FLÓRA MŐCSÉNYI: HOW MUCH WILDERNESS DO WE NEED?

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The term "wilderness" caused some disturbance among the participants of the IP preparatory kick-off meeting as the other groups discussed problems of rural and urban areas. Wilderness did not fit in the urban-rural classification. As a solution of the disturbance I describe wilderness as natural areas. Of course the "amount" of natural features has to be clarified. Numerous papers discuss and classify landscapes according to the measure of naturalness, which I would like to avoid presently. Being aware that forests do not cover totally the term wilderness, for the sake of necessary simplification during the preparation of this paper I described wilderness as forest. In accordance I discuss the processes that could be registered in forest areas in the past and take place at present.

According to the decision on topics at the kick off meeting I chose to prepare a case study on the changing quantity of wilderness areas in Hungary and in a specific research area of the country, as well as the possibilities today in growing more forests on the surfaces. First I give a short summary on forest-quantity change in the Carpathian Basin with the description of reasons. Secondly I present the special forest features of a smaller Hungarian research area and finally I show the new ideas and methods in sustainable support of forest management.

Forest areas have naturally positive effect on keeping good soil conditions, inhibiting erosion or deflation even on steep slopes. However now it is not my topic to discuss these effects. I have to mention that forests protect the soil not only on steep hillsides but on mild-elevated areas as well and beside protection all conditions that are provided by the forests lead to a better soil quality. This is the reason why we should look at forests as main elements in keeping our soils in good state during long periods.

I. Forest changes in the Carpathian Basin and Hungary

First I was interested in the changing forest area in the Carpathian Basin and Hungary. There exist some valuable resources concerning the ancient use of forests in the Carpathian Basin by Dénes Bartha[1] and other works discussing the amount of forests throughout history.

Vegetation of the Carpathian Basin can be seen as original and intact until the second half of the 6th millennium B.C. At this time as a result of a smaller warming-up of the climate, significant immigration reached the basin from the Mediterranean-region. The immigrants were familiar with the methods of agricultural cultivation and they started to fell forests to gain surfaces for cultivation. At first the felling methods were not so intensive and only smaller areas, mainly on flat and mild-sloped terrain – that were easier to reach –, were touched. People either dried out individual trees or, in case of larger amounts, burnt them. However, this was the first time in history when human influence was a barrier to natural succession and modified its process.

1 Bartha Dénes: Történeti erdőhasználatok Magyarországon. In: Magyar Tudomány, 2003/12

The area occupation of agriculture rose during the 6th to 1st centuries B.C. in Western Europe although this did not refer to the Carpathian Basin where the drying and burning continued. Large-scale demolition of forests reached the region only in the Roman period (1st to 5th century AD). By this time larger de-forested patches could been found on the Great Hungarian Plain (Alföld).

Scientists reconstructed the forest-ratios at the time Hungarian tribes settled in the Carpathian Basin (896). After projection of the areas they found out that around the 9th century forest cover may have been around 60% on the present area of Hungary.

In the Middle Ages from the 14th century metallurgy and mining consumed vast quantities of timber. Forges (the heating equipment) were fired until the mid-18th century with wood and mines needed timber for the tunnel-holding structures. In 1565 King Maximilian II. – to reduce the immense devastation of forests – gave out the first act on forests. Though the result of the law was not much observed however the four main points are valid even also today: the amount of felling has to be planned, the area of felling has to be marked up, mother seed-trees have to be preserved and grazing of goats in the forest shall be forbidden.

The de-forested areas in the Great Hungarian Plain grew during the 150 years of the Turkish Reign from 1541-1686 as the Turkish military used the timber exceedingly from the army occupied middle part of the country. After decades of debate ecologists and historians concluded that, in consequence of the massive felling, steppe-processes started on the Great Hungarian Plain and so was the present "puszta" view formed.

Growing industry and population in the 17th-18th century consumed the forests and according to the first military mapping of the country – ordered by King Joseph II. – between 1782-1785 showed that the forest ratio was 29.7% by that time. The large amount of felling and the non-sustainable forest-management methods e.g. lack of reforestation[2] resulted in 1791 in the adoption of the first feudal forest act.

