

EXTENSIVE FARMING PRACTICES AS A TOOL FOR ACTIVE PROTECTION OF BIEBRZA WETLANDS BIODIVERSITY ON THE EXAMPLE OF MODEL WWF PROJECTS

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Abstract: High biodiversity of the Biebrza Wetlands is the result of forces of nature and human activity. Farm animals grazing and mowing of meadows have been very important for the natural values of open wetlands. Nearly complete abandonment of these farming practices in the last decades resulted in negative changes of wet meadows' fauna and flora due to process of secondary succession. Model WWF field projects are aimed to check the possibility of stopping this process or reversing it by continuation or restoration of grazing in the Biebrza river floodplains and hand mowing of sedge-moss meadows. Educational and promotional activities connected with the need for active conservation of open wetlands in the Biebrza Valley and co-operation with the local community are very important for these projects.

INTRODUCTION: BIEBRZA WETLANDS – UNIQUE NATURAL VALUES DEVELOPED BY FORCES OF NATURE AND HUMAN ACTIVITY

Biebrza Valley, situated in the north-eastern part of Poland (Podlasie Province) is a vast land depression stretching from Lipsk and Nowy Dwór to the Narew river Valley, more that 100 km long. It is the largest wetland in Poland and Central Europe (approx. 250 000 ha) (Banaszuk 2004), famous due to its unusual vastness, abundance of peatland vegetation, purity of waters and many rare bird species of international value breeding or resting during migrations here. Natural hydrological conditions shaped the longitudinal and lateral zonation of plant

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communities. Every year the Biebrza river floods the bottom of the valley, covering it with water for several months. Sometimes the floods occur in late autumn and last until the end of March; it also happens that the water recedes in mid-June.

These natural features of Biebrza Wetlands make them a reference point for the Western and Central European fens transformed in the past and now subjected to renaturalisation activities.

Natural environment of Biebrza Wetlands was formed by both: natural processes and human activity. Man influenced the environment by changing the hydrographical network (construction of large drainage channels in the Middle Basin of Biebrza Valley, drainage of wetlands and training of smaller water-courses), as well as various ways of using the natural resources (farming, hunting, fishing, forestry, collecting peat etc.).

Nowadays the main problems of nature conservation in the area of Biebrza Wetlands are negative changes in terrestrial non-forest ecosystems resulting from lowering of groundwater level and decreasing range of river floods, as well as abandonment of wet meadows mowing and cattle grazing by the local people. It triggered the process of plant succession towards rush or forest and scrub communities. This process causes the decrease of fauna and flora species abundance. The species appearing in course of succession process are more common and - in terms of nature conservation - less valuable than those displaced (Marczakiewicz 2004). The landscape of the area is also subject to negative changes.

Nature conservation practices in Western European countries have shown that grazing of grasslands is one of the most effective forms of their economic use and conservation as well as increasing their biodiversity (Bartoszuk *et al.*, 2001, Guziak & Lubaczewska 2001, Wasilewski 2003). Another form of usage enhancing biodiversity of wet meadows is their mowing. Both these forms of agricultural use have proved very effective in Biebrza Wetlands as a method of active prevention of open meadows overgrowing.

THE ROLE OF TRADITIONAL FARMING IN BIODIVERSITY PROTECTION OF WET MEADOWS IN THE BIEBRZA VALLEY

GRAZING

Grazing animals have a multiple impact on the ecosystem. By chewing and trampling the grass and leaving their droppings on it they form the characteristic vegetation type of a given area together with a complex of its organisms.

Constant intake of nutrition prevents overfertilisation of the grazing land. Chewing stops the development of tree and scrub seedlings and massive development of grasses. Deformation of soil surface with hooves creates places where grass can germinate. The impact of hooves on the grasslands enhances the tillering of grasses. Selective intake of food results in formation of mosaic landscape structure. Such variety of the grassland ensures more diversified niches for

invertebrates which are the component of food for various bird species. Moreover, the waders which are important for wetlands prefer tufted vegetation as a place for laying eggs and nestling. It also ensures feeding places for anseriformes resting during their seasonal migrations or wintering in this area, since during shallow floods the tufts protruding above the water level are the shelter for invertebrates and accumulate floating seeds (Guziak & Lubaczewska 2001).

