



EUROPEAN UNION

EUROPEAN
REGIONAL
DEVELOPMENT
FUND



WITH FINANCIAL
SUPPORT OF THE
RUSSIAN
FEDERATION



DESIRE ONLINE CONFERENCE

Dialogue of multidisciplinary working group on paludiculture implementation and biomass utilisation

Webinar on 10th of June, 2020, held as Zoom online conference

9:50 Opening of the chatroom, getting accustomed with technical challenges

10:00 Introduction: Goals of the workshop and presentation of participants

Expectations of participants and of DESIRE project - A. Samerkhanova, W. Wichtmann

Amalj Samerkhanova is scientific employee at the Ministry for environment. She works in the DESIRE project as project coordinator of the Kaliningrad Region on behalf of Nature Park 'Vishtynetsky'.

Aim of the DESIRE project: to improve water quality of the Neman catchment by rewetting peatlands and by implementation of paludiculture.

Goals of the webinar: continue multidisciplinary dialogue on peatlands rewetting and paludiculture in the Neman catchment area, knowledge exchange on peatlands restoration, dialogue on the potential of implementation of paludiculture and ideas of paludi - biomass utilisation.

Our expectations: we would like to learn more about the interests of farmers, the processing industry, and administration bodies/managing authorities in paludiculture. We would like to receive practical hints and get advice for the design of planning steps and implementation processes.

10:10 Welcome words of the Deputy Minister – E. Voytsekhovskaya

Elena Voytsekhovskaya is Deputy Minister for natural resources and environmental protection.

We are interested in the implementation of the project activities. The population of Kaliningrad region supports them as well. We wish you a lot of success.

10:20 Peatlands and their role in the landscape. Hydrogenetic peatland types and ecosystem services of peatlands - M. Grygoruk

Mateusz Grygoruk works at Warsaw University of Life Sciences as associate professor. His institute was responsible for drainage of peatlands in former times.

Peatland types differ by the different type of water coming to the system (groundwater, surface water, or rainwater). If we want to improve the quality of the landscape, we need to know how it functions. Before any rewetting, we need to define which type of water feeds the peatland. One cannot use groundwater to rewet rainwater fed bogs.

Peatlands in natural condition teach us how to proceed if we want to change the quality of the destroyed ones. Water quality is crucial for rewetting.

In Kaliningrad we found mainly rainwater fed bogs that need restoration.

For short-term use it might seem that agriculture is the best type of management. However, the longer the drained peatland is used, the smaller the gain.

In our project we want to establish a type of management that will be beneficial both ecologically and economically.

Peatlands provide carbon sequestration and are important for climate mitigation, water retention, and water quality.

Intact peatlands are the only solution for cleaning distributed sources of pollution along the rivers.

In the future, we might not be able to use the Baltic Sea for our holidays. Water will be either too cold (Sep-May), or dirty (in summer) due to algal blooms.

Most degraded peatlands require restoration. Drained peatlands provide small gains to little amount of people. Restored peatlands provide a lot of functions to the society.

10:30 Problems of peatland drainage, reasons, aims, utilisation schemes, degradation of peatlands by drainage, environmental problems - P. Banaszuk

Piotr Banaszuk is professor at the Biotechnical University in Bialystok. He is a specialist in wetland ecology, geochemistry of wetlands, and peatlands and restoration projects.

Peatlands are the most endangered ecosystems in the world. The rate of destruction differs across the world. The highest amount of destruction can be found in Asia. Recently, destruction was greatest in Europe, and is now increasing in America.

Disadvantages of drained peatlands are much higher than benefits.

Consequences of drainage of peatlands:

- Effect on catchment hydrology – enhanced runoff, increased flood peaks.
- Effects on soil properties – shrinkage, subsidence. Oxygen penetrates the soil – high mineralization rate of peat soil.
- Subsidence depends on the quality of peat, the water level, and the land use type. In Europe, the average subsidence rate is 1.6-2.8 cm/year if the groundwater is 65-130 cm below surface. It is 50-75 cm in the 1st years, after 5 years up to 5cm/year. Subsidence rates decrease with time.

- Other problems – emission of CO₂. Drained peatland used as grassland emit 29 T of CO₂ eq/ha/year. It is equal to emissions from a middle-class car driving 145,000 km annually. Drained peatland used as cropland – up to more than 90 T of CO₂ eq/ha/year.
- Chemical implications on the water quality: Emissions of N, S, P. Leaching of N is up to 360 kg/ha/year. Such polluted water is transferred to the streams and rivers and eventually to the Baltic Sea. There is also a loss of base cations (Ca, Mg). Mineralisation sometimes leads to acidification of the soil. Sometimes mobilization of heavy metals can occur.
- Impact of drainage on wildlife: Loss of biodiversity. Peatlands are very vulnerable ecosystems.

