Climate-ADAPT— Sharing adaptation information across Europe

European Climate Adaptation Platform

Climate-ADAPT

10 case studies

How Europe is adapting to climate change

European Environment Agency

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Introduction

This unique collection of 10 European case studies showcases measures that are already being carried out in Europe to increase resilience to extreme weather and slow-onset events, as well as improve adaptation to climate change. Sharing these ideas will raise awareness of what is possible and inspire the creation of new activities to deal with observed and expected climate change impacts. The brochure also aims to stimulate stakeholders to share information about their own experiences by contacting climate.adapt@eea.europa.eu.

Climate change adaptation policies and actions are increasingly being developed and implemented at EU, transnational, national and urban level. Case studies play an important role in supporting local and regional decision-makers in their efforts to cope with the effects of climate change by demonstrating the implementation of real adaptation measures. These measures are often initiated to meet a range of policy objectives and bring co-benefits, such as habitat restoration, preserving biodiversity, urban redevelopment, improved health and well-being in cities, and disaster risk reduction, as well as climate change adaptation and resilience.

More details of these and other case studies can be found on the Climate-ADAPT website (http://climate-adapt.eea.europa.eu/). They cover a range of sectors including agriculture, biodiversity, buildings, coastal areas, disaster risk reduction, energy, financial, forestry, health, transport, urban and water management. They also cover many different impacts (drought, extreme temperatures, flooding, sea level rise, storms, water scarcity), various European transnational regions and a wide number of countries.

Sectors

- Agriculture
- Biodiversity
- Buildings
- Coastal areas
- Disaster risk reduction
- Energy
- Financial
- Forestry
- Health
- Transport
- Urban
- Water management

Impacts

- Droughts
- Extreme temperatures
- Flooding
- Sea level rise
- Storms
- Water scarcity

New locks in Albertkanaal in Flanders, Belgium

The Albert canal in eastern Flanders is an important economic waterway but it experiences rare periods of low water flow, during which it is then less suitable for commercial shipping. As a consequence of climate change, the Meuse basin, which includes the canal, is projected to experience more frequent and longer periods of low water flow. This could have economic implications.

The Albert canal connects the industrial zones around Liège with the harbour of Antwerp. Ships can access both ends of the canal: via the River Scheldt to the Netherlands and via the River Meuse to France. It is an economically important waterway for Belgium, with a total traffic of 40 million tonnes/year. It also helps reduce the number of trucks on the highways by some 6 000 trucks/day, and results in less air pollution and congestion. In some, currently rare, cases, the discharge of the River Meuse is not enough to feed all the canals in Flanders and the Netherlands. During these periods, the low water level of the Albert canal means that the draft allowed for ships has to be reduced, making inland navigation less attractive as a mode of transport.

Overview of the four Archimedes screws installed in one of the six lock systems.
The last screw on the right is equipped with a casing to avoid harming fish.

The solution to this challenge was to install large Archimedes screw pumps at six lock systems. In the case of a drought, water is pumped upstream to replace the water lost by the ships passing through the lock. In the case of an excess of water, mainly in winter, the pumps are used as a bypass and also generate hydroelectricity. The screws are also designed to enable fish to migrate freely. The first four screw pumps (4.3 m diameter, weighing 85 tons) were installed in the Ham lock system in 2012, and three screws were installed in Olen in 2013. Further screws will be installed in the lock systems of Hasselt, Genk, Diepenbeek and Wijnegem over the next few years.

Energy

The cost of installing the screws is about EUR 7 million for each lock system. The benefits include ensuring navigability of the canal under changing climatic conditions, reliability of the canal for shipping and electricity generation. A hydrological and economic analysis, including climate change, concluded that on an annual basis more energy will be generated than used. The exact annual amount of power generated will depend on the amount and distribution of rainfall over the year, the future shipping intensity and the amount of withdrawal by other water users. The net effect on greenhouse gas emissions over time will depend on these same elements, but is generally favourable.

Transport

Water management

Droughts

An Archimedes screw in production.

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Barcelona trees tempering the Mediterranean city climate, Spain

Barcelona's main climate change challenges include temperature rise, a decrease in rainfall and an increase in extreme events such as droughts and heatwaves. The high urban density of Barcelona can exacerbate the heat island effect. Barcelona has committed to becoming a global model of a sustainable city in response to the urban development challenges related to climate change. For many years, Barcelona has had a focus on planting and managing trees. Trees can moderate the urban climate by cooling it in two different ways. Reflection of sunlight and transpiration by the leaves lower the air temperature, and shade reduces the surface temperature and protects people from the sun, especially during the hottest months. Furthermore, trees can prevent local flooding by helping to reduce the amount of stormwater runoff.