The manure is also very important for conservation and formation of biological diversity. It is a rich source of nutrients necessary for the growth of green biomass. In addition, dispersed droppings enhance the species and structural diversity of vegetation (Guziak & Lubaczewska 2001).

Thus, grazing is very important for the formation of habitat structure preferred by charadriiformes and anseriformes, but also for the growth of biomass, diversification and enrichment of species composition and regeneration of plant communities (Gordon 1998, Guziak & Lubaczewska 2001).

Cattle are the most universal animal species for grazing, especially in difficult field conditions. The experiences in many countries have shown that they are very effective both in maintaining and restoration of habitats for many animal and plant species. Proper grazing practices contribute to preservation and often even to increasing biodiversity in the grazed areas (Bunce *et al.*, 2001, Cattle grazing...1999, Gordon 1998, Gordon *et al.*, 1990, Higgins 1999, Warren *et al.*, 1999).

In the area of pastures in Biebrza Wetlands usually took place on the floodplains near the river. It was the case mainly for the villages located on the edges of the valley, in the vicinity of the river. Here the bearing capacity of soil is higher, that makes movement of cattle easier, that further from the river in the sticky peatland meadows (Wasilewski 2003). They were used for mowing. It was also the area where the cattle from villages situated in the wetlands or on their edges - but far from the river - were grazed.

MOWING

Wet meadows were usually mown once a year (in late summer), sometimes twice (first cut after Midsummer Day – 24 June). The harvested hay - due to high content of sedges containing a lot of silica - was a low quality fodder, used mainly for bedding.

The use of sedge hay meadows took place in very difficult conditions - high inundation of peatland with soil water, which made it impossible to use the traditional mechanical equipment. The only possible method was mowing with scythes and transportation of the hay in winter, when the marshes were frozen. Many hours' exposure to solar radiation, wind and biting insects did not make this work any easier. Moreover, the hay meadows were usually located quite far from human settlements. Thus, haymaking was a carefully planned expedition undertaken by the whole family or several neighbouring families. During one stay, which often lasted some days, the haymakers had to mow the meadows by hand

(the task of the men), dry the hay and transport it to one place (the task of women and children) and pile it carefully into stacks (again the task of men). The haystacks were placed on the local land elevations or on special platforms made of wooden poles and branches. Protected against the influence of groundwater, precipitation and wind, they were left on the meadows until winter. Only when the waters were frozen it was possible to reach the stacks with a sleigh or a tractor and transport the hay safely over the ice.

Considering the difficult conditions of collecting the hay from the marshes, its low quality, long distance from the farms, gradual depopulation of Biebrza villages after the World War II and the decrease of livestock population, it is no wonder that this type of usage was rapidly declining.

Traditional mowing practices were still commonly used in the 60-ies. In the 70-ies about a half of the sedge meadows area was abandoned. In the 90-ies mowing of wet meadows practically disappeared in the area of Biebrza Wetlands. It was practised for the longest time in the few enclaves with relatively easy access to the meadows (by ground roads on the dikes).

Under the influence of many centuries of agricultural use, sedge-moss communities developed in the areas of groundwater ascension. They belong to the plant associations of special natural value in the Biebrza Valley. This habitat type is preferred by the waders.

The influence of mowing on the habitats consisted in mechanical maintenance of low meadow vegetation (including destruction of scrub and tree seedlings), increasing the access of light to the lower layers, removal of biomass (hay) and thus creating an optimum habitat structure for photophilous plant species and the birds which could easily move on the meadow surface, find shelter and good feeding and nesting places. Moreover, removing hay from the meadow prevented overfertilisation of the habitat. Small depressions resulting from trampling the peat by walking haymakers filled with water, additionally improving the mosaic structure of habitat. Single shoots and small areas covered with reed, which were left in the meadow, enriched the habitat (favourable conditions e.g. for aquatic warbler).

