

LAND USE AND ECOSYSTEM SERVICES IN THE HUNGARIAN SECTION OF MAROS VALLEY

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Introduction

Investigation of the social perception of the natural environment is a substantial step in understanding the underlying mechanisms shaping the landscape.

The main objective of our study was to explore how local stakeholders perceive their natural environment by the River Maros and to assess what is important and valuable for them in it. We conducted this evaluation in the conceptual framework of ecosystem services (ESs). We used the definition of the Millennium Ecosystem Assessment, according to which ESs “are the benefits human populations derive, directly or indirectly, from natural and human-modified ecosystems” (MEA 2006).

Based on the results of our previous studies on ESs assessment (see Málovics et al 2011, Gébert et al 2011), we investigated the following questions: 1) What kind of ESs are perceived by local people? 2) Are there any differences between the ESs perceptions of the various stakeholder groups? 3) How local institutions (including norms, rules and regulations) interact with land-use types in the Maros-valley?

Material and Methods

Sampling methods

Environmental valuation methods addressing the role of ESs in society are extensively debated (Hanley-Spash 1993, Marjainé Szerényi 2000, 2005, Kelemen *et al.* 2010, Hein et al. 2006, Kelemen 2011, Limburg *et al.* 2002, Munda 2003, Spash-Hanley 1995, Nagy-Kiss 2011, Vatn 2009).¹ In this recent socioeconomic study we used qualitative methods. Our methodological choices are explained in depth in our earlier papers (see Gébert *et al.* 2011, Málovics *et al.* 2011.) Below we only detail elements of the current methodology which are different to the previously applied methodology. We conducted 60 in-depth semi-

¹ Further reading about the critique of nature's the monetary valuation can be found in CONCERTED ACTION: Environmental Valuation in Europe (EVE) project: <http://www.clivespash.org/eve/publ.html#SJI>

structured interviews with local farmers, members of NGO-s, teachers, hydrology and conservation specialists, foresters and officeholders between February and May, 2012. 33 interviews were taken at the Northern (Maroslele) site, 27 at the Southern (Ferencszállás-Klárafalva) site. University researchers and undergraduate students of the University of Szeged with either social or natural science background took part in the research. Approximately 40 students were trained to participate in the research.

We asked respondents to describe the three topics indicated below both in connection with the floodplain of the Maros and the general surroundings of the settlements (Maroslele, Klárafalva, Ferencszállás): *i*) Present land use patterns and previous changes in the local environment and land use. *ii*) Institutions influencing land use. *iii*) Desirable land use.

Written notes of the interviews were taken instead of sound recording. According to our previous experiences, interviewees were able to talk in a more open way when sound recorders had been switched off. Therefore when quoting an interview we refer to our notes and not recordings. Each interview is indicated by an individual code (E1-33 for the Northern side and D1-27 for the Southern side).

After the interviews, a smaller group (incl. researchers and students) analyzed the notes in pairs through categorization, meaning condensation and interpretation (see Kvale 1996). Results presented below are the outcomes of intensive deliberative process within the research group.

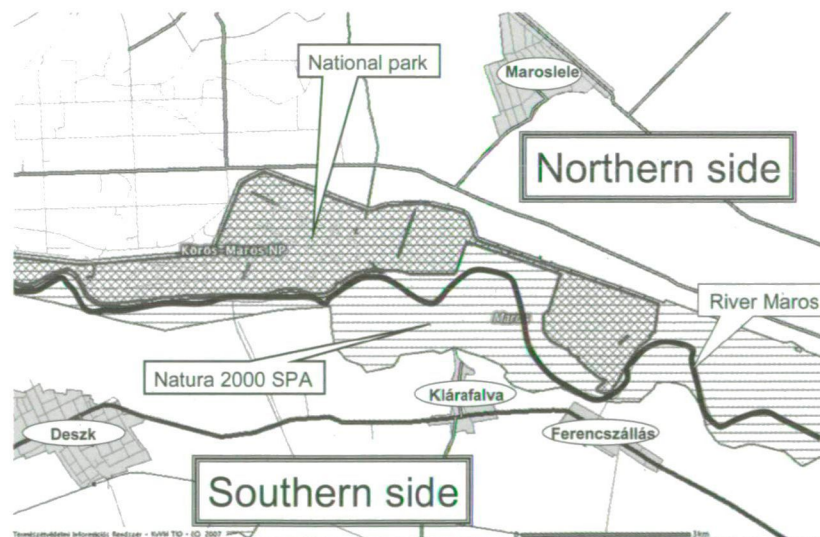


Fig. 1. The study area belongs to the territory of three villages: Maroslele (Northern side), Klárafalva and Ferencszállás (Southern side). Nature Conservation Information System (http://geo.kvvm.hu/tir_en/)

