

CLIMATE PROOF AREAS

TIME TO ADAPT



Time to adapt - 8 pilots that show you how

Work Package 2 report
September 2011

Find out more about the
pilots on the website.

www.climateproofareas.com



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ABBREVIATION LIST

| | |
|---------------------|---|
| NSR | North Sea Region |
| RSPB | Royal Society for the Protection of Birds |
| Wildlife Trust BCNP | Wildlife Trust Bedfordshire, Cambridgeshire, Northamptonshire, Peterborough |
| WP | Work Package |

1. INTRODUCTION

During the Climate Proof Areas (CPA) project the partners jointly developed and tested various adaptation measures through eight innovative pilots. There were three categories of pilot activities demonstrating approaches to regional climate adaptation:

- ▶ Feasibility studies
- ▶ Pilot implementation plans
- ▶ Investments.

The main results are described within this brochure.

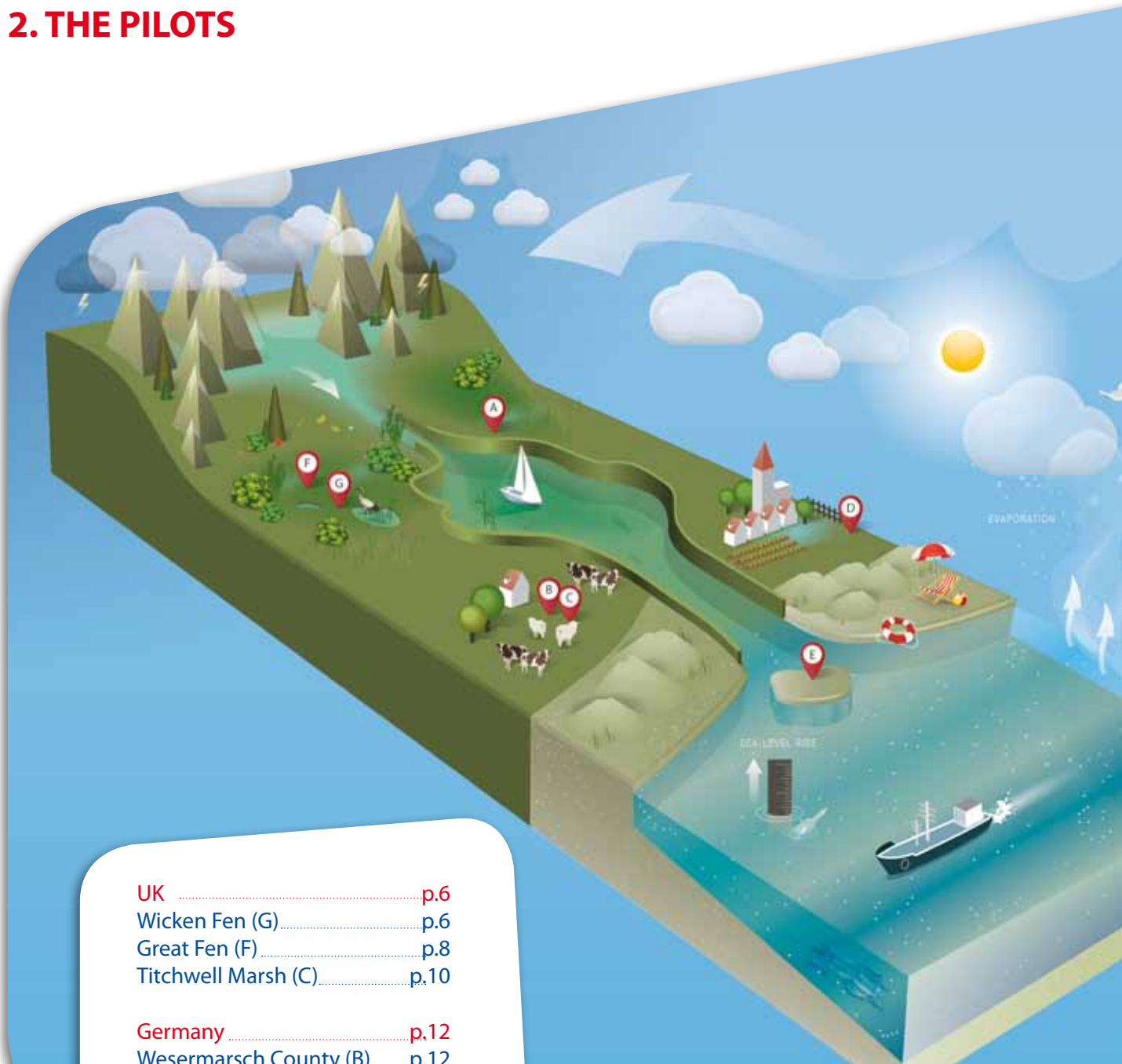
All partners' pilots were undertaken with extensive stakeholder engagement on both a local and regional scale. Results and lessons learnt from earlier EU-projects dealing with related subjects were also considered.