When the traditional practice of mowing sedge-moss meadows declined, negative natural changes could be observed. They consist in the process of disappearance of the moss layer and increased predominance of sedge species, such as *Carex appropinquata* and *Carex elata*. This phenomenon is accompanied by progressing flora and fauna impoverishment. In the case of flora, the negative changes include disappearance of bryophyte species and less competitive species of vascular plants. For fauna, they are particularly visible in the case of avifauna. Decline of regular mowing - even if it does not lead to immediate reed or scrub encroachment - results in accumulation of dry sedge leaves (so-called necromass), which makes it difficult for waders - such as the ruff, lapwing, redshank or black-tailed godwit - to move in the area and feed. Moreover, the dry biomass (hay) - when not removed - poses the risk of dangerous fires which can spread in the marshes. The produced ash fertilises the habitat, causing additional disturbances in the ecosystem.

EXAMPLES OF MODEL WWF PROJECTS IN THE BIEBRZA WETLANDS

PROJECT 'THE HAPPY COWS FROM BRZOSTOWO'

CHARACTERISTICS OF BRZOSTOWO

Brzostowo is a village located in the Lower Basin of Biebrza Valley, in Jedwabne community. It borders directly the Biebrza river and the Biebrza National Park (BNP). A major part of area within the boundaries of BNP belongs to the inhabitants of Brzostowo. Moreover, some areas owned by the Park are used as pastures and hay meadows by the local farmers.

Brzostowo is one of the few villages where farming (mainly pastoral agriculture and mowing) still follows the traditional extensive methods that are environment- and nature-friendly. Therefore, the areas of Brzostowo pastures and meadows are excellent breeding habitats, feeding grounds and resting places for numerous bird species which are getting rare in Europe. The area of floodplain used by Brzostowo farmers for grazing is inhabited by 11 breeding bird species (including lapwing, white-winged tern, black tern, redshank and black-tailed godwit) and 10 feeding species, e.g. grey-lag goose, white-fronted goose, bean goose and wigeon (Bartoszuk *et al.*, 2001, Chętnicki 2001). These birds need low, selectively chewed vegetation formed by grazing.

According to the own surveys of Kucharska completed in 2004 the lands of Brzostowo village belong to 27 owners, 21 of whom graze the cattle. The area of an average farm is approx. 18 ha (from 2.69 ha to 29.09 ha). The percentage of arable land for the whole area of a farm is 57 to 99%. Permanent grassland constitutes in total over 35% of the used area. In 14% of farms permanent grasslands take up over 59% of the arable land area.

The farms have a very fragmented land structure. Farmers possess on average 18 registration plots (5 to 34), 75% of farms consisting of over 18 plots. The plots are located in various villages in the neighbouring area. Moreover, particular arable plots belonging to one farm are small and often do not border each other.

Farm technical equipment includes mainly fodder machines, which only in few cases are relatively new.

The village is not connected to the sewerage network. Only a half of the farms have running water (hydrophore), and only 2/3 – a cesspool.

Soils in this region are poor: arable lands belong to IV-V soil class, and permanent pastures – IV-VI. On the mineral soils out of Biebrza Valley (on the right bank of Biebrza river) farmers from Brzostowo grow rye, triticale, wheat, mixture of grain crops and potatoes. Nearly all ground cultivations are used for animal feed. Due to the high percentage of meadows and pastures in the valley (on left bank of Biebrza river) practically all farmers keep dairy cattle. This production profile is their basic source of income. Green forage obtained from this area is of rather poor quality, but its high availability (own grazed areas and those of the others) and the fact that

there are no cost related to cultivation technology make it the only or main source of summer feed.

