# Climate-adapted management of the Körös-Maros National Park [1]

Körös-Maros National Park, SE-Hungary, was created in 1997 for the protection of birds. Located in the region consisting of the meandering branches of river Körös and on the Dévaványai, it has a variety of habitats including steppes, remnants of wooded grasslands and marshlands as well as meadows and groves of extraordinary value. The impacts of climate change to these habitats can be great and varied, but also can exasperate the impacts caused by other pressures. To address these impacts, a specific climate-change adaptation management plan (which includes management strategies and measures, restrictions, barriers, indicators, and methods for stakeholder engagement) has been created.

Case Study Description

**Challenges:**

There has already been a change in average annual temperature and precipitation in Hungary and projected changes are expected to pose new threats to the Körös-Maros National Park. Projections indicate an increase in average anual temperature of 2°C for 2021-2050 for the area. These changes will have diverse impacts on the Park's habitats and biodiversity, the extent and timing of which will depend on individual sensitivities to climatic changes, as descfribed below.

*Pannonic salt steppes and salt marshes (1530)*

These habitats are very dependent on the duration of wetting and temperatures, both of which affect salt accumulation and other soil characteristics. Periods of low or no rainfall result in drying of the steppes and marshes (note that there is already a regular trend of drying), while excess summer rainfall may increase leaching of the soil, leading to reducing salt characteristics and thereby degradation of the salt steppes and marshes. Sodic habitats are among the most endangered as they provide special, complex soil conditions that can support both steppic meadow species (due to humus content) and meadow species (due to groundwater effects) and sodic species (due to sodium-salt accumulation at around 1 m depth). If any of these processes/conditions change (becomes stronger or weaker), the habitat composition will change. Variable circumstances and climate extremes, including those as a result of projected climate change, can be beneficial for habitats such as dense and tall *Puccinellia* swards or Annual salt pioneer swards of steppes and lakes.

*Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation (3150)*

As a projected impact of climate change, decreasing rainfall harms hydrophyte vegetation with its levels simplifying as a result of horizontal and vertical degradation. Species number may fall as species with tight ecological tolerance disappear. Species requiring high naturalness state of habitat (*Myriophyllum verticillatum, Ceratophyllum demersum, C. submersum, Utricularia australis, Salvinia natans*) will be at risk of disappearing. The increase of less sensitive species is expected.

*Pannonic loess steppic grasslands (6250)*

As species composition is dependent on annual rainfall; this may be sharpened with projected changes in climate. Decreasing water from wet areas during summer threatens species composition as a result of lowering

groundwater table.

*Alluvial meadows of river valleys of the Cnidion dubii (6440)*
As a consequence of lowering groundwater table, these meadows are at risk of drying out and, in parallel, becoming weedier. Several of their stands rely on a shorter spring inundation.

*Alluvial forests with Alnus glutinosa and Fraxinus excelsior (91E0)*
These habitats are extremely endangered as the water scarcity due to projected climate change might impede the renewal / regeneration of tree and shrub species.

To address these risks, a climate-adapted management plan (CAMP) has been elaborated with the involvement of experts and local stakeholders. General and specific recommendations include: management strategies and measures, restrictions, barriers, indicators and methods for stakeholder engagement.

**Objectives:**
Main objectives are:

- Improvement of the resilience of protected and valuable habitats in the Climate-Adapted Management Plan (CAMP) area;
- Intensification and improvement of stakeholder dialogues within the park;
- Concepts to deal with uncertainties in climate-change projections;
- Integration of climate change scenarios in the management of habitats;
- Improvement and specification of monitoring activities;
- Implementation of an “active adaptive management” approach for the CAMP area;
- Development of exemplary management plans for Natura 2000 Habitats that integrate the latest knowledge about climate change and its impacts;
- Integration of the results of climate modelling and hydrological modelling, for the first time into the management of protected habitats.