During the Climate Proof Areas project the partners, who were from across the North Sea region, were in frequent communication and held regular meetings discussing the process, the challenges and the results of their pilots. In doing so the different European/North Sea regions inspired each other and learned much from each others approaches.

The pilots are located in a variety geographical locations; upland hills, lowland fens and polders, and intertidal areas. They also focused on various aspects of climate change; flooding, sea-level rise and drought. In order to gain a greater understanding of the similarities and differences of the various pilots they have all been placed within the water cycle. See opposite.

The main conclusions and recommendations from the pilot sites are described in this brochure. The recommendations were also used for the Memorandum of Understanding (WP3) and all pilot sites provided tools for the toolkit for climate adaptation (WP4).

2. THE PILOTS



schematic representation of the pilot projects and the water cycle

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2.1 UK

2.1.1 Wicken Fen

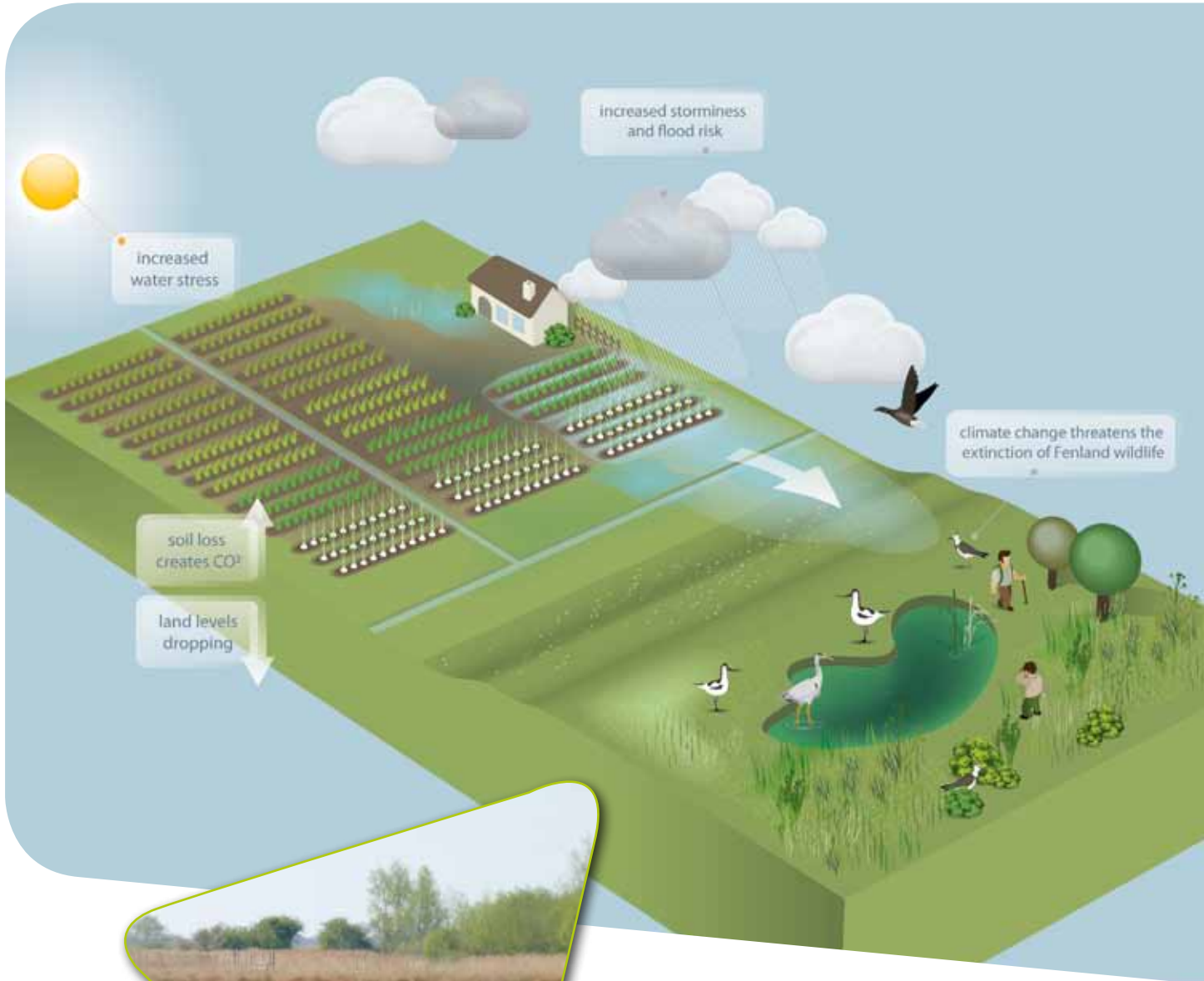
Wicken Fen was the first nature reserve to be owned by the National Trust; acquired to safe-guard its rare and unique sedge and peat habitats and the unique wildlife communities they support. The reserve now has over 8400 recorded species; many of these are Red Data Book and Nationally Scarce species. Wicken Fen is used and enjoyed by over 50,000 people per year.