In 2004 the total population of cattle kept in the area of the village was 374, approximately 17 livestock units in 1 farm (2 to 35 livestock units). Currently kept animals (local breeds) are the only ones that can adapt to the wetland conditions and low quality fodder. Moreover, 7 farmers declare that they have Polish red cattle (1 farmer – 4 units, the others – 1 unit each), and one – 1 unit of white-backed cattle.

Grazing area next to Brzostowo village (in the valley) consists of a narrow belt of meadow, reed and grassland communities located on the right bank of Biebrza river and 1-1.5 km wide, and a belt of low, periodically flooded grass communities on the left bank of the river (within the area of BNP – experimental plot). Its total area is approximately 322 ha.

Animals are grazed mainly on the lands located on the left bank of the river (periodically flooded pastures) in the area of BNP. Grazing on the side of the village - usually rotation or line-kept grazing - is usually seen as supplementary - before the cows are grazed at the other side of the river and after their return (May and October).

The plant communities which have developed on the left bank of the river are mainly the fine-leaved water-dropwort and greater yellow-cress (mainly creeping bentgrass, manna grass), communities of floodplain grasslands (*Agropyro – Rumicion crispi*) and numerous sweet rush stretches of various size (Bartoszuk *et al.*, 2001). The grazed areas include private plots, the lands managed by BNP and approx. 46 ha of the so-called no-man's-land (undefined ownership).

On average, the grazing season in Brzostowo lasts 162 days (122-184 days depending on the farm); 18 farmers graze their animals on the other side of the river for 113 days on average (62 to 152 days).

On the other side of the river the animals are in open grazing all day long (approx. from 7 a.m. to 6 p.m.) from the end of May to the end of September, sometimes even longer. The farmers declare to graze over 200 cattle, several horses and a few small flocks of geese in the area of meadows and pastures on the left river bank. The cattle grazing on the left bank cross the river twice a day. Horse grazing usually starts one week later than cattle grazing, but the horses stay on the pastures continuously for the whole grazing season. The time when grazing starts depends on the water level and the related range of floodings. As the water level in Biebrza river falls, the land area accessible to the animals, the time of their stay on the pasture and range of feeding area penetrated by them increase.

In 2004 the inhabitants of Brzostowo grazed 216 cows (216 livestock units) and 11 heifers (8.8 livestock units) on the other river bank, i.e. 227 cattle (224.8 livestock units) and 13 horses (13.5 livestock units) in total.

The results of ornithological researches (2001-2003) sponsored by WWF (Chętnicki *et al.*, 2001, Mazurek 2002, Mazurek 2003) on Brzostowo pastures have

shown that cows are very effective in the process of creating good breeding places for waterfowl. Low, selectively chewed grassland vegetation formed by grazing cattle contributes to improvement of nesting conditions for waders. The indirect positive influence of grazing consists in reducing the pressure of predators, which is the major cause of nest losses. The cattle themselves hardly cause any nest damage (9% of all losses in 2002 and 3.8% in 2003) (Chętnicki *et al.*, 2001, Mazurek 2002, Mazurek 2003).

The area of Brzostowo pastures was also the place where effectiveness of cattle and horse grazing in counteracting succession was assessed. (Braeckel Van & Bokdam 2002). According to the collected data, grazing animals prevented or reduced reed encroachment, but they could not restore sedge-moss communities in places where tussock sedge communities have developed. It shows that extensive grazing is more effective in stopping succession than in averting it.

WWF ACTIONS FOR BIODIVERSITY CONSERVATION OF FLOODPLAINS NEAR BRZOSTOWO ON THE BASIS OF TRADITIONAL GRAZING.

WWF realised that Brzostowo pastures have a unique value on international level as an excellent breeding area of rare waterfowl species. In order to answer the question how to preserve this condition in the future, and whether it is the traditional grazing that influenced the high ornithological values of this area, thorough research and analyses were commissioned at the beginning.