Besides climate-related benefits, city trees can also provide co-benefits: removing air pollutants, storing carbon, reducing noise pollution, regulating humidity and balancing the water cycle, creating ecological connectivity, providing habitat for urban biodiversity and creating a pleasant urban landscape.

Green corridor at Passeig the Sant Joan, Barcelona.

Plant stratification in the Parc del Laberint d'Horta, Barcelona.

Barcelona's Green Infrastructure and Biodiversity Plan 2020 (BGIBP) seeks to connect various areas of the city with green infrastructure. In line with the BGIBP goals, Barcelona's Tree Master Plan for 2017-37 identifies a number of actions to expand tree coverage and improve the climate resilience of the urban trees. These actions include the selection of tree species that are more resilient to water and heat stresses, diversification of tree species, increased use of runoff water for watering trees, automatic irrigation and control of water leaks. While Barcelona has a relatively small amount of green space per inhabitant, it has more street trees than most European cities.

The estimated budget of the Tree Master Plan is EUR 9.6 million/year, of which EUR 8.3 million/year is already available for tree management. The difference of EUR 1.3 million/year relates to investments that will be needed for improved soil and water management.

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http://ajuntament.barcelona.cat/ecologiaurbana/en/what-we-do-and-why/green-city-and-biodiversity

Biodiversity

Urban

Droughts

Extreme temperatures

Floodings

Water scarcity

Green roofs in Basel, Switzerland: combining mitigation and adaptation measures

The city of Basel in Switzerland has implemented an incentive programme to promote green roofs as both a mitigation measure to save energy and hence reduce emissions, and an adaptation measure, lowering indoor temperatures and absorbing rainwater, thus reducing flood risk. There are also biodiversity and social aesthetic benefits. Climate projections suggest that by the 2050s, the temperature in the Basel region could increase by 2 °C in winter and 2.5 °C in summer. Extreme rainfall events are also likely to increase in frequency and severity.

The green roof initiative aimed to improve the coverage of green roofs in the city of Basel through the use of a combination of financial incentives and building regulations. In the early 1990s, the city of Basel implemented a law supporting energy-saving measures. The green roofs were promoted via incentive programmes, funded through the Energy Saving Fund, which is made up of a 5 % levy on energy bills for all customers in the canton of Basel-Stadt. In 2002, an amendment to the city of Basel's building and construction law was passed, stating that all new and renovated flat roofs must be greened and designed to improve biodiversity. The city of Basel now has one of the world's largest areas of green roofs per capita. For developers, installing green roofs is now considered routine and they make no objections to installing them.

Green roof on Wiesenplatz tram depot in Basel, part of the 'Meadow carpet' project.

Biodiversity

Buildings

Energy

Urban

Extreme temperatures

Floodings

Green roofs tend to be 10-14 % more expensive than traditional roofs over their lifespan because of their initial costs (the cost of maintaining a green roof is similar to that for a traditional roof). Thus, a 20 % reduction in green-roof construction cost (such as that achieved through the subsidy scheme) is considered sufficient to equalise the costs of green and traditional roofs for investors. This means that green roofs are not only a sustainable solution but also a financially feasible option.
Green roofs have multiple direct benefits and co-benefits, including lowering indoor temperatures (by as much as 5 °C) resulting in energy savings; absorbing rainwater and delaying runoff, thus reducing flood risk due to intense rain events; reducing the temperature in densely built-up areas, providing habitat for urban wildlife and 'stepping stones' for migratory species; and providing a more aesthetically pleasing urban landscape.

Green roof at University Hospital, Basel.

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The economics of managing heavy rains and stormwater in Copenhagen — The Cloudburst Management Plan, Denmark

Copenhagen experienced four major rainfall events in the period 2011-2016, resulting in severe damage that was expensive to repair. These types of events are expected to be more intense and more frequent as a result of climate change. The city has drawn out a Cloudburst Management Plan that aims to reduce the impacts of flooding due to heavy rains. The plan included an assessment of the costs of different measures (traditional versus new options including adaptation measures), the cost of the damage despite the measures and the resulting financial impact. The results showed that continuing to focus on traditional sewerage systems would result in a societal loss compared with the alternative solution.