In the 1990s it became clear that climate change could have a huge impact over the coming decades with predicted summer droughts and rises in temperature, leading to a loss of wet conditions in summer and so making many species vulnerable to local extinction. The only way to truly climate proof this unique reserve was to expand it massively; creating new areas and opportunities where species would have room to create sustainable populations. The CPA study has focused on the re-creation of fen habitat using low cost non-engineering, sustainable solutions to assist the long term survival of species threatened by the adverse effects of climate change.

Climate adaptation measures:

- ▶ Construction of a low level earth bund designed to retain the water which will be abstracted from the local waterways during the wetter winter months.
- ▶ Extensive grazing project, using free roaming herds and a grazing study to look at the effectiveness of extensive grazing as a sustainable long term tool for habitat creation.





2.1.2 Great Fen

The Great Fen Project lies on the western edge of the Fens, a flat landscape around the Wash in East Anglia and encompasses two National Nature Reserves – Holme Fen and Woodwalton Fen. The project partners have a visionary plan to transform in excess of 3,000 ha of land into an area of wildlife-rich and publicly accessible fenland landscape. The project will also provide improved flood-risk management to protect surrounding land and property. The CPA work built on previous technical investigations and examined the engineering implications of habitat creation and flood-risk management. Restoration work during the pilot period has shown that valuable habitat can be developed in a short period of time.

The CPA project has helped the partners develop plans for climate resilience by identifying the need to refine the spatial arrangement of wildlife habitats and by indicating how flood-risk management can protect Woodwalton Fen and surrounding land as well as provide locations for storing floodwater for use in drier months.

Climate adaptation measures:

- ▶ Habitat restoration by transforming arable land into wetland
- ▶ Options for floodwater storage