A team of ornithologists from the Białystok University carried out ornithological research and observations of grazing methods for 3 years (2001-2003). The results confirm key importance of extensive grazing for the formation of optimum habitat structure for birds and low bird mortality resulting from trampling nests by cattle and horses. Moreover, the research emphasised low breeding success of birds due to nest destruction by predators (mainly small mammals, including the American mink).

WWF in co-operation with Mrs A. Kucharska from Warsaw Agricultural University carried out surveys among Brzostowo farmers concerning, among others, the structure of farms, their agricultural production and the extent of meeting the requirements of the Usual Good Farming Practice (some of the collected data have been presented in this article). The results enabled the assessment of chances and risks related to further use of traditional grazing methods in Brzostowo, especially in the context of changes in Polish agriculture after Poland's accession to the European Union. The identified threats (i.e. the risk of complete discontinuation of milk production, or its intensification, which in both cases could lead to abandonment of cattle grazing in floodplains of Biebrza Valley) and ownership conditions (especially the fact that particular cattle farmers do not have the sufficient acreage to continue raising the cattle on their own pastures at the present level and that milk production is their main agricultural activity, and therefore they have to graze their animals in the BNP and other owners' floodplains area near the river) determined the further action plan.

In spring 2004 Brzostowo farmers were trained by WWF to use the possibilities of participation in EU agro-environmental programme. It would enable them to get financial support for extensive agricultural activities and simultaneously to compensate the losses in relation to potential intensive cattle breeding. In addition, it would encourage the activities for conservation of nature of the valuable grasslands. Individual consultations with many of Brzostowo farmers and encouraging them to participate in the agro-environmental programme lasted for several months. Farmers had the possibility to get information on the agro-environmental programme and to dispel all doubts during the meetings with the authors of its Polish version (among others, from the Ministry of Agriculture and Rural Development and the Institute for Land Reclamation and Grassland Farming) as well as with specialists from the Agricultural Advisory Centre. Although the acreage where the farmers could implement the environmental packages of the agro-environmental programme is relatively small due to complicated ownership structure of Brzostowo pastures (a mosaic of fragmented private plots, 46 ha of land with undefined ownership and a high percentage of State owned lands managed by the Biebrza National Park) and no possibility of BNP land tenancy, and thus the payments are quite low, all the farmers declared that they are willing to use the agro-environmental programme (packages: preservation of extensive grasslands and conservation of extensive meadows). At the moment of writing this article, the documentation necessary for them to file applications for the agro-environmental programme was in course of elaboration.

In 2004 several meetings were organised between Brzostowo farmers and representatives of commercial companies dealing with milk production and supply of related equipment, co-operating with WWF, who provided free counselling in the scope of adapting milk-producing farms to the EU requirements.

Inhabitants of Brzostowo are relatively well aware of the natural values of "their" pastures and the importance of farm animal grazing for the birds, mainly because of crowds of tourists who visit the village to observe thousands of birds during their seasonal migrations and the breeding season. Another attraction of Brzostowo are the "happy cows", herds of which freely cross the river twice a day from spring to autumn: in the morning, going from sheds to the pastures, and in the afternoon, at the milking time, when they come back to the farms. The animals can freely wander the vast green pastures on the Biebrza river (without any fences). However, the living standard in Brzostowo is not very high, so the farmers must have their feet firmly on the ground, despite the liking for "their birds". They are not going to graze the cattle in the marshes only to protect the birds, but they will continue the nature-friendly farming only when it proves economically profitable. Except for support from the agro-environmental programme, some of them count on additional income from serving B&B services (agrotourism).

In order to make Brzostowo more attractive for tourists through raising the standard of tourist infrastructure, and to encourage and make it possible for the tourists to observe the birds and cows and to admire the open landscapes of Biebrza Wetlands in a nature-friendly way, WWF is financing the construction of a

observation platform near the place where the cattle cross the river. Its use will be free for inhabitants of the village and tourist guides.