The alternative adaptation measures aim to store or drain excess water at ground level. The plan consists of four surface solutions as well as pipe-based solutions, including:

- stormwater roads and pipes that transport water towards lakes and the harbour, e.g. in the built-up area of central Copenhagen;
- retention roads for storing waters;
- retention areas to store very large water volumes, e.g. parks that could turn into lakes during flood events;
- green roads to detain and hold back water in smaller side streets.

Renovation of Sankt Ann Plads, Copenhagen. The park in the middle has a concave design to increase the volume of water it can contain, and it drains to the nearby harbour.

The traditional sewerage system was estimated to cost DKK 20 billion (EUR 2.6 billion) compared with DKK 13 billion for the alternative solution. Despite capital investments in the traditional sewerage system, financial losses from flooding would remain high (net loss of DKK 4 billion). On the other hand, the chosen combined solution — consisting of expanding the sewer network and surface projects focusing on water retention and drainage — would result in a net saving of DKK 3 billion. The plan is also likely to contribute to a growth in property values, increased employment, upgrade of urban spaces and increased tax revenues.

The Cloudburst Management Plan was developed during 2013 and includes 300 surface projects. The projects have started to be implemented at around 15 projects per year for the next 20-30 years. The projects are prioritised according to the level of flood risk, a socio-economic assessment and the availability of co-benefits.

Stormwater retention area on Tåsinge Plads, Copenhagen, under a cloudburst. The urban square Tåsinge Plads was redesigned with green low-lying areas that temporarily store and naturally drain stormwater from the surrounding urban area.

Urban

Water management

Floodings

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Storms

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Financial contributions of planning applications to prevent heathland fires in Dorset, United Kingdom

To protect its remaining heathland from fire, the county of Dorset, in south-west England, has implemented a planning regulation to fund measures to help reduce the risks. Dorset used to have an extensive area of heathlands (50 000 ha), which has been reduced to about 8 000 ha because of changes in agricultural practice, conifer planting, scrub encroachment, urban expansion and road building. The risks of fire are likely to increase with climate change, because of higher temperatures and more frequent dry conditions. Moreover, urban development close to the heathland significantly increases the risk of fires and other impacts on the heath, such as loss of biodiversity.

The Dorset Heathland Planning Framework Supplementary Planning Document (SPD) seeks to secure financial contributions from developers who want to build in the area, to fund the implementation of a package of alleviation measures to offset the adverse effects of residential development. The contributions are applied to all new housing that results in a net gain in dwelling units within a zone between 400 m and 5 km from designated European wildlife sites. The framework does not allow any development within a 400 m buffer zone around heathland sites.

Dorset heathland landscape.

A large fire on 9 June 2011 destroyed 56 hectares of Dorset heathland.

Biodiversity

Financial

Forestry

The fees fund a number of measures to reduce the impact of development on the Dorset heathlands. Such measures include improvement or development of recreational sites to divert the recreational pressure from the most sensitive heathlands; land purchased as alternative open space; provision of more rangers and wardens; purchasing monitoring equipment; land management to reduce fire load and risk of fires; and purchasing firefighting equipment.

The costs of implementing the measures are only the marginal costs of administrative work. The cost of measures was estimated at GBP 4.1 million and should be supplied from charges on house owners. The benefits are the assurance that the integrity of the heathlands will not be further eroded or diminished by a steady increase in urban pressures due to additional development; the reduced risk of fires; the preservation of biodiversity; and the contribution to reducing the heathlands' sensitivity to climate change.

Droughts

Extreme temperatures

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Implementation of the Heat-Health Action Plan of the former Yugoslav Republic of Macedonia

In the summer heatwave of 2007, high temperatures contributed to over 1 000 premature deaths in the former Yugoslav Republic of Macedonia. The air temperature reached 45.7 °C in Demir Kapija, the highest temperature since records began. Climate change is expected to increase these periods of very hot weather in the former Yugoslav Republic of Macedonia, and the government has made plans to ensure that the country is more prepared in the future.

