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Development of adaptation strategies of marshland water management to regional climate change

Helge Bormann (1), Ahlhorn Frank (2), Giani Luise (3), Klaassen Kirsten (3), and Klenke Thomas (2)

(1) University of Oldenburg, Department for Biology and Environmental Sciences, Hydrology, Oldenburg, Germany (helge.bormann@uni-oldenburg.de, +49 441 798 3769), (2) University of Oldenburg, COAST, (3) University of Oldenburg, Department for Biology and Environmental Sciences, Soil Science

Since many centuries, low lying areas at the German North Sea coast are intensively managed by water boards and dike boards. Sophisticated water management systems have been developed in order to keep the water out of the low lying areas in wet periods, while in some regions additional water is needed in dry periods for agricultural and ecological purposes. For example in the Wesermarsch region, a water management system has been developed in historical times, draining the landscape in winter time by means of channels, ditches, gates, sluices and pumping stations. In contrast, in summer time water is conducted from Weser River into the Wesermarsch region to serve watering of animals, fencing grazing areas and ensuring a continuous flow in the marsh watercourses. Doing so, maintaining soil fertility is guaranteed for agriculture as well as protection against floods, sustaining river ecology and traditional livestock farming. Due to climate variability and river engineering, the water management of the Wesermarsch already runs into problems because watering in summer cannot be assured any longer in sufficient water quality. During high tides, salt water from the North Sea is flowing upstream into the Weser estuary, generating brackish conditions in the lower Weser River. In addition, soil subsidence and soil mineralization of marsh and peat soils as well as the sea level rise increase the necessary pumping frequency and the emerging energy costs. The expected future climate change will further aggravate those problems and require an adaptation of the current management system.

This presentation introduces the concept behind and preliminary results of an integrative and participatory project, aiming at the development of a new water management strategy adapted to the regional climate change likely to occur until year 2050. In close cooperation with a number of regional stakeholders and based on the priorities with respect to the future development of the region, alternative strategies for a future water management were developed. They are based on the stakeholder's picture of their future landscape, describing how the region should look like in year 2050, considering the landscape in general as well as socioeconomic aspects such as land use, employment market and tourism. And they are also based on guiding principles of future water management on which all stakeholders agreed. In comparison with the list of potential measures suggested by regional stakeholders, a concept is presented which was developed by a group of international water management experts from Netherlands, UK, Sweden and Belgium in the framework of a project workshop of the EU-Interreg IVb 'Climate Proof Areas' project. This comparison highlights the impact of setting certain boundary conditions of a future development, i.e. the sustainable development of the future landscape versus keeping the landscape and its cultural heritage as it is now, for example by maintaining the traditional farming system as fundamental precondition for the climate adaptation process. Setting these priorities governs the decision making process and decides whether the focus is set on technical adaptation measures in contrast to alternative land use concepts for a region.