It is not commonly known and told however, that the most significant loss of woodlands was suffered between 1848 and 1878 as a result of the emancipation of serfs. Peasants could own private landed property and choose freely employer – and could become an individual farmer – only after the freeing in the 19th century AD. Large portion of new owners had a right for pastures, so they fell 1.3 million hectares of forest and transferred it into pasture. The need for timber only grew until the end of 19th century and by this time the last witnesses of the Pannonian virgin forests, the famous *Quercus robur ssp. slavonica*-woods vanished. The forest ratio of Hungary was 26% at the end of the 19th century.

The lowest was the forest-coverage in Hungary after the First World War: 11.8%. According to the peace treaty of Versailles 1920 Hungary lost 84% of her former forest areas and so the total percentage sank drastically.

The territory of Hungary is presently 93,000 km^2 and the ratio of forests on 1st January 2003 was 19.6% (1 823 000 hectares). The total forest cover is larger, 21%, because the areas obliged for reforestation are also included in here. In Tolna county, where my specific research area is situated, it is 16.9%. All forest areas of Hungary (100%) are generally planned by the State Forest Service. 2/3 of the forests serve economic aims and 1/3 serves the public good, or has protective functions. On 10% of the forests the property rights are not clear. 58.7% of the functioning forests

[2] Note that there is a difference between the term reforestation and afforestation. Afforestation is the plantation of a forest on previously non-forest land-use area. Reforestation means the plantation of young forest on a cut and previously forest land-use area.

are owned by the state and 31% are private property. Gross annual increment[3] and the planned felling amounts exceed well the actual felling, that's why the annual growing stock and the volume of **forests grew steadily in the last decades**. In 1938 the forest ratio was 11.9%, in 1965 15.3% and in 2004 19.7%. The same growth can be observed throughout Europe, so the generalized alarms of environmental bodies, that the amount of forest in Europe decreases, are not founded[4].

Forests play a very important role also as protected natural values. 10% of Hungary is under natural protection and 47% of the protected areas are forests. According to data from 2001 non-native wood species like *Pinus nigra*, *Pinus sylvestris* (except on the skirts of the Alps in Hungary), *Robinia pseudoacacia* and *Populus hybrids* take up 40% of all woods in Hungary while the native species like oak and birch, etc. take up more than 55% of the woods.

II. Changes of woodland in the Völgység, Hungary

After getting acquainted with the forest-processes in the Carpathian Basin and Hungary, I would like to continue with the woodland changes in a smaller region, Tolna county in Southern Hungary: in Völgység. Völgység means valley-land in English and a look at the topography map makes the name clear at the first glance: numerous valleys between lots of mild hills and with small villages blending into the landscape.

The forest conditions of the Völgység changed first significantly during the Turkish Reign as the abandonment and depopulation caused the natural reforestation of the region. The soil shows evidence of the former forests: in most parts the type is a mixture of forest and meadow soil: reddish-brown forest soil can be found under the yellowish-grey meadow soil. After the felling of the early forests the area was cultivated as arable land for a long time that gave meadow characteristics to the upper layers.

Maps form 1783-1784 show the forest state in Völgység: the settlers – with allowance of the landlord – after the Turkish reign started to fell the woodland in the vicinity of the villages and in the milder sloped valley-bottoms. Large, untouched patches of forests are still present at this time though.

The society's need for wood, however, grew throughout the whole country and the amount of forests on potential arable lands fell back drastically. As it can be seen on a map from 1856-1860, interconnected woods do not exist any more and the forest patches are separated from each other by pastures and plough lands in between.

The lowest wilderness-ratio could be observed in the middle of the 20th century as it can be seen on a map from 1953. Wide-spread agricultural fields covered the landscape and only small patches of wood were left. The first reason for the less and less forest is the need of society for wood that could be stopped by authoritical regulations while the second reason was the need for arable land. The latter desire could not be stopped by any legislative regulation so the forest shrunk.

The map of 1987 shows a total change in the land use and in the landscape: the decrease of woodlands stops and turns into the opposite: increasing. The reason for the turn is the new situation of agriculture: not every piece of land is needed for food production so abandoned and not optimal fields can be afforested. The afforestation-species chosen were at first not the very best ones as mainly non-native species

[3] The increment is the amount of wood that is newly produced every year in the forest, basically the growth of the trunks.

4 Resource of data: http://www.fagosz.hu/elemzesek,tanulmanyok

were planted like *Pinus nigra* and *Pinus sylvestris*. In the second phase of afforestation the composition was better as better timber quality *Robinia* as well as mixed native trees (*Acer*, *Tilia*, *Quercus*) were used.