The National Heat-Health Action Plan was developed within the National Strategy for Adaptation for the health sector, to implement adaptation measures and prevent the consequences associated with extreme heat due to climate change. Its goals are to decrease morbidity connected with heatwaves by issuing heat and health warnings; encourage planning in the relevant sectors; mainstream health in all policies; and raise awareness among the public and health sector workers. One of the key solutions proposed by the plan was the implementation of an alert system for timely announcements of heatwaves, especially between May and September. This plan includes:

Front page of the Heat-Health Action Plan of the former Yugoslav Republic of Macedonia

- a body responsible for issuing alerts;
- an early warning service to provide alerts up to 24-48 hours in advance of a heatwave;
- specific temperature thresholds for action;
- communication of the alert via the media;
- activities to inform citizens and health and social sectors about protection measures to be taken during heatwaves;
- recommendations for reducing exposure to heat inside health and social institutions, and special protection plans for vulnerable population groups;

- long-term planning to prepare the health and social care systems, including training of personnel and appropriate health protection;

- monitoring and evaluation of the plan.

An application for Android mobile phones was also developed; it provides heat and health warnings and related recommendations to users.

The annual costs of heat-health adaptation measures were estimated at 12 million local currency units (LCU) compared with health damage costs of 170 million LCU per year that would result from the increase in disease and deaths.

Example of (green) heatwave alert in February 2017.
Source: http://www.toplotnibranovi.mk/en/index.asp

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Health

Urban

Extreme temperatures

A transboundary depoldered area for flood protection and nature: Hedwige and Prosper Polders, Belgium

The Hedwige and Prosper Polders are low-lying areas of reclaimed land that are located just before the Scheldt estuary reaches Antwerp. Storm surges threaten the Flanders coast, including the city of Antwerp. The occurrence of storm surges in the North Sea has increased significantly since the 1950s, and sea-level rise is projected to further raise this threat in coming decades.

The Hedwige-Prosper Polder project is part of the wider Sigma Plan. The Sigma Plan is designed to reinforce dikes and quay walls, and open up areas that can flood to protect land along the Scheldt estuary. The project aims to remove the outer defences of the two polders and reopen these areas to the tides. This 'depoldering' process involves moving dike protection inland to provide room for water during tidal surges. The new dikes constructed inland will provide flood protection for the low-lying hinterland, and a system of creeks will be dug in the polders to simulate the natural wetland. This project (465 ha), combined with the adjacent Saeftinghe wetlands area, will create a large, cross-border, brackish intertidal area of approximately 4 100 ha.

Waterwegen en Zeekanaal completed the new inland dike on the Belgian side, the Prosper Polder, in 2015. Works in the Hedwige Polder are expected to start in the course of 2018 and take approximately 3 years.

Map of the project area. The dark green area to the left is the Dutch Hedwige Polder (with the Saeftinghe wetlands beyond); the light green area to the right is the Belgian Prosper Polder.

A cost-benefit analysis of alternatives indicated that the project would cost between EUR 66 million and EUR 75 million. As well as flood protection, other potential benefits from the project include improved water quality (the marshlands will contribute to the self-cleaning capacity of the estuary), an increase in natural wetland area and more recreational opportunities. Potential losses include the reduction of part of the cultural (farming) landscape and removal of current recreational opportunities, living space and agricultural land. The project costs for both the Polders will be covered mainly by the Belgian Sigma Plan, given the importance of the project for Belgian integrated water management objectives (shipping accessibility and flood protection).

Aerial view of the project area: (1) Hedwige and Prosper Polders prior to depoldering; (2) the Scheldt river; and (3) the existing Saeftinghe tidal wetlands, next to the project area.

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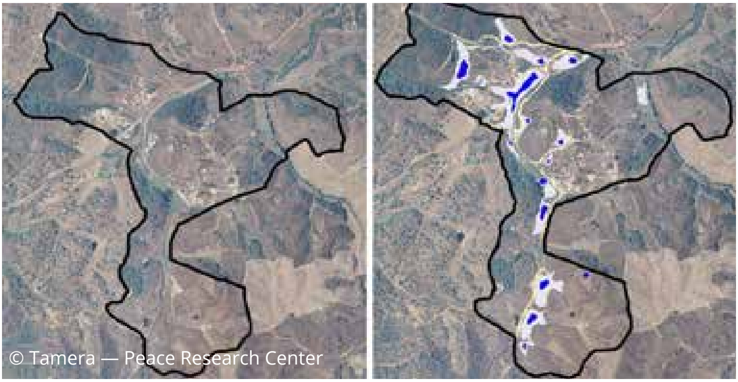
Tamera water retention landscape to restore the water cycle and reduce vulnerability to droughts, Portugal

Tamera is a 154-ha farm located in the most arid region of Portugal (Alentejo). This region has experienced increasing soil erosion and desertification; trends that are likely to be worsened by future climate change. Tamera has managed to counteract such trends through the creation of a water retention landscape (WRL) scheme, which has enabled it to become self-sufficient in terms of water and food. It has also reduced its vulnerability to climate change and extreme events such as droughts, water scarcity and floods.