In order to secure financial profitability of traditional pastoral and meadow farming in Brzostowo, and to ensure continuity of active nature conservation of floodplains in the Biebrza Valley, other needs of Brzostowo village and possibilities to meet them are currently being analysed. The results of the project by WWF and the North Podlasie Society for Birds Protection, entitled „Preserving biological diversity of Biebrza Valley pastures and alluvial meadows formed by traditional agricultural use”, which are expected in the nearest future, will be very useful for that purpose. The activities currently being conducted in the scope of the project include:

- elaboration of a management plan for Brzostowo bird area, which will include conservation recommendations and proposals of their enforcement, ensuring the preservation of numerous waterfowl population related to traditional extensive grazing.
- restitution of the breeding herd of Polish red cattle (lowland type) in the Biebrza Valley. The cattle of that type is the only typical Polish breed. Forty years ago it used to be very popular in the area of Biebrza Valley due to excellent adaptation to the difficult conditions of marshy pastures and severe climate, resistance to diseases, easy calving and milk with high protein and fat content. Due to lower milk yield than in the case of modern breeds of typical dairy cattle and the “modernness trend”, this breed has been gradually eliminated from the herds. Today it is regaining appreciation due to its numerous breeding advantages as well as financial incentives for breeders within the agro-environmental package “preservation of local farm animal breeds”.

PROJECT ‘RUFF MEADOW’

CHARACTERISTICS OF THE RUFF MEADOW

According to Jakimiuk (Jakimiuk *et al.*, 2000) plant associations of special natural value which have developed in the areas of groundwater ascension in Biebrza Valley include the sedge-moss communities (belonging to the class *Scheuchzerio-Caricetea nigrae*). Ornithological research carried out in the 70-ies in the area of occurrence of these communities in the central part of Bagno Ławki showed that, in comparison with other types of open sedge meadows, this zone was most abundant in species. A characteristic element was the presence of numerous waders: black-tailed godwits, redshanks, lapwings and breeding ruffs. Also the jack snipes nested in this area - it was the only observed case of this species breeding in Poland after the World War II (Jakimiuk *et al.*, 2000).

It is quite typical that special density of these species' occurrence has been observed near Honczarowska Dike, which was associated with mown meadows, still present in this area. Due to the abundance of waders, the ornithologists working there called it the “ruff area”. This name, well-established in the local ‘conservation tradition’ was – after a slight modification - used as a title for the

project of active conservation of open wetlands biodiversity in the Biebrza National Park, carried out by WWF, Biebrza Society and BNP (Jakimiuk *et al.*, 2000).

The meadow, like the majority of open wet meadows in Biebrza Valley, had been hand-mown every year by the farmers from local villages for many centuries. The harvested hay was used for litter and fodder for farm animals. After World War II, due to depopulation of villages in Biebrza Valley and the decrease of cattle and horse population, farmers abandoned the practice of mowing wet meadows with difficult access.

Abandonment of traditional mowing practices which took place several decades ago brought about changes in the vegetation cover of sedge meadows. The rate and direction of these changes probably depend mainly on the local environment conditions (various water relations, different soil acidity). Many areas have been overgrown with willow scrubs, alder, birch and reed. Abandonment of mowing in the area of the 'Ruff Meadow' resulted in succession of sedge-moss meadows (*Carici-Agrostietum caninae*) towards communities dominated by tussock sedges (*Magnocaricion*) (Jakimiuk *et al.*, 2000, Werpachowski 2004). It is accompanied by decreasing the diversity of flora and fauna.

Black-tailed godwits, redshanks and ruffs, which need low vegetation for nesting – i.e. areas 'cut down' by scythes or grazing animals - left the 'Ruff Meadow'. Nevertheless, it has remained a very important breeding place for other birds. One of the species nesting here is aquatic warbler (*Acrocephalus paludicola*) - a very rare, endangered bird species. The Biebrza National Park is the most important legally protected breeding place of aquatic warbler within its whole range in the world.