2.1.3 Titchwell Marsh

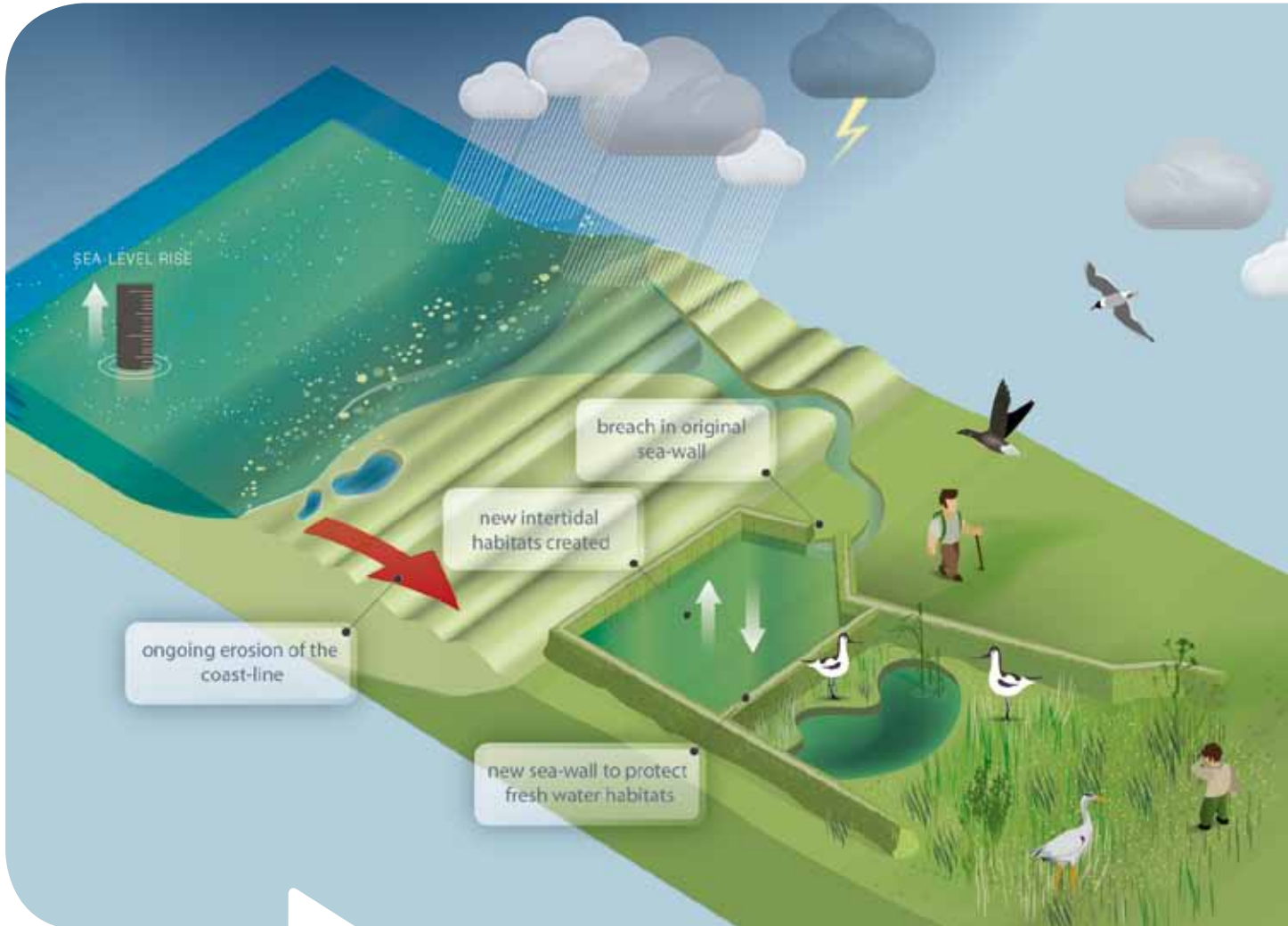
Titchwell Marsh is an RSPB wetland nature reserve on the North Norfolk Coast of the UK, currently threatened by a combination of ongoing coastal erosion and future climate change. A managed realignment scheme is being undertaken to protect the majority of the internationally important freshwater habitats whilst allowing the coastal habitats space to evolve.

The focus of the CPA project has been to ensure that visitors have access to the new managed realignment scheme as it provides an unparalleled opportunity to communicate the benefits of adaptation methods like managed realignment to a wide audience. The new Parrinder Hide, a key deliverable of the project has been completed (in December 2010) and it is now being used by the public. The managed realignment happening at Titchwell Marsh will be breached autumn 2011 and the Parrinder Hide will allow unprecedented access for the public to see and understand the development of a managed realignment scheme. The Parrinder Hide offers the opportunity to show and educate a large number of visitors (circa 80,000 per annum) about the effects of climate change and the benefits of managed realignment. The hide, built into the new sea wall, enhances the value of the realigned area and ensures the nature reserve remains accessible and attractive for visitors after the managed realignment scheme has been completed. This is likely to make the implementation of other schemes around the coastline easier, as some of the fear and concern that can be generated by adaptation measures like managed realignment will be eased as people have easy access to a real life example.

