

TE-O_03 Management of wetland areas – Tradition & innovation for sustainable land use and network between rural and urban areas

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1. Objectives

Wetland areas are important for grassland management, soil protection, carbon storage, water regulation and biodiversity. With ongoing structural changes in agriculture, a great number are abandoned because their conservation requires lots of work. Management with conventional high tech equipment is often hardly possible due to highly water-saturated soils. Today's challenge is the search for sustainable management practices that are not time-consuming and have the same ecological impact as manual work. Use of work-horses can be an innovative approach for preservation of natural and cultural landscape.

2. Methodology

In 2013 and 2014 the project "Sustainable Wetland Management with Workhorses" was implemented in the regions Ausseerland and Enns Valley (Styria/Austria), where different Natura 2000 sites and other protected areas with a wide range of wet lands can be found (Hohegger, Mayer, 2014). The project was realized by the Agricultural Research and Education Centre Raumberg-Gumpenstein in cooperation with land owners, farmers, Natura 2000 site managers, the Styrian League of Nature Protection and the Work Horse Association.

Activities of the pilot project were:

- Pilot tests of wetland management with work horses through combining tradition with innovation by using modern, adapted equipment as well as the comparison of conventional agricultural machines and manual work with hand mower and scythe.
- Monitoring of potential impacts on biodiversity in relation to the method
- Analyses of demand & supply for additional services, second income, local recreation, tourism
- Elaboration of benefits for regional added value and socio-ecological approach
- Awareness creation for (traditional) ecological sustainable landscape management practices to keep landscape open with extensive landscape management
- Public relations

Different wetland areas were selected as trial plots. Some of them have not been managed for the last 30-50 years, some were only managed by manual work (motor mower, hand work). For the mowing trials with workhorses an adapted mower with double knives was used (figure 1). The trials were implemented with the horse breed Noriker, a medium-weight, sure-footed, strong and persistent mountain-carthorse with high potential for working and free time riding.



Figure 1: Mower with double knives: advanced technology, cutter bar is 2,2 m long, a three v-belts actuate the chain, very robust, does not plug up, best adapted for mowing meadows with horses, costs: about 6,800 € (Hohegger, Mayer, 2014)

3. Results

Horse power has many regional benefits. The strengths and weaknesses of wetland management with work horses are shown in table 1. The multiple capabilities of work horses are a chance for sustainable ecological agriculture in rural areas and other services and a connection between rural and urban areas for recreation and sports as well as practical experiences. New income possibilities for horse owners and breeders and therefore can be seen as a valuable contribution to strengthen the rural economy.

The main results of the implemented pilot project can be summarised as following:

- Mowing of wetland areas is important to keep landscape open and to protect biodiversity e.g. in wetland areas and to reserve green infrastructure
- Big and heavy machines cannot fulfil the management demands and requirements for protected areas and small structured areas
- The use of horse power is possible under difficult site conditions and has low impact on wet soils. It maintains the biodiversity of wet meadows and keeps cultural landscape open, through the prevention of forest and scrub encroachment. A pasture management with slopes up to 30% is possible.
- The use of workhorses supports small-scale grassland farming to protect cultural landscape. Furthermore it has many ecological benefits: minimal noise, no emissions from engines, no fossil fuels are necessary, animals like birds, deer, insects can easily escape
- The financial effort for technical equipment is low with big potential for technical evaluation and optimization, e.g. adaptation of the mowing equipment to sites with other conditions, different application possibilities.
- The hay can be used for innovative products or as litter for stables.
- Apart from mowing there are multifunctional possibilities for use of horses and can generate second income for horse owners and breeders (thinning of forests, clearing of bushes or dwarf shrubs, cultivation and harvesting of potatoes, structural improvement of meadows, support of touristic services like riding, coach tours, horse sleigh rides and environmentally-friendly transport activities (e.g. transport to cabins, removal of e.g. plastic litter in touristic village Bad Mitterndorf or waste from other municipalities).
- Working with horses has positive effects on children, teenagers, people with mental problems.
- The Austrian Environmental Program (ÖPUL 2015) offers compensations for horse owners in less-favoured areas, rare horse breeds like Noriker, use of horses in agriculture (e.g. pasture management and management of protected areas)

Work horses for mowing of wet meadows is a good alternative instead of hand mowing, no mowing and for small areas which are hard to reach but it needs subsidies (table 2). Also the removal of hay with a tarpaulin that is drawn by horses is more efficient as manual work (figure 2).