Study area

We conducted our study in the two sides along the Hungarian section of the river Maros: 1) Northern part (right side) of the river: area of Maroslele, 2) Southern part (left side) of the river: area of Klárafalva and Ferencszállás. The floodplain in this area is quite wide covered mainly by forests. The two sides are different in terms of conservation status. The Northern part belongs to the Körös-Maros National Park, while the Southern part is Natura 2000 SPA (Fig. 1).

Landscape history

The Maros Valley has been inhabited since prehistoric times. The landscape was shaped by the river. Various habitats were presented in the floodplains: lakes, backwaters, marshes, gallery forests, reeds and meadows. The rich wildlife provided excellent opportunities for fishing, hunting and herbs-collecting, while the higher and therefore dry fields could be used for agriculture (Blazovich 1993, Gaskó 1999, Marjanucz 2000, Tóth 2000, Sümegi *et al.* 2011).

During the Conquest of the Carpathian Basin (the end of the 9th century) the floodplain along the river was covered by soft and hardwood forests with marshy forests in the higher terrain as suggested by historical overviews of the entire Great Plain (Danszki 1963, Lajtos 2012). According to historical maps, in the Middle Ages several villages were located along the river. Until the 18th century during the larger floods of the Maros the land was covered by 2-3 meters of water, so at this time people travelled by boat between Makó and Szeged (Bálint 1926). By the end of the Turkish Occupation (1541-1686) the Maros Valley had become deserted. This was followed by a period of slow resettlement (Blazovich 1993, Tóth 2000). By the time of the early 18th century the re-settled population lived on animal husbandry, fishing and hunting, and also on salt and wood transportation from Transylvania (Blazovich 1993). Arable farming, viticulture, orchards and vegetable gardens were also common but less important. The energy of the river was harnessed by water-mills, its sand was mined and it supplied drinking-water (Tóth 2000).

A river canalization attempt began in 1754, but in a short time, the Maros returned into its original bed (Paulovics 2002). Then in the middle of the 19th century the river was canalized and the flood protection dikes were built (Blazovich 1993). During the 19th century arable and grassland management was intensifying, the terrain was levelled (Gaskó 1999, Sümegi *et al.* 2011). In the drier areas forests were typically cleared and converted to grasslands and arable fields. Willows in the lower areas were spared to produce twigs and fagots for the dikes (Lajtos 2012). At the end of the 19th century the proportion of arable land increased at the expense of meadows and pastures. This process was promoted by the flood control (Szabó 2002).

One plan for reforestation was prepared in 1875 by Fendt Antal (the ‘forest master’ of Szeged). He suggested planting Canadian poplar in the floodplain, but it is not known how many plantations were implemented (Gaskó 1999). After 1945 forests became state-owned and state-managed. Large-scale reforestation started in the area in the 1950’s. During the 1970s’ incentives were introduced to enhance the production of ‘paper-poplars’ (large plantations of non-native *Populus* hybrids, which grow faster than native *Populus* species) in the floodplain (Lajtos 2012). Oak trees were also planted in the middle of the 20th century according to one respondent; we couldn’t find the exact data of it in the literature. After the transition in 1989, even more *Populus* hybrid forests were planted in the former arable lands, therefore Poplar plantations significantly increased in the overall area (Lajtos 2012).

The formation of the Körös-Maros National Park (1997) and the new conservation legislation led to the efforts to replace the non-native *Populus* hybrid plantations with native poplar and ash species. However this proved to be a difficult task, due to the damage caused by game and some invasive wood species (e.g. *Acer negundo*, *Amorpha fruticosa*, *Fraxinus pennsylvanica*) (Lajtos 2012). Nowadays the floodplain is characterized by forestry and hunting and the area of cultivated land is diminishing (E4). Recent changes in the land use are detailed in the next chapter.