Climate adaption measures

- ▶ New visitor facilities that allow access to a managed realignment scheme,
- ▶ Interpretation that communicates the importance of climate adaptation measures to a wide audience.





2.2 Germany

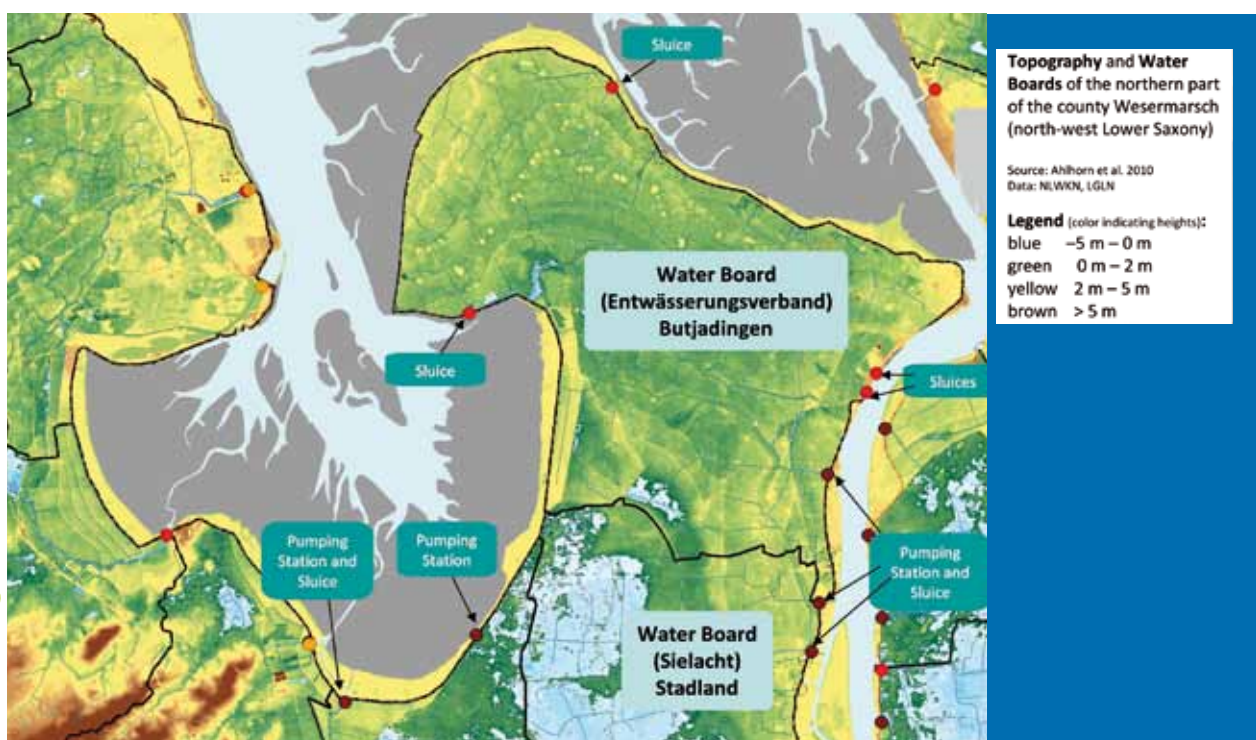
2.2.1 Wesermarsch County urban and rural pilot

About 92,000 people live in the coastal county of Wesermarsch located in the Northwestern part of Germany. The area (822 km²) has a mostly rural character except for the small ports Brake, Elsfleth and Nordenham which are located alongside the estuary of the River Weser.

Agriculture is the predominant type of land use (95%) which mainly consists of grassland (90%) for dairy farming. Crop farming (maize) for bioenergy purposes is getting more prominent recently. In order to protect the region against storm tides, dikes were constructed which have been continuously heightened over the last centuries. The traditional water management system is designed to serve two needs (i) to drain rain water which could result in flooding in winter and (ii) to countervail water deficits in summer time thus preventing local droughts in the area. In addition, salinisation of surface and groundwater bodies is an increasing problem. All these problems are expected to become more severe in the future, due to the likely impacts of climate change (e.g. sea level rise, variation of precipitation over the year).

