

**Annex 6**

**Climate Change Adaptation Strategy**

## TRILATERAL CLIMATE CHANGE ADAPTATION STRATEGY

### INTRODUCTION

The Wadden Sea is an exceptional coastal ecosystem of outstanding universal value. The Guiding Principle of the trilateral Governmental cooperation on the protection of the Wadden Sea is to achieve a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way (2010 Joint Declaration). The principle aims at:

- maintenance of the natural structures and functions,
- conservation of the characteristic biodiversity,
- maintenance of the scenic qualities of the landscape.

Recognizing the fundamental nature of the trilateral Guiding Principle of the cooperation, the participating Governments have adopted in the 2010 Joint Declaration a **common vision** for the Wadden Sea:

*The Wadden Sea is a unique, natural and dynamic ecosystem with characteristic biodiversity, vast open landscapes and rich cultural heritage, enjoyed by all, and delivering benefits in a sustainable way to present and future generations.*

Climate change and enhanced sea level rise may seriously impact structure, functions and the characteristic biodiversity of the Wadden Sea ecosystem as well as the safety of the inhabitants in the region.

The trilateral cooperation therefor aims at, achieving resilience<sup>1</sup> to climate change. Addressing the impacts of climate change as a cross cutting theme within an overall situation of high uncertainty, is a major challenge for the trilateral cooperation.

### THE AIMS

1. The overall aim of climate change adaptation in the Wadden Sea region is to safeguard and promote the qualities and the integrity of the area as a natural and sustainable ecosystem whilst ensuring the safety of the inhabitants and visitors, as well as the cultural heritage and landscape assets and sustainable human use

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<sup>1</sup> The terms resilience and adaptability have a similar meaning. The IPCC has defined resilience as follows:

“The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change. “ (from: IPCC Fourth Assessment Report - Climate Change 2007: Synthesis Report; Annex II; Glossary)

2. The aim of the climate adaptation strategy is enhance and promote policies and measures necessary for increasing the resilience of the Wadden Sea to impacts of climate change. The strategy focuses on the Wadden Sea Area and the adjacent offshore and mainland areas as far as directly relevant for the implementation of seven the basic elements of the strategy
3. The aim of trilateral cooperation in implementing the strategy is to achieve optimal added value by focusing on activities with the highest trilateral relevance, in particular the exchange of knowledge and best practice, the exchange of experts, as well as performing trilaterally coordinated studies and pilot projects covering sites over the whole Wadden Sea.

## THE CHALLENGE

The most important aspects of climate change in the Wadden Sea region are:

1. Sea level rise and storm surges: projections on global mean sea level rise vary among 0.2 and 1.4 m for the period 1990 – 2100. So far, no indication of accelerated sea level rise could be observed in the Wadden Sea. Studies on the future development of storm surges estimate a small to insignificant increase towards the end of this century. Ground water level will rise as a result of sea level rise
2. Precipitation patterns. Due to projected lower summer and higher winter precipitation, fresh water discharge into the Wadden Sea may become more fluctuating with larger extremes. Fresh water availability in the region, especially on the islands (in case they are self-sustainable) may become a critical issue.
3. Temperature: projections indicate that mean annual temperatures in the Wadden Sea region may increase among 2.0 and 4.7 degrees Celsius until the end of this century. Water temperatures in the Wadden Sea are already increasing and are expected to increase further.

Due to the high uncertainty regarding the magnitude and direction of the above climate change aspects, as well as the complexity of geophysical and biological interactions, projections on the direction and magnitude of these aspects still constitute a major scientific challenge. Still, they are highly likely to negatively interfere with the aims for the protection of the Wadden Sea.

Some impacts can, at least qualitatively, already be addressed. As long-term impact, it is expected that not enough sediment will be available to balance enhanced sea level rise. As a result, the Wadden Sea may start to “drown”, resulting in changing structures and functions, flora and fauna as well as the landscape (i.e., from an intertidal to a lagoon ecosystem). Such and other impacts may occur after a certain threshold value, the so-called tipping point, has been exceeded, after which the system is no longer resilient.

Furthermore, enhanced sea level rise will induce/accelerate coastal retreat of the barrier islands, thereby reducing the extension of the back-barrier bays. Without proper management, higher storm surge water levels will impair flood safety of the

inhabitants. Finally, increasing water and air temperatures will cause geographical shifts of species and habitats.