Wetlands must be wet!

10:40 Potential of nutrient elimination/reduction by rewetting of peatlands and implementation of paludiculture - J. Lange

Jelena Lange is member of the Greifswald DESIRE team at Greifswald University.

Peatlands drained for agriculture have mostly lost their filter function. They release nutrients into the water rather than retaining them.

The problem reaches out beyond the catchment area – it can lead to algal bloom in the Baltic Sea.

Natural peatlands receive low nutrient loads, have low nutrient discharge into the water, and low GHG emissions. Drained peatlands receive high fertilisation due to agricultural use. This leads to high nutrient load, while N retention is low, high decomposition, high nutrient discharge, high GHG emissions. Rewetted peatlands – aim is to return to natural condition, reduce decomposition, GHG emissions, use of fertilisers; but it takes time.

A high potential for nutrient removal in studied wetland buffer zones of W Europe and USA was found. 57% of TN, 34% TP could be removed by the studied wetlands. But it depends on several factors, such as peatland type, vegetation type, soil type, nutrient load. The higher the load, the less could be removed by peatlands. Thus, not only rewetting is needed, but also reduction of fertiliser use.

To remove a surplus nutrients – N and P, wetland plants could be planted and harvested. In groundwater fed fens, *Carex* and *Phragmites* sp. could help to remove large amounts of N and P.

An experiment showed that the higher the nutrient load (fertiliser use), the higher the content of N and P in *Carex* spp.

Summary: Rewetting is an important measure to restore the filter function and to reduce nutrient release. Planting and harvesting of wetland plants could help remove additional nutrients from the soil.

10:50 Rewetting and Paludiculture as solution approaches - W. Wichtmann

Wendelin Wichtmann is the coordinator of the DESIRE project at Greifswald University/Michael Succow Foundation. He is an expert in peatland restoration and implementation of paludiculture.

Benefits of peatland restoration:

- Restores peatland functionality, peat formation, landscape balance
- Reduces further degradation of the peat layer, GHG emissions, nutrient loads to ground and surface water
- Improves biodiversity and water quality

After rewetting, it is possible to either leave the area for natural development, or to implement paludiculture. Use of paludiculture gives additional benefits:

- Additional reduction of GHG emissions and nutrients.
- Cultural landscapes are maintained.
- Continued utilisation of the area.
- Basis for development – new production chains.
- Income perspectives.

Main plant species for paludiculture – Cattail (insulation plates), *Carex* (Sedges) (construction plates, dishes, energy pellets), *Phragmites* (common reed) (thatching), Black Alder (timber wood, veneer, furniture, kitchens). Other use for water buffalos, berries, etc.

11:00 Peatlands in Kaliningrad region and their potential development - M. Napreenko

Maxim Napreenko is researcher and leader of NGO Nature Heritage, Kaliningrad.

In Kaliningrad region, there are different types of peatlands. After the human intervention, they make up only 5-6% of the territory of the region. Density of peatlands is highest in the Neman delta and at the SE coast of the Curonian Lagoon.

Some wetlands are in good condition and show high biodiversity potential. Main threats are drainage, littering, peat mining, and especially fires. Thus, involving Kaliningrad region in the project was a good idea.

Main purposes of peatland rewetting projects in Kaliningrad are: restoration and rehabilitation for performing ecosystem services, approbation of new forms of economy, paludiculture, biomass harvesting.

11:10 Experiences in peatland rewetting and paludiculture in Russia - V. Panov

Vladimir Panov is professor at Tver Technical University, East European Institute.

Peatland rewetting and restoration works have been carried out during the last 100-150 years in Russia. In the mid-19th century, we concentrated on the growing of the peat. Peatland rewetting for environmental purposes emerged in the last 20 years.

As part of the PeatRus project (2011-2018), we have rewetted 11,000 ha in Tver region. We participate in many different rewetting projects as experts in Moscow, Ryazan, and other regions. We believe that the rewetting approaches we use are optimal. We support the idea that it's important to restart self-restoration processes.

The main result of the planning steps should be to choose a method that aims at the optimal water use without creating excess water. We redistribute the internal runoff of the peatland. For this, a

complex system of small dams should be created. The sites are normally not homogenous and when using just one solution it is very difficult to create good conditions for restoration.