CPA catalyzed to constitute a regional forum comprising local stakeholders relevant in decision making. The members identified water management to be the most crucial aspect of climate adaptation in the Wesermarsch. An inventory of recent water related problems was compiled and the impact of regional climate change on the hydrological cycle was assessed using hydrological model based scenario analysis.

Within this regional forum two focus groups were established in order to develop possible and complementary water management adaptation options on specific pilot areas, i.e. "Wesermarsch rural" and "Wesermarsch urban". The ideas developed for both pilot areas were merged into a joint vision on the future of the Wesermarsch water management.





Climate adaptation measures:

- ▶ Scenario and model based analysis on the impacts of climate change on the regional water cycle.
- ▶ Establishment of a regional forum which is expected to continue working on closely connected issues after CPA has been finished.
- ▶ Establishment of participatory focus groups developing portfolios of possible adaptation measures as basis for a regional adaptation strategy in rural and urban environments.
- ▶ Joint vision on the future of the Wesermarsch water management for the year 2050.

2.3 Sweden

2.3.1 Arvika

Arvika, a municipality with approximately 27,000 residents is located in the southwestern part of Sweden. This urban area is idyllically situated by the shores of a small bay on Lake Glafsforden, which discharges to the North Sea.

In November 2000 after an autumn of excessive precipitation when as much as three times the normal amount fell, the water levels rose more three meters above the average. Roads and railways were closed, people were evacuated and the water caused enormous damage. More recently extensive amounts of rain have caused great problems when they drained into the storm water system resulting in hundreds of basements being flooded.

Within the CPA project local climate scenarios have been developed to help enable the public infrastructure to adapt to a changing climate. New data, specifically produced for Arvika about the future climate, has been used when simulating the potential impacts on the storm water system in Arvika's urban areas. This has also helped when producing an inundation map for the area. The results show a great need for investments in the storm water system in order to meet future changes in rain intensities. The storm water simulation results and inundation map form an important basis for future dialogue with local politicians and stake holders when deciding how to take action.

To protect Arvika from future floods, the municipality has advanced plans on establishing a flood barrier in the strait between the bay and Lake Glafsforden. The barrier will be mobilized when the rise of the water level in the lake indicates a flood situation. This is now a case at the Environmental court .

Climate adaptation measures:

- ▶ Flood Barrier between bay and Lake Glafsforden
- ▶ Inundation map
- ▶ Models of stormwater system as a basis for ranking and planning measures and for communication.
- ▶ Multidisciplinary stormwater group