A WRL is a system for the restoration of the full water cycle: the rain which falls in the WRL area is retained by vegetation or in water bodies and recharges the groundwater; thus, there is no rainwater runoff. In addition, the retention area acts in place of the fragile humus layer and, through its high water-absorbing capacity, helps to prevent landslides and floods. In Tamera, 29 lakes and retention spaces were created and the area of water bodies was increased from 0.62 ha to about 8.32 ha between 2006 and 2015. These interventions have been integrated with other measures such as the construction of terraces, channels and rotational grazing land. Tamera is now prepared to fully absorb even heavy, continuous rainfall. This large retention area is located at the highest point of the valley. The gravity is therefore enough to enable irrigation of the land within the catchment, without the need for additional energy for pumping.

Aerial photo of the valley garden area after construction of the lakes was completed.



Aerial photos of Tamera in 2006 and 2014, before and after construction of lakes was completed.

The direct benefits of this solution are reduced vulnerability to climate change and improved water management (e.g. reduction in irrigation needs, improved water availability, better water quality and stabilisation of the groundwater table). There are also a large number of co-benefits such as increased carbon storage, increased productivity and diversification of agricultural products, recreational value of lakes, increased biodiversity, increased numbers of visitors due to new water-related events, and improvement in the quality of life of local inhabitants. For example, the area of woodland has increased from 9.34 ha to 19.50 ha mainly in areas previously occupied by natural grasslands. This has led to an overall increase in carbon storage of 9.4 % per year between 2006 and 2014. Finally, an additional consideration is that the price of water is expected to increase over the next few years making this type of resilient farm system very valuable.

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Timmendorfer Strand coastal flood defence strategy, Germany

Large parts of Timmendorfer Strand, located on the Baltic Sea, lie no more than 3 m above sea level and are threatened by storm surges. The previous flood defence was a natural beach ridge. Studies based on projections of sea level rise (40-60 cm in 100 years) showed that it was insufficient to ensure the safety of the population and protect the economic assets. The local population was sceptical about coastal flood defence because the last catastrophic storm surge happened 130 years ago and Timmendorfer Strand relies on tourism that is dependent on its broad, scenic beaches. Thus, it was clear that an appropriate solution could be created only with the active participation and acceptance of the local population.

Firstly, a socio-economic assessment revealed the potential damage to people and assets in a flood event and highlighted the need for improved coastal flood defence. In a second step, possible coastal defence measures under different sea level rise scenarios were discussed in stakeholder workshops. The outcome of these workshops formed the basis of the third step; an ideas competition. The final step selected the measure to adopt. In the end, it was a compromise, in that they agreed to build a sheet pile wall integrated into the natural beach ridge but lower than the one originally proposed, so that tourists and citizens could still walk behind the wall and see the sea. A key success factor was that the authorities took a very inclusive, participatory approach and developed measures that fitted the values of the community.

Another key success factor was that the Timmendorfer Strand community was able to finance some of the additional costs. The additional costs were incurred because the solution adopted was adjusted to the needs of this tourist city, e.g. glazed retention walls were built near cafés to ensure a view of the sea. The beach promenade was also reconstructed and combined architectural finishing and landscaping.

The design of the coastal flood defence measure included several sections with extra solutions applied. The glazed retention walls increase the attractiveness of the area for visitors and local citizens.

Landscaping measures in place.

Coastal areas

Disaster risk reduction

Costs and benefits were quantified for two scenarios: a sea level rise of 0.30 m and one of 0.50 m. The estimated benefits are between four and eight times higher than the estimated costs of the measures. The upfront investment of EUR 30 million is the major cost (the same cost for each scenario). The main benefit is avoided damage from storm surges (EUR 71.5 million to EUR 170 million between 2011 and 2100), and the additional tourism shows substantial benefits (EUR 45 million to EUR 72 million from 2011 to 2100). The majority of investment costs (69 %) were covered by the regional government and EU funding through the Cohesion Policy, and the community covered about 31 % of the costs.