In the case of flora, the negative changes include disappearance of bryophyte species and less competitive species of vascular plants (Jakimiuk *et al.*, 2000).

WWF ACTIONS FOR CONSERVATION OF SEDGE-MOSS MEADOWS BIODIVERSITY ON THE BASIS OF TRADITIONAL HAND MOWING

In 1999, after more than 20 years, haymakers returned to the 'Ruff Meadow'. It happened thanks to the project undertaken by WWF, Biebrza Society and the Biebrza National Park. The project includes several fields of activity:

1. active conservation of open wetland meadows through hand mowing and removal of harvested hay
2. popularising the need for active conservation of wetland meadows
3. monitoring the impact of hand mowing.

Regardless of the 'Ruff Meadow' project, actions have been undertaken for prevention of peatland overdrying through construction of weirs at old drainage ditches, e.g. in the Lower Biebrza Basin. It will result in a prolonged period of high moistening of meadows. An additional result should be reducing the peat fire risk in this area.

Ad.1.

Active conservation of the 'Ruff Meadow' consists in restoration of traditional hand mowing, which begins here in late August, after the birds' breeding season. Every-year mowing and removal of hay prevents accumulation of a thick litter layer, composed mainly of dry sedge leaves (necromass). Accumulated litter has a negative influence on breeding of waders and development of many plant species. It is difficult for the birds to move in the tangle of dry leaves, and the plants have a reduced access to light.

About 40 farmers from the local villages were employed during implementation of the 'Ruff Meadow' project. They carried out conservation activities in the period from mid-August to the end of winter. Their tasks included mowing the meadows with scythes, drying, collecting and stacking of the obtained hay and – in winter, when the marsh surface is frozen and it is possible to drive the tractor over the ice - removing hay from the meadow. Payment for doing this work on the area of 1 ha is about PLN 1200 (app. 280-300 EUR). Calculated into work by one person, it is on average 10 days.

Ad. 2.

In the scope of popularising active conservation of wetland meadows, the following events were organised:

- Polish Championship in Mowing Wetland Meadows for Nature 'Biebrza Haymaking'

The first event of the cycle 'Biebrza Haymaking' was addressed to the local schoolchildren, who had the opportunity to get to know the traditional method of harvesting hay from the wetland meadows, in the way their grandfathers used to do it many years ago, i.e. without mechanical equipment. Children helped to rake the hay with wooden rakes, formed it into heaps and carried it to the hay stack on traditional hand yoke.

In the following year a number of Biebrza Wetlands lovers and tourist guides were invited to the 'Biebrza Haymaking'. Apart from working in the field, in the evenings participants of the event learnt to weave baskets of the Biebrza wicker and carve out traditional wooden ornaments of Podlasie houses (drips).

The third 'Biebrza Haymaking' was organised in 2001 as the Competition in Mowing Wetland Meadows entitled 'For the Daddy's Scythe'. Participants of the competition were professional haymakers that are mainly farmers. Those who spend most of their time sitting at the desk, i.e. directors of national parks and presidents of nature conservation funds and Non-Governmental Organizations (NGOs), fought for the 'Community Major's Whetstone'.

Due to great interest in the competition the organisers decided to hold the event on the national level. In 2002 forty competitors from all over Poland took part in the First Polish Open Championship in Mowing Wetland Meadows 'For the Daddy's Scythe'. The number of spectators reached 300 and media coverage was provided all over Poland. The aim of the competition was achieved - it was excellent sports rivalry of the haymakers and a great fun for supporters. Another few hectares of the 'Ruff Meadow' were mown, and a message was disseminated

all over Poland that traditional farming is essential for active conservation of very valuable habitats which, unfortunately, are endangered due to abandonment of their use.

In 2003 the event was moved from the 'Ruff Meadow' to another place due to its high popularity and the related high attendance rates, which started to be a threat for the sensitive habitats of 'Ruff Meadow' area.