2.4 Netherlands

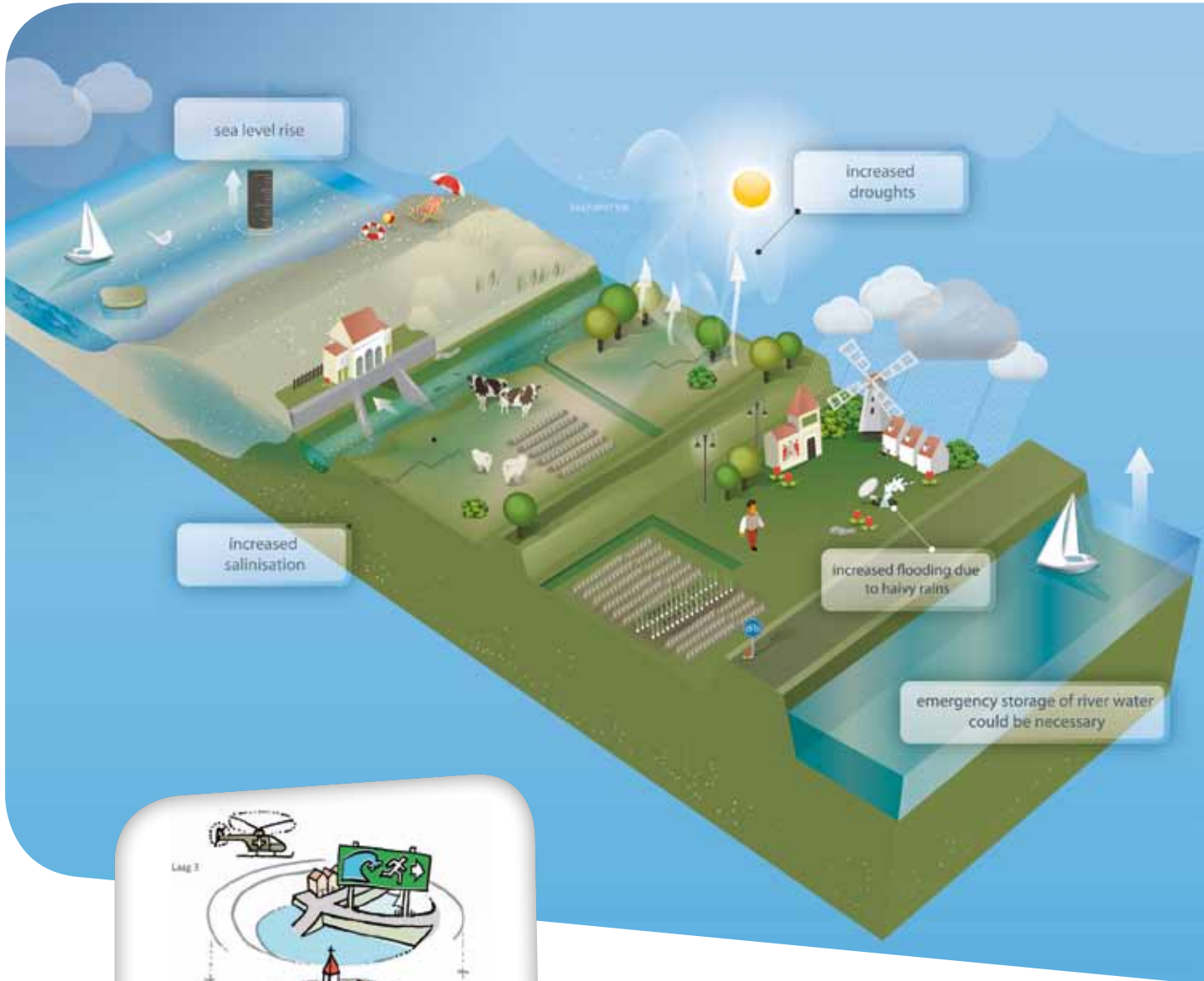
2.4.1 Schouwen-Duiveland

Schouwen-Duiveland, is situated in the South-western delta of the Netherlands. Three large stretches of open water surround the island: the turbulent North Sea, the Oosterschelde, former estuary and the salt water lake, Grevelingenmeer. The island is home to approximately 35,000 people who live in a small-scale social structure. The villages and the historic towns of Zierikzee and Brouwershaven lie in an agricultural polder landscape. An extensive area of dunes along the North Sea and high dikes along the delta protect the island from flooding. Climate change will impact the island of Schouwen-Duiveland in many ways. Climate Proof Areas is identifying how the island can adapt to the changing climate (climate adaptation). Within the project the main effects of climate change were identified as; sea level rise, extensive droughts, more heavy rainfall and rising temperature. We discovered that by relating them to topical issues, practical solutions for climate adaptation can be created. Schouwen-Duiveland is affected by salinisation in times of drought. It seems that the island would be better off using the annual precipitation excess to provide fresh water. In the long term, major changes are required to the dikes. These changes must also be considered now, because the space for dike reinforcements must remain available. Pilots show that dike reinforcement can be attractively combined with other spatial wishes. Climate adaptation is a continuous process that has already started.

Climate adaptation measures:

- ▶ Development of agriculture on saline soil
- ▶ Local water storage for agricultural use
- ▶ Multifunctional use of the coastal zone (dikes and dunes), climate proof designing
- ▶ Multi-layer security approach : 1. Prevention of flooding by sea-defences; 2. Avoiding casualties and damage when flooded by smart spatial planning; 3. Contingency plans and well organised disaster management in case of a flood. All three together produce areas and communities resilient to flooding. A more flood proof and robust road infrastructure in combination with water defences and inland dikes is proposed to for the long term (2050 -2100).