Land use

The important land use types mentioned by the informants were the following: forestry, animal husbandry, agriculture on plough land, gardening, hunting, fishing, tourism and recreation, environmental education. Due to the diversity of our respondents we can give a rather detailed picture from the local perspective about land use of the studied area.²

Forestry

On the N side, in the area between the dikes and the riverbed, the main land use type is forestry. Most of the forests are state-owned and managed by a large forestry corporation: DALERD Zrt. (E9, E33, D19). The area also belongs to the Körös-Maros National Park, because of an old oak forest and seminatural poplar and willow forests with considerable conservation value. A Hungarian Forest Reserve Programme study site is also located here (E5). The formerly more intensive management had to be changed because of nature conservation legislation after 1998 (E5, E20). Not only nature conservation, but also forest management regulations cause difficulties for the foresters, not to mention invasive tree species (E33, E31). Economical constrains are not well received by

² Codes indicate the interview codes.

the stakeholders (E8, D16). There are also some private forests in the area, which are used by following an adaptive management approach according to its owner (E31). Collection of firewood is restricted because of the biological importance of dead wood in the forest – clearly resented by locals (E6, E9, E14). On the S side of the river the forests were established mainly after the great flood in 1970 (D8, D12). These are mainly hybrid poplar plantations, and the short cultivation period is typical (D8, D22). Private owners are present here; they employ staff to manage the forests. (D12). Controlled collection of firewood is possible (D12). Some people think that the forests are being well managed (D14), but others complain of mismanagement (D16).

Animal husbandry

There were herds of horses, sheep and pigs in the seventies in the N side of the river. Pastures were present on both side of the dike (E1, E4, E9). Today the fodder is too expensive, and there is no market for the products (E15, E30, E10). The pastures were converted to forest or plough land. On the S side of the river there were pastures in the sixties (D3, D20, D13) with cows, horses and sheep. The animals were bathed and watered in the Maros (D3, D13). Today only very few people have any livestock remained, mainly around the house (D2, D20).

Arable fields

The soil is very suitable for agriculture; irrigation is possible from the river at Maroslele village (E13, E12, E18, D3). Small scale garlic production is very popular here (E17, E23, E21, E24). In this production system crop rotation is necessary, so produce maize or wheat are grown between two garlic production years (E25). There are very few arable land inside the dike in both side of the river. It is used mainly by the hunters for game fodder production (E6, E7, E13). On the southern side of the river there are some large private farms outside the dike, they cultivate the land intensively, producing mainly maize, wheat and rape (D4, D6).

Gardening

There were orchards and small private gardens in the floodplain in both side of the river formerly, most of them have been abandoned by now (E14, E15, E25, D2, D17). Some people produce vegetables in their garden but much less than earlier (D3, D11).

Hunting

Being very active, the hunting association in Maroslele has quite a lot of members, with even visitors from abroad to hunt (E6; E17, E30). Hunters have conflicts frequently with other land users (especially with foresters) (E6, E9, E30). There is a hunting association also in the Southern side of the river, hunting,

however, is not significant here. The chair of the hunters association and the forestry district is the same person thus resolving of conflicts is easier (D12).

Fishing

Sport fishing is very popular even now (E19), though earlier it was more so. Fish abundance has decreased in the last decades. There is another type of fishing in the river, using fishnet and fish pot. Fishing authority controls both – actually competing – types of fishing (E20, E29). Most of the anglers have a license, but poaching is recorded occasionally, too (E1). In the Southern part of the river, near Ferencszállás a tiny picnic and angling place (“Angler beach”) is a popular community space for local people (D14, E22).

Tourism and recreation

Most of the locals do not go often for walking and picnic to the river and forest (E4, E18, E22, E25, E27, D22). Almost every interviewee mentioned the “Big Tree of Hungarians”, a several hundred years old poplar tree, as a popular destination of excursions before its collapse in 2002 (E3, E12, E19). Formerly tourism and recreation was much more intense (E27). Beside the popular ‘Angler beach’ mentioned above (D2, D8, D14), we also met people who has never visited the river (D20).

Environmental education

The local school in Maroslele organizes regular excursions to the river and the floodplain forests (E19, E17, E27). Conservation and ornithological camps were organized here as well from the 80s’ (E1), while no such activity was mentioned in the Southern part of the river.