**Solutions:**
Several measures have been implemented to deal with the consequences of climate change:

- Maintenance of water regime, solving the problem of water supply and excess water because of neglected waterworks, avoiding too high water level during spring (not to threaten nesting birds and private-owned areas) or summer (enabling mowing and cutback of Typha stands) by directing water into canals towards fishponds.
- Prevention against invasive species. This includes shredding, cutting or harvesting exotic species, banning burning, introducing sheep and /or cattle grazing in some areas (includes selection of proper cattle breeds and times of grazing for optimizing the benefits), avoiding overgrazing in wet areas, mowing, prohibiting the introduction of exotic fish species into the waters.
- Preservation and restoration of river habitats and their connectivity with adjoining terrestrial habitats (lateral connectivity).
- Monitoring water quality in the canals that are the sources of water supply in dry years.

Results of the implementation of these measures are being monitored. However, monitoring has just started and there is no documentation (at the end of 2013) of results available, yet.

**Importance and relevance of the adaptation:**

Case mainly developed and implemented because of other policy objectives, but with significant consideration of CCA aspects.

Additional Details

**Stakeholder engagement:**

Key stakeholders were nature conservation administrations on local, regional and national level, water management administration on regional level; regional tourism associations and research institutions. The partnership consisted of National Park administration along with national nature conservation and water management authorities since they are in the best position to involve relevant stakeholders. Media communication, such as press releases and newspaper articles were produced to bring the issues of the project to the attention of the public and increase awareness. Direct approaches were taken with stakeholders and target groups via fair participation and exhibitions in park information centres. A project workshop brought together local and regional stakeholders to discuss the project topics and results.

As climate literacy is just in its initial phase in the Hungarian rural areas, it was presumed that stakeholders were not overly concerned about climate change topics. It became apparent in the stakeholder engagement exercises for the Climate Adapted Management Plan that stakeholders connect several problems with weather extremes and long-term changes. However, practically no actions are undertaken in favour of mitigation or adaptation. The stakeholder dialogue has broadened the information basis about possible impacts and projected developments of climate change, thus, the relatively low awareness was heightened and the engagement process hopefully had a beneficial side-effect of strengthening their consciousness and willingness to decrease their carbon footprint as well as to adapt to climate change.

The active participation of stakeholders in these processes, including integrating their interests and needs in the development of climate adapted management plans, increased the likelihood for the proposed adaptation and mitigation measures and practices.

**Success and limiting factors:**

The main success factors were the profound knowledge of national park officers and park rangers, and their direct connection to the land owners and users (farmers).

**Budget, funding and additional benefits:**

Coast is about 50,000 EUR for the whole basic study and planning process; source: 85% EU ERDF, 15% national.

Benefits are hard to quantify: although the results of the implementation of these measures are being monitored. Monitoring has just started and there is no documentation of results yet available. Benefits include the maintenance of the water regime, addressing the problem of water supply and excess water; increasing the resilience of agricultural systems; maintenance or recovery of several protected habitats and endangered species; and strengthening local stakeholders' consciousness and willingness to decrease carbon footprint as well as to adapt to climate change.

**Legal aspects:**

Recommendations for the management of climate-induced changes for regional partners were developed in the form of a best practice report, and management strategy guidelines. From the lessons learned policy recommendations were produced which can be useful to inform national and European law with a special focus on the Water Framework Directive and the Natura 2000 framework (Habitats-Directive, Birds Directive).

**Implementation time:**

March 2010 - February 2013.

Reference Information

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**Websites:**
http://www.habit-change.eu [3]

http://www.kmnpi.hu [4]

**Sources:**
Climate Change Adapted Management Plan (CAMP) for Koros-Maros NP areas. Report of the HABIT-CHANGE project, May 2013.

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Experiences of adaptation (multimedia resources)

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Case Studies

Documentary search engine

Other

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**Links**
[1] https://adaptecca.es/en/climate-adapted-management-koros-maros-national-park
[2] mailto:malatinszky.akos@mkk.szie.hu
[3] http://www.habit-change.eu
[4] http://www.kmnpi.hu