Multilayer safety
illustration by Christa Jesse

2.4.2 Oosterschelde

The Oosterschelde, a former estuary in the south-western delta of the Netherlands is the largest Dutch National Park, and has been designated as a Natura 2000 site. At low water, thousands of birds forage on the intertidal mud flats and sandbanks and then as the tide rises, they retreat to the local salt marshes.

The Oosterschelde is not only very attractive to birds, but also to water sports enthusiasts and fishermen. However the valuable intertidal flats, sandbanks and salt marshes in the Oosterschelde are slowly disintegrating, at least 50 hectares of these intertidal areas are lost every year. This dramatic loss is being caused by erosion which has developed as a consequence of the construction of the storm-surge barrier and compartmentalization dams. In the future this situation is predicted to get worse due to rising sea levels, which are a consequence of climate change. If no action is taken, 90% of intertidal areas will disappear by erosion. In 2075 only 1500 hectares of the original 11,000 will remain.

Within the CPA project pilot trials are being carried out in order to establish the best way to protect these valuable intertidal areas against erosion, to safe guard them for coastal protection and retain their important ecological value.

Climate adaptation measures:

- ▶ Sand nourishment on the intertidal areas
- ▶ Saltmarsh defenses, oyster beds and hanging intertidal flats against erosion
- ▶ Connecting former intertidal areas again to the Oosterschelde in order to restore the habitat



NOV 2008

OKT 2009

18

OKT 2010





3. Lessons learned from the pilots and transnational cooperation

As well as all the specific aspects and lessons learned through the delivery of the pilots we have also learned some more generic points of interest.

We discovered that:

- ▶ There's a lot of uncertainty about climate change, so climate adaptation projects need a tailor-made process.
- ▶ Climate change is not just a long term process. Climate change already causes problems, like drought or heavy rainstorms, which will get worse in the future.
- ▶ People tend to think in 'available money' and in 'political time frames' (until the next election), rather than in climate or geological times scales.
- ▶ Despite available knowledge on possible future changes, economic development is often prioritised compared to climate adaptation requirements.
- ▶ Climate is just one of many drivers and is often not seen as the most important one.
- ▶ Suitable regional and local knowledge on climate change impacts is essential to make progress in the climate adaptation process.
- ▶ Decision makers like to stick to one scenario rather than to be confronted with uncertainty in the future.
- ▶ Once the stakeholders understood the problem it made acceptance of the solution much easier

So to encourage acceptance of climate adaptation measures we recommend to:

- ▶ Focus on climate adaptation rather than to climate change.
Start now.
- ▶ Because of the uncertainty, it's important to take resilient measures. Resilience is the key-word in climate adaptation.
- ▶ Get agreement on common principles of climate adaptation.
- ▶ Seek a sustainable solution that's both holistic and integrated.
- ▶ Integrate a Climate Adaption Assessment in every spatial or water management plan.
- ▶ Adapt your communication strategy: be honest about the uncertainties and downscale to regional or local level. Provide local examples.
- ▶ Spend time making sure stakeholders really understand and accept there is a problem first, rather than just presenting them with a solution.
- ▶ Using small pilot projects as demonstration sites. They can show in relatively short time the benefits (e.g. creation of habitats).
- ▶ Connect the subject of climate change to local themes and projects.
- ▶ Create alliances to get the problems on the political agenda.

**Find out more about the
pilots on the website.**

www.climateproofareas.com



What is Climate Proof Areas?

Climate is changing and Europe needs to adapt. Scientists and civil servants from Belgium, England, Germany, Sweden and the Netherlands united in one project: Climate Proof Areas, funded by European North Sea Region Program. Their goal? Creating safer, more natural and more prosperous land use options for future development.

Thirteen partners from these five different countries joined forces to develop new and innovative methods and help render threatened areas 'climate proof'.

Since 2008, the team has gained insights on:

- ▶ the regional effects of climate change on the North Sea Region
- ▶ the implementation of innovative measures in 8 pilot sites
- ▶ recommendations for gaining political support
- ▶ the necessary tools for building your own climate proof area

Please visit our website to find our results ...
Time to adapt!