Mining

The floodplain and watercourse of Maros is suitable for sand mining. In the northern part of the river, near to Maroslele, large quantity of sand were mined in the last few years for the M43 highway building (E2, E6, E30). Three large sand-mine pits remained to be used as fishing-lake after the flooding, according to the land-owner’s plans. Illegal sand mining was also mentioned (E1). There were also intensive sand mining in the Southern side 15 years ago, but it has stopped (D4, D11). Oil mining is present in the area of Maroslele, but the oil company tends not to disturb the agriculture, forestry or nature conservation (E28, E31).

Inventory of ecosystem services

We present the perceived ESs according to the main categories used in the MEA 2006, i.e. “Provisioning services”, “Regulating services”, “Cultural

services” and “Supporting services” with quotations from the interviews (*in italics*).

Provisioning services

On the Northern side, the most valuable ecosystem services mentioned by the people are “Provisioning services” especially: “Food” and “Fodder”. We experienced a significant difference between the perception of past and present. Most of the interviewees had nice memories from the past, when agriculture was more frequent in the floodland and also a more valuable activity than nowadays. Animal husbandry is also a disappearing “Provisioning service” in the area.

“Until the 80's, there was turf and grass on the floodplain, many of the farmers grew there corn and potato, which were sown late, and could stand the flood” (E1).

“There is onion production on my field. In the old times, we used to farm on the fields after work and grown corn and sugar beet” (E18).

“The area is suitable for garlic. The spring-garlic loves here” (E21).

“Folks were independent from the shops in the old times, because they could grow themselves their own food. We could use better the agricultural capability of the area” (E24).

“Locals are not dealing with animal husbandry anymore” (E17).

People also value timber and some of them mentioned other type of raw materials like sand and thermal water.

“Timber is an important product of forestry. It is worse if people stoke with it at home than fuel power plants with them” (E33).

“There are wrap-material, pallet and boxes, timber made from the poplar grown in the area. It is mostly exported, because there are only a few domestic manufactories for this (E33).

“The locals come to collect dry wood to the floodland, but they already need a license from the forestry for this activity. There is a demand for this very much” (E31).

“There are also oil-pumps in the area” (E31). “MOL is in this area for decades because of oil and gas” (E28).

“There is sand-mining in the floodland” (E29).

“They found thermal-water in this area. We could use this to heat our homes and greenhouses” (E2).

In the Southern side provisioning services appeared also frequently in the 26 interviews especially “Food”, “Timber or other raw materials”, “Energy source, fuel” and “Fodder”. The supposed healing power of the river mud of Maros was also mentioned by one participant. An interviewee told us about a formerly cultivated potato variety, known as the ‘rose potato’, which has already disappeared from the region.

“There used to be some vegetable gardens in the floodplain. It was great, we didn't have to buy everything, people could produce for themselves. I would take back the good old days” (D17).

“There used to be approximately 100 cattle and 300 pigs in the village those days. Now there are just three houses with livestock remained. This part of the landscape deteriorated after the transition, after the closure of collective farms. Brainy people escape from here” (D20).

“Agriculture should be revived, that would solve the problem of unemployment, too. Different co-ops, laboratories, perhaps factories should be established, which could revive this region in terms of many areas. The main cause of neglect here is that nobody has any interest in production, there isn't much money and finding a technology, which doesn't pollute the environment, is hard. There are much more opportunities in this area than we thought” (D9).

“Fishermen from Szeged get all the fish left in the river. They extended their fishing area and they use electricity for fishing. There is no chance (for local people) to catch anything” (D20).

“Sand mining was highly productive approximately 15 years ago. Much more sand could be yielded from the river Maros but there is no demand so those huge machines won't be used needlessly by this fuel price of 450 HUF” (D4).

Forestry and the collected dead wood as “Energy source and fuel” seem to be often emphasized in the interviews.

“Tree plantations are good, because they are tidier and at least we have fuel wood. The area is mainly worthy for afforestation” (D14).

“It isn't good that we mustn't collect the dead wood, everything is wild but it would help many people if they were allowed to take home the firewood. It is because in case it was permitted, people would get not only the logs but also would cut the living trees” (D22).

“In the woods the soil is good, there could be arable lands in areas where forests are cut down. But the trees are always re-planted and it takes too much time for the trees to grow up” (D6).