Being aware of the varied topographical features of the Völgység the question of soil-quality arises. For example how was it possible on such a sloped terrain, cultivated agriculturally in so large proportions that the erosion did not cause tremendous harm to the soil? How was the yearly fertility provided? How were the local field roads maintained? The answer is simple to every question: the farming society applied very serious self-regulative rules in order to prevent the declining of soil quality. The steeper slopes were terraced, the intensive cattle breeding provided the yearly genuine fertiliser with no need for any artificial chemicals and the maintenance of the field roads was carried out in communal work. To sum up: even though if the agricultural cultivation was very intensive the loss of the soil was minimal as the soil-protecting measures were carried out continuously.

As it can be seen, in the Völgység dense cover and nearly total lack of forests has occurred throughout the centuries. However the missing of massive surface cover has not caused severe problems in the mild-sloped hill areas, as the maintenance of the landscape was thorough and caring.

Today in the Völgység as well as in the whole of Hungary the careful afforestation of large areas can be carried out. Experts say that a 25%-30% forest coverage of Hungary would be ideal from the ecological point of view, which means that an additional 5-10% could be afforested. In the framework of the National Agro-Environmental Program there are existing plans concerning the afforested pieces of land. These plans determine 8% (7620 km^2) of Hungary for forest plantation and give the exact locations as well.

III. Conditions of afforestation, reforestation and forest management

The only question is how to assist the afforestation, the reforestation and maintenance of existing forests? According to the new EU budget there is ample funding for afforestation of former agricultural land so theoretically the new forest plantation on 8% of Hungary is not a financial problem. On the contrary the funding of reforestation and all forest management tasks are dependent on the yearly budget of the Hungarian government and in bad economic periods like nowadays it usually happens that the state does not pay – or only after severe protests and strikes – for the works that the owners and forest managers have carried out in the previous or the present year.

The possible solution for the funding of reforestation comes from an unexpected direction: the Kyoto climate protocol. A Hungarian private forest owner named Zoltán Buzás has worked out a very interesting method for funding the existing forests[5].

Mr. Buzás claims that the most important "players" in balancing the glass-house gas, CO_2, the old existing forests, were left out of the protocol as it concerns only the new plantations, the afforestations. While countries are obliged to reduce their emission and countries and firms can merchandise with their emission units (European Unit Account-EUA), existing forests that take in all emissions do not get any financial support. Forest owners deliver a certain service for the Hungarian state in absorbing large amounts of CO_2 and they should have the right to get the price for their service, Mr. Buzás claims.

[5] Resource of data: HVG on 17. 02. 2006 at http://hvg.hu/print/20060217kioto.aspx and Fatáj Online 2006. 8. hét at http://www.fagosz.hu/

All plants that photosynthesise take the carbon that builds up their organic materials from the CO_2 in the air. How can the quantity of carbon be determined that forests build into their bodies? From the yearly increment. The increment is the amount of wood that is newly produced every year in the forest, basically the growth of the trunks. The amount of the increment is specific for each tree species and if the yearly increment is multiplied by this specific constant then we get the yearly amount of the CO_2 tied. If we further multiply the amount of tied CO_2 with the international price of the emission unit accounts we get the financial support the forest owners should get for the CO_2 absorption. The total yearly increment in the Hungarian forests is 12 million m^3 wood after which the owners could yearly get altogether approximately 38 billion Euros. The founder of this new method also calculated the possible support for his own 44 hectares forest, which would be 7200 Euros yearly.

Until now the forest owner or the forest manager got the largest income from the felling of the wood so his interest has always been to cut the trees not to plant and keep the forest. The new regulation would be the first one throughout history that would financially encourage the owners to keep their forests in good condition for long periods of time. This would result also in more ecologic felling and maintenance methods: instead of total felling of the hillside the owner would prefer felling of individual trees. The individual felling is much better to the soil as large scale erosion and soil loss is not possible as the forest cover remains basically untouched just a few trunks are cut.

The above mentioned funding method was sent to the Hungarian Ministry of Environment but their answer was, based on the law about the Kyoto protocol, that the protocol does not concern the older existing forests just the new afforestations. Hungary, as a member of the protocol should apply for the alteration of the act as soon as possible.

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