

# Policy Paper

## of the Wadden Sea Forum regarding climate change adaptation in the Wadden Sea Region

### Important Aspects of Surface Water Management in the trilateral Wadden Sea Region

The society is faced by increasing challenges of water management due to climate change.

Possibilities of gravitational drainage of the Wadden Sea Region will decrease due to sea level rise and siltation of outlets.

Conflicts between sectors and interest groups will increase.

Tasks of the water boards will grow beyond recent capacities.

Living conditions will change in the long-term.

Present perceptions about landscapes needs rethinking of the society.



## *Introduction*

Climate change is a fast growing threat impacting the Wadden Sea Region (WSR) with the Wadden Sea World Heritage Site and its hinterland, where people live, work and recreate. The Trilateral Wadden Sea Cooperation has dealt with climate change with regard to coastal protection and adaptation of the ecosystem for many years. Recently, an Expert Group Climate was installed to continue the work on adaptation challenges of the Wadden Sea ecosystem.

A trilateral working group elaborated on coastal protection and sea level rise with a focus on solutions for sustainable coastal protection and the role of spatial planning and sediment management in this respect. Furthermore, a task group climate elaborated an adaptation strategy for the intertidal area.

As an integrative part, the Wadden Sea Forum (WSF) took a closer look on impacts of climate change in the hinterland of the Wadden Sea, emphasizing that climate change is an inclusive challenge for the WSR affecting both the areas in front of and the cultivated landscape behind dikes.

The WSF aims to elaborate on challenges of climate change adaptation within the regional and local society with its socio-economic sectors and stakeholders. The WSF has implemented a workshop on climate change adaptation in November 2018 to start a process of carving stakeholder positions on burning issues. It was concluded that the society must be made more aware that living with increasing risks will become essential, if opportunities for changes are not taken. Adaptation in various fields is needed to avoid unnecessary risks. As the society in general is used to keep their traditions, changes in behaviour and perceptions need to be initiated and supported in a slow but long lasting process. At the end, this will achieve more willingness to strive for new opportunities. In this context, it is crucial to highlight that adaptation means to prepare for both, dealing with potential effects of climate change and taking new opportunities in (integrative) development and management.

## *Background and Aims*

This brief report focusses on one of the, in our view, most important issues: challenges for surface water management of the marsh area of the WSR with regard to climate change adaptation. Rising temperatures and changes in precipitation patterns will affect the region and its society severely. No doubt, besides negative impacts also advantages for several sectors could be the case. Drier and warmer summers would be welcomed by the tourism sector and the extension of growing seasons would be positive for the agricultural sector.



This paper builds on the WSF members' expertise and assessment and focusses on challenges with water addressing challenges of water boards, the agricultural sector, nature conservation and the society with regard to changing living conditions.

The aim of this policy paper is demanding urgent decision-making and the implementation of measures to deal with challenges for surface water management in the WSR with regard to climate change adaptation to its stakeholders and the different political levels in the WSR. Within this paper the WSF members are addressing management options and providing recommendations to be considered in further action on climate change adaptation.

## *Basic principles*

The use of the low lying coastal areas of the WSR is depending on artificial drainage of the surface water for centuries. The embankment of the area with dikes and sea walls required innovative measures in surface water management because the natural run-off was prevented by the dikes. Starting with wooden tubes in early times, drainage management ended up with pumping station of high capacity. Connected to a widely ramified drainage system consisting of ditches, canals and rivers in the hinterland, surface water management serves now as an important backbone for sustainable development in the WSR.

The existing drainage management systems were mainly built in the last centuries and, since then, were continuously maintained and adapted to new challenges. These challenges were mainly caused by economic growth and increasing infrastructure needs for traffic, housing and industrial development. At present, in many areas the existing drainage management systems are reaching their carrying capacity, because of a changing climate and its consequences.

In order to be prepared to meet future needs, the WSF stakeholders discussed with water management experts current and future challenges of surface water management in the WSR. Finally, the WSF identified most relevant challenges in surface water management, which have to be faced by the society and decision makers in governments and socio-economic sectors.

## *Challenges in Surface Water Management by a Changing Climate for ...*

### *... Water Boards:*

The challenges posed by a changing climate are almost the same within the entire WSR. Changes in seasonal precipitation patterns and increased frequency of extreme rain fall events could lead to seasonal draughts as well as to increased hinterland run-offs. Furthermore, a rising sea level will lead to a lower drainage capacity due to increased sedimentation or higher low water levels in front of the tidal gates. Consequently, the capacity of gravitational drainage is reduced or completely lost. Increased sealing of the hinterland by the development of new housing and industrial areas will lead to a faster run-off into ditches, canals and rivers, which will extend these challenges

According to the institutional level the responsibilities and the hierarchical order of the water boards are different in each Wadden Sea country. In The Netherlands large and powerful Water Boards (“Waterschappen”) are responsible for surface water management and coastal defence. These boards have almost the same legislative power as provinces and are professionally organised. In Germany, i.e. Lower Saxony and Schleswig-Holstein, more than 100 drainage boards exist, are self-organised associations managed by laymen and supervised by the regional water administration. In Denmark the municipalities are responsible for climate adaption planning. The landowners are responsible for protecting their own land against flooding. In the marshland the landowners are organized in local dyke associations, who are maintaining the dykes, which is partly supported by financial and, into some extend, technical assistance of the municipalities and the Danish Coastal Authority.