What matters is to make a dam that lasts for at least several years. The main solution here is to discharge the excess water from the ditch to the surrounding area.

We carry out cartographic, hydrological, and remote monitoring on our sites.

We made an experiment of growing reed biomass during three years which turned out to be labour intensive and expensive in Russia. In our opinion it makes more sense to identify the existing wet sites to harvest reeds. It will reduce costs.

The main problem of rewetting and paludiculture in Russia is the current legislation. The only problem that authorities respond to are the fires.

Comment A. Samerkhanova: *As for the legislation issues, we have the consulting support from the Kaliningrad region Duma, and we could try to improve the current legislation. Let's discuss it further.*

11:20 Peatland restoration - experience from Norway - P. M. Eid

Pal Martin Eid works at the Norwegian Environmental Agency and is an expert in practical aspects of peatland restoration.

We started peatland restoration in 2013. We learned a lot from colleagues from other countries, e.g., Finland, GB. We have tried different methods by now. We work in nature protection areas.

Our mires have a significant slope, which leads to difficulties in the rewetting process.

Main techniques (see also video):

- Build peat dams for every 20 cm inclination, max 20 meters between dams.
- Aim: Restore to last forever
- In heavily drained sites, the entire peatland surface is oxidized. We used bonding peat dams. The idea is to achieve water levels between 10 cm above and 10 cm below surface.
- One needs a good excavator and a good excavator driver. Broad belts, tilt rotator, belts with inwardly bent edges, size 16 tonnes.
- Restoration of peat mining area. Not possible to make 10 cm under soil surface, some are deeper.

Mistakes:

- Broken peat dams – too much water, no infilling
- Long narrow dams and no infilling

Challenges: restoration of lead-polluted and PFOA (perfluorooctanoic acid)-polluted sites. Removal of much of the peat and restoring it afterwards.

Mire restoration is a skill which takes time to learn. Learn from others. The different methods available must be used. Excavator drivers who actively are responsible for that what happens in the field should be rather skilled.

11:40 Peatland restoration - experience from Western Siberia - Y. Kharanzhevskaya

Yulia Kharanzhevskaya is a specialist in hydrology and hydrochemistry of peatlands, Siberian research institute of agriculture and peat – branch of the Siberian federal scientific centre of agrobiotechnologies (RAS).

Moisture surplus in Western Siberia leads to the wide distribution of peatlands. 30-50% of its territory are peatlands. In Tomsk region, only 4% are drained for forestry or peat extraction.

Peatlands in the region are predominantly bogs (rainwater-fed peatlands).

Several parts of the Great Vasyugan Mire are drained, mainly for forestry. The results of the drainage are fires, degradation of peat soil, change in chemical content and of micro-relief. We observed an increase in the degradation level of top soil, an irregular decomposition of the drained area, and a decrease of the peat accumulation rate.

Pilot restoration sites were identified within the Great Vasyugan Mire. There are already existing monitoring sites.

Total drained area - 52 km², total burnt area - 5.54 km². Field work was done at four different sites within the Great Vasyugan Mire. Vegetation analyses and monitoring of water level dynamics was carried out.

In the burnt area (points A, B), the surface level collapsed because of fires and the water level seems high. The area near ditches was flooded. Only at one site, the water table level was 20 cm below the ground (otherwise higher?).

These investigations showed that conditions within the mire differ a lot and require a complex of measures. We have a plan for actions for the future.

11:50 Is rewetting of peatlands and paludiculture for nutrients reduction feasible? Discussion guided by W. Wichtmann and A. Samerkhanova.**Question 1: What are the costs of rewetting projects?**

P. M. Eid: Costs are quite high in Norway. In Finland - 1 Euro/meter for restoration, in Norway, 6-7 times higher because of sites complexity and higher costs in general.

Bonding (damming up after British model) seems to be optimal for successful rewetting.

W. Panov: 3,000 RUB/ha (≈38 Euro/ha) for design and engineering works if we have all the baseline data. Purpose restoration. However, the price can vary depending on the purpose – 1,000-50,000 RUB/ha (13 - 637 Euro), or even 100,000 RUB/ha (1,274 Euro/ha). If the purpose is capital construction with permits, then it's more expensive.

Decrease of costs – because drainage activities were rather standardized and supported by exact planning. These plans can be used as basis for rewetting activities. All necessary information about the sites is available from the soviet period.