“This situation's going to be worse. Previously the woods were in the center of the foresters' heart. Nowadays they just get a chainsaw and that's all. It's only the money that counts for the entrepreneurs. Subsidies for re-planting are being stolen” (D16).

“Here are just Populus hybrids, nothing wild and swampy, no bushy parts or grasslands. One part of local people is managing the woods the other part is stealing the wood... Forest is a really good investment nowadays! Wood can be sold abroad for making orange boxes out of them. Nowadays the area doesn't provide the same amount of wood as previously especially because we cut it down too early. It's good that the area isn't protected so we can work in the forests in summertime, too!” (D12).

Regulating services

“Water regulation”, “Flood protection” and “Conservation of nature and biodiversity” are the perceived regulating ES on the Northern part of the

riverbank. Some of the interviewees - especially foresters - mentioned species reproduction. They intentionally left ancient oaks and dead trees for insects to proliferate.

"The irrigating possibilities are not totally used as should be" (E30).

"Irrigating from the Maros is cheap and economical" (E13).

Quotations for "Regulating species reproduction" and "Conservation of nature and biodiversity":

"The avifauna is the same as 30 years ago. It is rich and free from human interference" (E1).

"There is a lot of songbird, raven, black kite, black stork and black woodpecker. There are heron-sites, insects and snails (E16).

"The capability of the area to support games is lower than in the old times because of agriculture" (E6).

"There was 3.5 acre (of an old oak wood), but we cut down in 1992 and left 0.2 acre for insects" (E9).

"The nature is beautiful only if there are living creatures in it" (E30).

"The forest-reservation in the area remained without interference. These are not installed forests, they work as gene-bank" (E9).

"When they grazed the cattle, it was better if there was more species on the meadow. The grass is more fine, and also the milk" (E28).

Most of interviewees from the Southern part mentioned the "Regulating species reproduction", the "Water regulation", the "Flood protection" and the "Conservation of nature and biodiversity". In addition to these ESs, smaller emphasis were given to the "Climate regulation", the "Air quality regulation", the "Pollination" and the "Break down of pollutants" ES. Only a few people referred to the role of the trees in the floodplain in terms of flood protection while many mentioned the dam. Some interviewees recognized that soils are more productive in areas affected by the floodings.

"Woods and plants provide the clean air. The river has a positive effect on the microclimate of the surrounding areas, air humidity is higher" (D15).

"Wood take up waves so the water doesn't wash out the bank" (D14).

"Unfortunately fish aren't abundant nowadays. The trees and the animals are the real values on the bank" (D21).

The pollution of the river was mentioned by many, affecting the possible use and resort of specific ES.

"Previously people could almost drink the water of the river" (D14).

"The evidence of cyanide pollution in the river Tisza has been still apparent in the river Maros. The water of the river Maros looks like the red beet juice because of the tanneries in Romania" (D20).

"I don't like this huge amount of rubbish, previously the river was much cleaner and nicer. I would be happy, if something was done against rubbish" (D11).

The respondents also talked about institutional changes in the area connected with the use of environment.

"The natural shelters for wild animals had been diminishing during the time of the collaborative farms, because the drains had to be maintained due to the regular checks of the water authority" (D7).

"The land is not land anymore but a livelihood for the local people. They are exploiting the environment and everything becomes sterilized" (D25).

Cultural services

Cultural services are another very much appreciated ESs, especially cultural and historical heritage. Many of the interviewees spoke about the so-called "Big Tree of Hungarians", which was a huge poplar on the Northern side floodlands. The surrounding area was a place for social events, like picnics and memorials, until it dried out.

"I am really sorry that the Big Tree of Hungarians has dried out. In the old times, we used to go there often, but unfortunately the road to that place is hardly viable nowadays" (E3).

"I have a lot of nice memories from my childhood about the afternoons spent around the Big Tree of Hungarians" (E19).

"When the Big Tree was fallen, everybody from the locals brought a piece to home as a memory" (E9).

"The hunt of woodcock was banished some years ago, but it had a tradition in Hungary" (E6).

"In the old times the bank of Maros was a community space. We used to go to swim" (E4).

"On the first of May, there was a tradition to gather on the pasture and there was hussar-demonstration and we were cooking in cauldron" (E27).