Table 1: Advantages and disadvantages of using work-horses for the management of wetland areas.

Strengths	Weaknesses
Horse power has a multidisciplinary effect	Working horses need breaks
Working horses do not consume renewable energies	Time consuming management to keep landscape open
Under difficult conditions (wet meadows) they work more soil-conserving than agricultural machines	Working with horses needs special know-how which needs to be acquired
The slower working-process enables other animals to escape in time	In areas with more than 30% inclination the use of this mowing technic is not possible
Protection of small structured cultural landscape, biodiversity and rare breeds (e.g. "Noriker"), multifunctional effort	More funds and ambitious persons are needed (different initiatives are rising in Europe/ e.g. FECTU)
Attractiveness for urban population looking for rest and relaxation in nature and open rural landscape	
In comparison to machines, the noise emissions of working horses are very low	A distance of more than four kilometres to the next working-location is not economically
The mowing equipment for working horses is cheaper than a high tech tractor or machine	Working with horses needs a lot of personal initiative and a direct contact to the animals, nature and environment
Horses are no direct fodder-competitors against cattle	

Table 2: The following aspects compare sustainable management of wetland areas with work horses and other mowing methods from the economic side

Machine/Method	Ground coverage per hectare [h]	Diesel consumption [L]
Tractor	1	5-8,3
Motor mower	6	4,1-8
Scythe	12	to get to the site by car
Horse-drawn mower	5	0
Horse-drawn tarpaulin	4	0
Removing by hand	12	0

h-hours; L-liter



Figure 2: The removal of hay with a horse-drawn tarpaulin that is more efficient than manual work. (Fuchs, E. 2014)

Another important reason for the management of protected wetland areas (Mayer, et al. 2013) with horse power is the protection of soil and the reduction of soil compaction compared with machines which can cause huge damages. Studies showed that horses can use the same spot at least eight times before an extensive hoof print produces a compression of soil (Fleischer, M.; Süß, D. 2002; figure 3). The compression from a tractor or other big machines spread on the whole surface. The wheel ruts affect the soil-water-balance in a negative way.

The benefits of the use of horse power comprise also the protection of species and the better chance for animals to escape in time during the mowing process.



Figure 3: The hooves of the work horses cause less damage to the soil than agricultural machines (Fuchs, E., 2014).

4. Conclusion and outlook

The local history of the Enns Valley and the Ausseerland is characterized by traditional grassland management to protect and preserve small-structured cultural landscape and wetland areas. The preservation of cultural landscape is essentially to stop forestation and the loss of biodiversity and at the same time to reinforce added value through sustainable tourism. The manifold landscape was and is an essential basis for the exchange between rural and urban areas and its population. The Enns Valley and the Ausseerland have a long tradition in recreation for people coming from cities like Vienna or Graz. Many secondary residences are still situated in these touristic areas. The sustainable tourism plays a very important role. The manifold landscape (mountains, pastures, river valleys with its high potentials of habitats and species) as well as typical plants as *Iris sibirica* and *Narcissus radiiflorus* are trademarks for the regions. The high air quality, culture and tradition and typical regional products are important for economic benefit. All age groups from urban areas benefit by using these services for recreation, sport and research of nature (nature science and sport camps). The Leader Region Enns Valley and Ausseerland represents an important impact for sustainable land management.

During the last decades a renaissance of the use of horse power is in progress. Horse management for agriculture, riding, coach tours and therapy on horse (social farms) played and still plays an important role in winter and summer time. Old sumpter paths crossed the Enns valley. The old knowledge is used for new innovative tourism attractions and new economic initiatives.

Today's management is mainly based on agricultural subsidies. With the ongoing structural change in agriculture new strategies and innovative solutions are needed for future sustainable management. The realized project is a best-practice example for sustainable, ecological management of wetland areas to keep cultural landscape open and to develop a green puffer zone which can be used beside agricultural management also for recreation and awareness rising for protection of habitats and species. Local population and regional farmers who still remember the use of work horses took great interest in the method which is at the same time an old and new approach. They were surprised about the modern machinery partly imported from Germany and USA. Also media and tourism showed great interest in the project.

The sustainable management of wet land areas e.g. Natura 2000 sites and other relevant protected areas with workhorses was implemented in the new Austrian ÖPUL Programme (Agri-Environmental Program 2015) to enhance environmentally-friendly management of agricultural areas.

References

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