farmers and nature protection agencies) has to be transferred to organizations and private companies that are willing to use peatlands in a more sustainable way.
Questions?

And do not become a cheese head.