## STRATEGIC OBJECTIVES AND PRINCIPLES

Under the precondition that the safety of the inhabitants is guaranteed, resilience to climate change in the Wadden Sea region may best be achieved by implementing an adaptation strategy that consists of seven basic elements: Natural dynamics, Interconnectivity, Integration, Flexibility, Long-term approach, Site specific approach and Participation. For each element, priorities for implementation are listed that will contribute to a more resilient Wadden Sea region to climate change.

### 1. Natural dynamics

The Wadden Sea ecosystem is more than 5,000 years old and has already endured periods of stronger sea level rise and more frequent and severe storms. In a natural state, sediment redistribution maintains a dynamic equilibrium that makes the Wadden Sea quite resilient to external changes. Thus, allowing and restoring natural dynamics can increase the resilience of the Wadden Sea to climate change.

#### Priorities for natural dynamics

- Evaluate the effects of different measures (e.g. for coastal risk management) on natural dynamics.
- Promote and support management measures that consider, allow and/or support natural dynamics.
- Limit measures that induce negative sediment budgets in the Wadden Sea.
- Evaluate legislation and suggest improvements in relation to this objective.

### 2. Interconnectivity of habitats

The trilateral Wadden Sea forms a central element within the European Green Infrastructure (COM/2013/0249 final along the south-western North-Sea Coast. It provides the necessary interconnectivity of habitats to allow species and communities to follow shifts of climatic conditions in easterly and northerly directions. Thereby preventing species extinction and securing adaptation of characteristic biodiversity far beyond its original borders.

#### Priorities for interconnectivity of habitats:

- Secure and enhance the interconnectivity of habitats, both marine and terrestrial.
- Provide, as much as possible, space for the restoration of habitats lost due to climate change.
- Exchange and communicate practical field experience with restoration measures.

### 3. Integration

Climate change may have an impact on many different Wadden Sea ecosystem features and elements, human activities and interests, at various spatial and temporal scales. It is important to recognize that climate change is a cross cutting theme. Therefore, dealing with impacts of climate change requires an integrative approach across borders, disciplines, sectors and administrative layers (ICZM).

It concerns, first of all, the sectors and disciplines dealing with coastal risk management, nature protection and spatial planning. For measures that may have an impact across national borders, for example large-scale sand extraction and suppletion, trilateral cooperation and coordination is a necessity.

#### Priorities for integration

- Promote and support trilateral pilot projects on integration of disciplines and sectors, including administrative layers.
- Promote and support integrative measures for increasing the Wadden Sea resilience.
- Continue and further strengthen TG-C activities, including exchange of best practices.

#### **4. Flexibility**

There is considerable uncertainty about climate change and its impacts regarding direction, timing and magnitude (e.g. plausible sea level rise projections vary among 0.2 and 1.4 m). These uncertainties require a flexible approach with regard to Wadden Sea policy and management, as well as close contacts with the scientific community. So called “no-regret-measures” may contribute to a flexible approach that considers uncertainty. An adaptive management consisting of such measures should be beneficial even if the expected development does not happen, for instance if sea level rise turns out lower (or higher) than anticipated. ‘No regret’ should also be applied concerning the natural values and the integrity of the Wadden Sea. Further, flexible approaches contribute to the ability to adequately and timely respond to new information regarding actual and projected changes in drivers and impacts (adaptive management). Finally, flexibility means that measures should be adaptable to new circumstances. It is important to improve our insight in possible ‘tipping points in time’ that require principle choices, and that may influence our opinion on no-regret measures that we plan on the short term.

#### Priorities for flexibility

- Develop policy guidance for adaptive management under different climate change scenarios, focused on each tidal basin of the Wadden Sea.
- Optimize and secure the Trilateral Monitoring and Assessment Program (TMAP) for rapid feedback regarding climate change issues.
- Support trilateral scientific and planning cooperation on climate change adaptation (drivers, impacts and no-regret measures) as part of adaptive management.
- Evaluate to what extent legislation may limit climate change management.