Polish Championship in Mowing Wetland Meadows for Nature has become a regular event in the Biebrza region and is usually organised in the first decade of September.

- Winter Hay Collection 'As it used to be on the Biebrza Wetlands'

When the marshes are frozen and their normally boggy surface can carry heavy loads, the second stage of works on the 'Ruff Meadow' starts. The farmers come here to collect hay stacks which they left on the meadow in late summer. It is a good opportunity to present the cultural and nature-related aspects of winter hay collection to the wide audience. Main attraction is the possibility to participate in hay transportation according to the traditional method - i.e. with special long sleigh for transporting hay.

- 'Ruff Decoys'

In the scope of the project a cycle of workshops for the local schoolchildren, entitled 'Ruff Decoys', was organised. During the workshops children were taught by teachers and nature conservationists about the ecology of ruffs, their threats and conservation methods. Practical classes consisted in preparation of wooden decoys of ruffs, i.e. the models of tooting males of this species in natural size. Józef Rafałko, a local sculptor from Trzcianne village, made rough models of the decoys of wood and metal rods. The children painted them in the colours and patterns of ruff plumage and made oil-cloth ruffs and crests, characteristic for male ruffs in the mating season. Then, the children placed decoys on the 'Ruff Meadow' to attract real birds. Unfortunately, these attempts proved ineffective, but it was a clear signal - also for the children - that it is very easy to harm the nature, and much more difficult to "mend" it.

- The Orchid Day

One of the plant species chosen as the "indicator" for monitoring the impact of meadow mowing was the early marsh orchid, occurring abundantly on the 'Ruff Meadow'. Its flowers are usually violet or purple-coloured. However, there can also occur pale yellow flowers of the subspecies early marsh orchid, pale form (*Dactylorhiza incarnata* subsp. *ochroleuca*). It is a very rare, endangered variety in Poland, entered into the Polish Red Book of Plants.

The early marsh orchids growing on fixed experimental plots have been already counted and measured several times in June, under the supervision of a botanist from the BNP. WWF volunteers and members of other NGOs of the Biebrza region took part in the counting.

The research results show that mowing increases the population of early marsh orchid, as well as populations of other plant species. Positive impact of mowing wetland meadows on many plant species consists in the fact that - thanks to hay collection - the layer of dry sedge leaves is considerably reduced. Thus, it cannot impede the development of other plant species by reducing their access to light and effectiveness of self-seeding.

All the above-mentioned events, progress of project works and other topics related to the project objective were widely covered by the local, regional and sometimes even national media.

Two boards informing about the project were placed near the Honczarowska Dike tourist track. They present information on active conservation of wetland meadows and the cultural aspects of traditional mowing.

Ad.3.

The impact of mowing on the nature is monitored by means of observing reactions of several indicator plant species, plant communities, invertebrates and birds. The results of annual research for mown and unmown fixed monitoring areas are compared. A detailed report presenting the research results is available at WWF and the Biebrza National Park.

CONCLUSIONS

The present farming system based on extensive free – with no fences – horses-cattle grazing in the area of Brzostowo seems to be optimal for the biodiversity of this region. Collective extensive grazing of cattle, horses and geese, additionally one or two cuts a year depending on the range and time of flooding and low or lacking fertilization enable preservation and conservation of the unique landscape and natural richness of floodplains in Biebrza Valley.

Local farmers from the region of Biebrza Wetlands could gain the additional funds due to implementation of agro-environmental programmes and are willing to protect nature with such a condition of financial subsidies.

The funds from agro-environmental programmes can be very helpful for maintaining or restoring traditional farming practices at Biebrza Wetlands.

There is potential in the area for such activities, but continuous support of BNP or NGOs is still required to encourage farmers. The role of local inhabitants is of great interest for successful active protection of wetlands by farming practices.

The involvement of NGOs in active nature protection, ecological education and promotional activities of local cultural heritage significantly supports the efforts of national administration responsible for nature protection.

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