The "Day of Birds and Trees" was also frequently mentioned when the citizens of Maroslele - especially fowlers - organize a trip to the forests near Maros. The educational value of the forests was indicated related to the school trips.

"There were fowler camps and ecocamps in the area, people come here from the whole country. We made a place for tents and asked permission from the National Park" (E1).

"Fowlers are coming to the area" (E20).

"It is important that the children should get to know the nature, the forests. There are playful competitions for kids during forests-trips and teachers also organize garbage collection" (E25).

"Recreation and ecotourism" is often emphasized in the interviews. The place is especially valued because of recreation fishing and other small family trips.

"I go walking to the rampart with pleasure. I am very sorry that the roads are not in the same state as in my childhood" (E22).

"The most important motivation to go to the bank of Maros is recreation fishing" (E22).

"The Hunting Association organizes trips, also for foreigners" (E17).

"There could be a thermal-bath, like in Zalakaros from the thermal-water found by MOL" (E21).

"People use the forest to sport and trips" (E30).

"The mine lakes, remained from the sand-mining are good for bathe" (E13).

"I would like to build a small fishing-haunt, to have a good time there with friends (E11).

"In the old times, people went to the riverbank more often; there was a built beach with pub. Nowadays, nobody wants to go there, because they are afraid from the strong backwash" (E4).

"Aesthetic values" and the value of "Sense of place" were indicated in some of the interviews, often connected with cultural heritage.

"There is nothing else here, than beautiful landscape" (E33).

"If I can, I go to delight in the landscape" (E15).

"I have warm memories from my childhood, when we went to the riverbank with my little pals and listen to the bird-singing" (E18).

"I like this place, I can not imagine living elsewhere" (E10).

Similarly, for the Southern area, the river and its surroundings are the most important landscape elements for the respondents. Among the Cultural services most interviewees mentioned "Recreation and ecotourism", "Aesthetic values" and "Sense of place". "Cultural, historical and spiritual heritage values", and "Scientific and educational services" appeared with smaller emphasis. Buildings, which became part of the landscape e.g. a church in the floodplain, a small house in an island and an archaeological site as an important element were also mentioned.

"The bank of the river here, in my opinion there isn't any better place than this" (D21).

"Previously people used to swim in the Maros and life weltered there. I would gladly bring back the good old days when we'd gone carelessly onto the pier and were allowed to use nature free" (D17).

"It's only horse riding that comes to my mind as a touristic value, nothing else. This place is not for tourists. I am sorry that this place isn't utilized better, if it was treated well lots of thing could be brought out" (D11).

"This situation won't change because nobody does anything against it, there isn't money for it... to make a living; that's the most important for people, they can't deal with the environment" (D17).

"Living here is better than in a village, which isn't by the river" (D4).

"We were born here, we are going to die here" (D8).

"If the river Maros wasn't here I wouldn't live here" (D13).

“The three most important things are: water, calmness and peace. There isn’t more beautiful than when everything is calm and I can fish by myself” (D2).

Supporting services

Supporting services was the least mentioned type of the four main categories. Interviewees spoke about “Soil formation” and “Nutrient cycling”.

“The area is a good field for fodder, the good soil structure depends on the Maros” (E30).

“There was cattle-breeding, therefore the task of maturing was solved. But it is not so nowadays” (E21).

“With crop rotation the field can renew itself” (E25).

“The forests renew themselves naturally along the river” (E31).

In some interviews from Klárafalva and Ferencszállás, “Soil formation” appeared and the inappropriate management of the soil was highlighted. “Nutrient cycling” was mentioned by one person who knows that dry, dead trees are important for this. “There is really high-quality soil here. If there is a half brick put into the soil, it will be a whole next day” (D3).

“The aim was to cultivate the land in the most efficient way. With our soil we don’t do what we should, and don’t do when we should, but only when we have time for it” (D26).

Comparison of the Northern and the Southern side of the river:

“Food”, “Timber or other raw materials” were the most frequently mentioned categories from “Provisioning services” on the both sides of the river Maros. Less participants mentioned “Energy source, fuel” and “Fodder”, “Genetic resources” appeared on both sides. “Biochemicals, natural medicines and pharmaceuticals” appeared in interviews only on the Southern bank of the river, viz. the healing power of the river mud. There were not big differences about “Regulating services” on either sides of the river Maros. “Water regulation”, “Flood protection”, “Conservation of nature and biodiversity”, “Erosion regulation”, “Regulating species reproduction” and “Air quality regulation” were mentioned in Maroslele. Beside these categories – except “Erosion regulation”- appeared “Climate regulation”, “Break down of pollutants” and “Pollination” in Klárafalva and Ferencszállás.