In all regions, conflicts are connected to differing interests e.g. between water management goals and the agricultural or nature conservation aims. Also conflicts with regard to changing landscapes, the perceptions of the society and the tourism sector could arise. Further challenges due to lacking financial support for the adaptation of the existing system to a changing climate as well as missing insurances against flooding have to be tackled, mainly in Denmark and Germany. In The Netherlands the WSF stakeholders also demand for sound decisions by politicians on the available knowledge and expertise.

*... the Agricultural Sector:*

According to surface water management the agricultural sector faces challenges in a way that in winter too much water and during summer sometimes too little water is available. In winter time a reduced drainage capacity can lead to wet land which will not be ready for farming in spring. In a dry summer season there might be shortage of surface water, which cannot be compensated by irrigation and maintenance of adequate water levels in the ditches cannot be secured.

Based on the above mentioned challenges for the water boards the agricultural sector is suffering of the inadequate ability of drainage management. Furthermore, climate change will also impose another threat to agriculture which is connected to ground water salinization in some areas, depending on sedimentological conditions. Due to a changed seasonal precipitation pattern ground water recharge is reduced and, therefore, the natural counter pressure for saline ground water body near the North Sea is reduced. Consequently, a shift of the fresh saline ground water zone is likely to happen, which might have impacts on crops.

The agricultural sector has to deal with consequences of climate change due to water management in various fields. Farmers have to cope with changes in fertilisation, crop rotation systems and soil cultivation. Contractual nature management could be an option to survive.

*... Changing living conditions:*

The living conditions in coastal areas might also change in the future. People have to get used to more water in the WSR during extreme rain fall events and have to be better prepared in such cases. In The Netherlands the slogan "living with water" was introduced to make people aware of the necessity for an adaptive water management. For example, in the province of Groningen many water management projects were implemented to increase the carrying capacity of the drainage management system by installing large retention ponds or creating artificial lakes with housing facilities. In Germany the installation of retention ponds in new housing areas is obligatory. In Denmark, rules by spatial planning in low lying coastal areas are obligatory. "Living with water" should be accompanied by different ways of experiencing and enjoying the landscape.



Besides living with water, the society has to learn perceiving and accepting changed landscapes. Higher or stronger dikes, retention areas, wetlands as nature reserves and other changing landscape features will be results of adaptive water management in the WSR. Also the cultural heritage values might be affected by climate adaptation measures.

Changing landscapes and living conditions are sensitive issues. Information and awareness rising are important measures to reach acceptance within the society.

... *Nature Conservation:*

Changes in surface water management will also have impacts on the development of nature and nature conservation in the WSR. The artificial drainage systems in Germany and The Netherlands have led in the past to different biotope types and habitats along the Wadden Sea coast. A further change in the management of the existing ditches and canals, i.e. maintaining higher or lower water levels, could lead to a loss of existing biotopes but also to a reclamation of new biotopes. Additional changes will affect the biodiversity with a change of species distribution and possibly to an introduction of alien species. According to the EU Water Framework Directive artificial barriers regulating the tidal influence, i.e. sluices and tidal gates should guarantee the migration of the fish fauna.

Adaptation of surface water management could be used to improve the quality of nature areas, by creating new wetland areas, connecting habitats and new collaborations with the agricultural sector.

## Conclusions/Recommendations

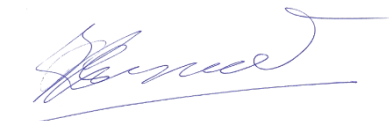
Based on the previous paragraphs the Wadden Sea Forum encourages the responsible administration for surface water management in the four regions of the Wadden Sea area to

- relevant backbones in low lying coastal areas around the Wadden Sea;
- Take the concerns of the local society and stakeholders seriously to get support and acceptance for necessary measures;
- Provide adequate resources to meet the challenges of climate change and water management;
- Increase the adaptive capacity of the regions by stimulating and enhancing cross-sectoral solutions for an improved surface water management in the WSR;
- Use opportunities to enhance the quality of nature habitats and its biodiversity;
- Stimulate cooperation on transnational level to learn from each other;
- Raise the awareness of the coastal society for the consequences and possible changes of a changing climate to the surface water management systems;
- Create “windows of opportunities” by policies to accelerate the climate change adaptation process in surface water management.

On behalf of the Wadden Sea Forum, May 2019



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