#### **5. Long-term approach**

Climate change and accelerated sea level rise are gradual processes that need a long-term management approach. Further, adaptation measures include, amongst others, infrastructural works and ecosystem engineering both of which generally require long-term planning and have long life-spans. Finally, adaptation measures may interfere with traditional coastal defense or water management policies and thus raise public concern. Changing traditional views and feelings probably requires at least one generation of communication and dialogue.

Long-term policy and strategy horizons should not lead to static approaches. With reference to flexibility (see above), the chosen instruments should be able to adapt to new knowledge and diverging natural and cultural developments. Hence,

periodic updating should be implemented with the possibility of adapting policies and strategies to new knowledge and developments.

#### Priorities for a long-term approach

- Promote the inclusion of climate change adaptation management as a central issue in long-term spatial planning and relevant policies and legislation
- Investigate and promote the implementation of so called bench marks for action with respect to future developments in long-term planning.
- Support the option to promptly enhance long-term policies as appropriate.
- Provide advice on the implementation of the Wadden Sea Plan regarding these priorities.

### **6. Site specific approach**

Both the challenges of climate change and optimal adaptation may differ throughout the Wadden Sea region. For example, a northward shift in storm wind direction may lead to higher storm surges in the Netherlands and Lower-Saxony, but to lower storm water levels in Denmark and Schleswig-Holstein. Further differences may result from locally varying historical perspectives and cultural heritage. In order to secure local resilience, on the basis of a common knowledge base, site-specific “tailor-made” solutions should be developed.

#### Priorities for local adaptation

- Promote, support the development of a common knowledge base that can be drawn upon locally and communicate these solutions broadly for eventual application at other sites.
- Promote and support the development of site-specific “tailor-made” solutions, Evaluate site-specific solutions from the trilateral perspective of the Strategy

### **7. Participatory approach**

Participation of stakeholders by providing information and securing active involvement is one prerequisite for the successful introduction of adaptation measures. This is due to the sensitivity of issues dealing with the safety and well-being of the inhabitants of the Wadden Sea region. This sensitivity, combined with traditions and the need for long-term planning of adaptation measures, call for communication and participation strategies and instruments like the Wadden Sea Forum. Active involvement should lead to awareness for the challenges of climate change and acceptance of adaptation measures (“common ownership”).

#### Priorities for participation

- Strengthen the cooperation with the Wadden Sea Forum on communication and participation regarding climate change adaptation.
- Include climate change adaptation in the overall trilateral communication strategy.
- Support the International Wadden Sea School in developing relevant education material.

## **IMPLEMENTATION**

The focus of the implementation of this Strategy will be on activities with trilateral added value, in particular to

### **Best practice**

- Evaluate the effects of different measures (e.g. for coastal risk management) on natural dynamics.
- Secure and enhance the interconnectivity of habitats, both marine and terrestrial.
- Continue and further strengthen joint activities, including exchange of best practices.
- Promote and support trilateral pilot projects on integration of disciplines and sectors, including administrative layers.
- Evaluate site-specific solutions from the trilateral perspective of the Strategy.
- Promote and support the development of a common knowledge base that can be drawn upon locally and communicate these solutions broadly for eventual application at other sites.

### **Policy and management**

- Support trilateral scientific and planning cooperation on climate change adaptation (drivers, impacts and no-regret measures) as part of adaptive management.
- Promote the inclusion of climate change adaptation management as a central issue in long-term spatial planning and relevant policies and legislation
- Investigate and promote the implementation of so-called bench marks for action with respect to future developments in long-term planning.
- Support the option to promptly enhance long-term policies as appropriate.
- Provide advice on the implementation of the Wadden Sea Plan regarding these priorities.

### **Monitoring and assessment**

- Optimize and secure the Trilateral Monitoring and Assessment Program (TMAP) for rapid feedback regarding climate change issues.

### **Communication and education**

- Exchange and communicate practical field experience with restoration measures
- Strengthen the cooperation with the Wadden Sea Forum on communication and participation regarding climate change adaptation
- Include climate change adaptation in the overall trilateral communication strategy.
- Support the International Wadden Sea School in developing relevant education material.

For the monitoring and evaluation of the implementation of the Trilateral Climate Change Adaptation Strategy, a trilateral expert group will be installed. This group will also closely follow national developments and exchange experiences and expertise and provide advice on climate change policies on the basis of best available knowledge and overall risk analyses.