The most frequently mentioned cultural services were the “Recreation and ecotourism” like horse riding and the “Cultural, historical and spiritual heritage values”, as the “Big Tree of Hungarians” on the Northern side. Fewer participants mentioned the other categories. “Scientific and educational services” - like fowling and school-trips seems to have more significance in the northern bank of the river. According to the interviews “Recreation and ecotourism” and

“Aesthetic values” are the most important for interviewees in Klárafalva and Ferencszállás. “Sense of place” was more frequently mentioned on the Southern side than on the Northern

“Soil formation” and “Nutrient cycling” appeared from “Supporting services” on both sides of the river Maros.

Discussion

The Millennium Ecosystem Assessment (MEA 2006) – as the cornerstone of the sustainability science – was a massive and thorough effort by the scientific and the policy community to explore the impact of the ecosystems and their services on human well-being. As Carpenter *et al.* (2009) states, besides the strengths the MEA exposed “gaps in the underlying science” related to ES and human-wellbeing. “We lack basic information on the dynamics of social-ecological systems and the relationships of ecosystem services to human well-being.” (Carpenter *et al.* 2009.). According to a recent paper by Martín-López *et al.* (2012), ecosystem assessments have been developed by mainly based on biophysical and economic indicators, however, only a few studies focused on the socio-cultural dimensions of ES.

Regarding our results, ES perception in the area was mainly linked to provisioning and cultural services. In other similar studies the most frequently perceived ES were not provisioning, but rather regulating services (Martín-López *et al.* 2012, Agbenyega *et al.*, 2009 and Castro *et al.*, 2011). The history of ES and the negative/positive trends related to these services were recognized. “Provisioning services” are strongly linked to livelihood, husbandry, and reflected the dramatic changes in the last decades. During the socialist period people had a closer connection with the landscape, since much more people got their livelihood from working in the agriculture and forestry in the collective farms. A storyline rising again and again is – it was much better when the landscape was “really used” meaning: when the forests in the floodplain were kept tidier, the drains in the fields were always clean; it was also easy to find people to cut the hay from the bank. In this narrative, “use” meant a more intensive presence of the people in the field. From the end of the nineties nature conservation activity became more influential with a new and strong presence in the area, causing the further “removal” of local people from the landscape. However, it was not able to encourage the other type of ES use, such as is tourism, education or recreation.

“Cultural services” perception was closely related to the people’s attachment toward this area: enthusiastic interviewees talked about the beauty of the landscape, their intense feelings towards the environment, but also a negative trend were mentioned several times about using the cultural services this ecosystem provides. It is important to emphasize the methodological barriers of our study. Our sampling was not representative, therefore we cannot make general

statements about the importance of ES for local people. However, there seems to be definable trends in the interviews and conspicuous differences between the two riverside. Our impression is that in the southern villages closer to the riverbank (Kláralfalva, Ferencszállás), the relevance of ES connected directly to the river was much higher, the closer location of the Southern villages to the river increases the probability of local visitings to the riverbank.

During our research, we also had to face with some methodological and conceptual dilemmas. One of the questions was how to evaluate the man-made objects in the landscape? For instance: is a perceived service – like flood protection - connected with an artificial building - like a dam - one of the ES? In this study we choose to handle these objects as part of the ecosystem, because it is hard to separate the services provided by a man-made and a natural object.

Another dilemma was how to handle the mentioned ESs from the past? Can they be recognized as an ES, in case they are not present anymore? We decided to incorporate past ESs in our inventory, as from the differences between past and present situation, we can identify important storylines about changes of the landscape and ES.

Our research revealed some trade-offs (e.g. provisioning and regulating or cultural ES), conflicts (e.g. between forestry – national park, forestry-hunters, fishermen groups), the effect of local institutions on land-use types, and differences between the ES perception of the stakeholder groups. Detailed discussion of these findings will be presented in a further paper.

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