Floodings

Sea level rise

Storms

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Temporary flood water storage in agricultural areas in the Middle Tisza River Basin, Hungary

The Tisza river in Hungary experienced major flooding between 1998 and 2000. This floodplain has been subject to extensive river regulation and land reclamation for the past 150 years, which has increased the region's vulnerability to floods. Climate change is also likely to increase the frequency and magnitude of floods further.

Following the floods in the 1998-2000 period, the Hungarian Government designed a new act to address multiple problems. It aimed partly to reduce the risk of flooding and partly to develop disadvantaged areas and improve living conditions in these regions. The flood risk part of the act focused on strengthening the weak points of the existing dike system, restoring the runoff capacity of the flood channel (the cross-section between the dikes) and creating six temporary reservoirs. These reservoirs are used for agricultural purposes in normal periods, but can be utilised for temporary water retention during a flood. This allows buffering during extreme rainfall events and reduces flood risk. All six reservoirs have been built and one reservoir has already been used during a flood event in 2010.

The retention of flood peaks in the agricultural areas allows the protection of the built environment.

Temporary flood retention areas during a flood event; storing water in these areas mitigates the impacts downstream.

An analysis of the expected costs of different flood defence options and residual damage shows that the selected option substantially reduces the risk compared with no intervention. The analysis takes into account the cumulative impacts of flood events in a 100-year period in the Hungarian section of the Tisza river. It represents a trade-off between effectiveness of risk reduction and relatively low initial investment costs. Other options such as the implementation of 11 reservoirs instead of 6 would be more effective, but would also be significantly more expensive to implement. The overall cost of around EUR 260 million has been paid with contributions from the European Regional Development Fund and the Cohesion Fund.