We are against the construction of roads, pumping stations, pools, and other constructions on the peatland. They increase costs but provide minimal benefits for hydrology. Natural materials must be used only.

From 100% of our solutions, nearly 30% will be either destroyed or a failure. Thus it's important to create a self-supporting system, that will function also in case of human mistakes. If these rules are followed, the costs would decrease 50-100 fold. This is only applicable to Russia.

Regarding paludiculture: instead of planting of reeds in Russia it makes more sense to utilise naturally developed vegetation after rewetting.

Question 2: What is the potential of paludiculture in Kaliningrad? What are the farmers' perspectives to paludiculture? What are the processing industry's perspectives to paludiculture?

A. Samerkhanova: Shamil Akhmanov – had a business in thatching, but the problem is in legislation. There are a lot of people that have potential, as much as in raw materials.

Wood timber processing is currently paused. The already existing pellet factories have problems because of it. Kaliningrad has a potential in using paludiculture for different purposes, we have experts.

M. Napreenko: Rewetting aims for rehabilitation on the one hand, testing new forms of utilisation on the other.

Question 3: Is there a potential for the future? Do managing authorities support such activities?

S. Akhmanov: He still has a company for producing reed. First exported the reed, then started to produce roof panels. There is a demand from EU countries, though the profitability dropped down. *Reason seems to be in economic boycott of western countries.* Current business is alive but smaller than it was before. Compared to early 2000s, the income dropped down significantly – 7-10 times.

In *Chernyakhovsk*, there is an energy pellet plant, the powers are 4t/h, 6-8mm. Due to the increase in prices of raw material, the plant has not been working for two years now. It could process any plants as a raw material, there is a local demand as well.

However, we are open for any ideas.

Question 4: Will the administration support paludiculture?

A. Samerkhanova: In the framework of the PeatRus project, there was an action plan developed between the Ministry of natural resources of Kaliningrad region and us. As a part of it, the Ministry is responsible for peatlands rewetting and mapping. PeatRus is the first step towards rewetting, the DESIRE project is a follow-up. Slowly but surely we move to the practical rewetting. At the same time, we want to improve the current legislation. We work together with our policy makers. Hopefully, next steps will be nationally financed pilot projects.

Question 5: Why is the market so bad for thatching? In the EU, the thatching business is on rise, but only 15% is supplied locally.

S. Akhmanov: Reed is also supplied from Ukraine and Krasnodar region. Chopped reed is used for energy as well. However, we don't know yet the market response due to Covid-19.

A. Samerkhanova: local farmers could be subsidised by the regional business support centre, contact person is Sergey Babasyuk. There is a project called 'Business Battle'; we could develop a business idea regarding paludiculture.

W. Wichtmann: DESIRE can support the development of such ideas that could be granted by other initiatives in the end.

A. Kamocki (Bialystok) to V. Panov (Tver):

1. Where do you get peat for dams?

Peat is taken from near construction sites. There is enough peat or peat-sand mix after peat extraction. In the end, we have dams with good roads leading to them – we use gravel or crashed brick (to build roads?). We don't use timber or metal, it's too expensive.

1. How do you monitor the sites?

We use cartographical vegetation maps – 3 times: before rewetting, intermediate period maps, after 7-8 years. We expect to see significant changes between these maps.

We do field description of vegetation on certain spots. The bigger maps are done by ground monitoring.

We monitor water level on certain spots. If necessary, we make chemical analysis and survey micro relief.

Drone monitoring of dams and of the hydrological situation is used constantly.

12:20 Outlook and end of the webinar

W. Wichtmann – The online seminar gave a good overview on the role of peatlands in the landscape and their possible functions, especially for nutrients and water retention and possibilities for their restoration of degraded peatland systems. The presented possibilities for the restoration of peatlands from different regions showed that internationally a wealth of experience is available, which, however, needs to be further extended in order to be applied in the regions. Experiences on technical measures for the practical restoration of peatlands were also passed on. Now it is a matter of using this information and applying it in the practical implementation of rewetting measures, especially in the Kaliningrad region. Particularly valuable was the broad participation, in addition to the international experts, of representatives of a wide range of interest groups, administration, ministries, biomass utilizers, etc.

Next session is planned for November-December, perhaps even face-to-face. We will discuss potential utilisation, activities on the ground, and measures that need to be taken. Hopefully, it will include the visit to the pilot sites and we will see the work of Caterpillars, building dams and closing ditches in Kaliningrad peatlands.

Report: Iryna Raiskaya, Wendelin Wichtmann