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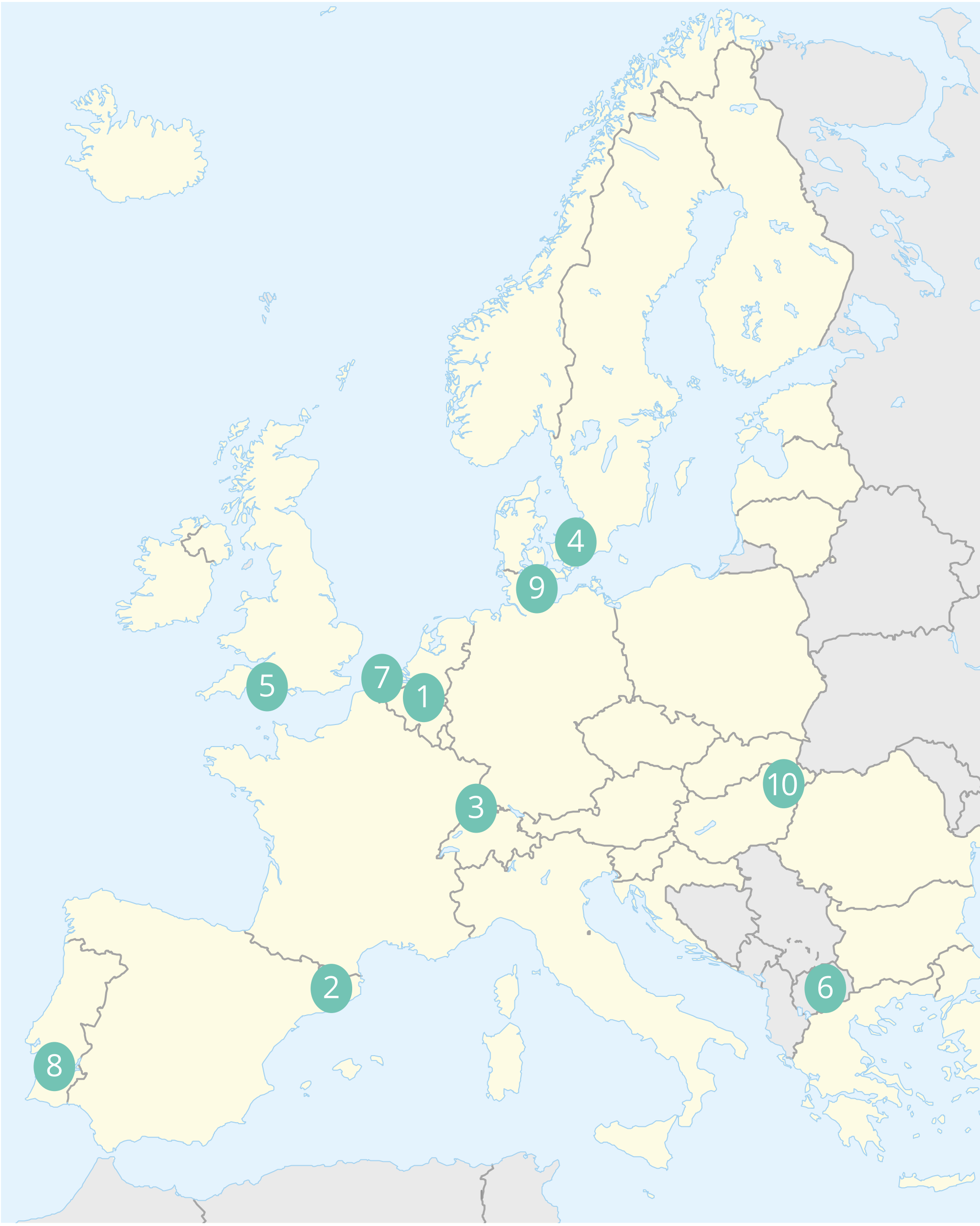
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	Case study	Climate-ADAPT web-link
1	New locks in Albertkanaal in Flanders, Belgium	http://climate-adapt.eea.europa.eu/metadata/case-studies/new-locks-in-albertkanaal-in-flanders-belgium
2	Barcelona trees tempering the Mediterranean city climate, Spain	http://climate-adapt.eea.europa.eu/metadata/case-studies/barcelona-trees-tempering-the-mediterranean-city-climate
3	Green roofs in Basel, Switzerland: combining mitigation and adaptation measures	http://climate-adapt.eea.europa.eu/metadata/case-studies/green-roofs-in-basel-switzerland-combining-mitigation-and-adaptation-measures-1
4	The economics of managing heavy rains and stormwater in Copenhagen - The Cloudburst Management Plan, Denmark	http://climate-adapt.eea.europa.eu/metadata/case-studies/the-economics-of-managing-heavy-rains-and-stormwater-in-copenhagen-2013-the-cloudburst-management-plan
5	Financial contributions of planning applications to prevent heathland fires in Dorset, United Kingdom	http://climate-adapt.eea.europa.eu/metadata/case-studies/financial-contributions-of-planning-applications-to-prevention-of-heathland-fires-in-dorset-uk
6	Implementation of the Heat-Health Action Plan of the former Yugoslav Republic of Macedonia	http://climate-adapt.eea.europa.eu/metadata/case-studies/implementation-of-the-heat-health-action-plan-of-the-former-yugoslav-republic-of-macedonia
7	A transboundary depoldered area for flood protection and nature: Hedwige and Prosper Polders, Belgium	http://climate-adapt.eea.europa.eu/metadata/case-studies/a-transboundary-depoldered-area-for-flood-protection-and-nature-hedwige-and-prosper-polders
8	Tamera water retention landscape to restore the water cycle and reduce vulnerability to droughts, Portugal	http://climate-adapt.eea.europa.eu/metadata/case-studies/tamera-water-retention-landscape-to-restore-the-water-cycle-and-reduce-vulnerability-to-droughts
9	Timmendorfer Strand coastal flood defence strategy, Germany	http://climate-adapt.eea.europa.eu/metadata/case-studies/timmendorfer-strand-coastal-protection-strategy-germany
10	Temporary flood water storage in agricultural areas in the Middle Tisza river basin, Hungary	http://climate-adapt.eea.europa.eu/metadata/case-studies/temporary-flood-water-storage-in-agricultural-areas-in-the-middle-tisza-river-basin-hungary

The European Climate Adaptation Platform (Climate-ADAPT) is a partnership between the European Commission (DG CLIMA) and the European Environment Agency.

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Climate-ADAPT aims to support Europe in adapting to climate change. It helps users to access and share data and information on:

- expected climate change in Europe;
- current and future vulnerability of regions and sectors;
- EU, national and transnational adaptation strategies and actions;
- adaptation case studies and potential adaptation options;
- tools that support adaptation planning.

The platform includes a database that contains quality-checked information that can be easily searched applying a range of different filters: type of data, adaptation sectors, climate impacts, adaptation elements, countries, publication year and keywords. These filters can be also used to retrieve Climate-ADAPT case studies.

http://climate-adapt.eea.europa.eu/