



BINGO

a better future under
CLIMATE CHANGE

BRINGING INNOVATION TO ONGOING WATER MANAGEMENT

D5.1

Portfolio of risk management and
adaptation strategies available for the
six research sites in BINGO

June 2017

www.projectbingo.eu



The BINGO project has received funding from the European Union's Horizon 2020 Research and Innovation programme, under the Grant Agreement number 641739.



Horizon 2020 Societal challenge 5:
Climate action, environment, resource
efficiency and raw materials

BINGO

Bringing INnovation to onGOing water management – a better future under climate change

Grant Agreement n° 641739, Research and Innovation Action

Deliverable number:	D5.1
Deliverable name:	Portfolio of risk management and adaptation strategies available for the six research sites in BINGO
WP / WP number:	WP5.1
Delivery due date:	Project month 24 (30/06/2017)
Actual date of submission:	23/06/2017
Dissemination level:	Public
Lead beneficiary:	KWR
Responsible scientist/administrator:	Henk-Jan van Alphen, Emmy Bergsma, Stefan Urioc
Estimated effort (PM):	1.05 PM
Contributor(s):	Stefan Görlitz (InterSus); Eduard Interwies (InterSus); Juliane Koti (IWW)
Estimated effort contributor(s) (PM):	IWW: 0.05 PM; InterSus: 0.4 PM
Internal reviewer:	Mariëlle van Zouwen (KWR)

Changes with respect to the DoA

Not applicable

Dissemination and uptake

Public

Short Summary of results (<250 words)

This document provides a guidance to the online Portfolio of adaptation measures that was developed within the European Horizon 2020 BINGO project. The BINGO project studies the regional impacts of climate change in six regions across Europe and aims to develop tailor-made regional adaptation strategies to deal with these impacts. The online Portfolio means to assist regional stakeholders with the development of local adaptation strategies. By linking adaptation measures to the risks identified at the research sites (which are: decreases in the availability and quality of fresh water due to droughts, (flash) floods and the risk of combined sewage overflow), the sectors primarily affected by these risks (Water Resource Management, Flood Management, Urban Drainage, Public Water Supply, Agriculture), and finally, the character of the adaptation measure (soft/structural), the Portfolio helps the stakeholders to find adaptation measures that are tailored to their specific needs and interests.

This guidance report sketches the background and aim of the Portfolio, clarifies some of the underlying concepts, describes the data collection method and its inherent limitations, introduces the main components of the Portfolio and explains how it can be used.

Evidence of accomplishment

Online database and guidance report

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1. An online Portfolio of adaptation measures for BINGO

This document provides a guidance to introduce and explain the online Portfolio of adaptation measures that was developed within the European Horizon 2020 BINGO project (Bringing INnovation to onGOing water management - a better future under climate change), available through the following link: [http://5.153.250.204:8888/\\$/](http://5.153.250.204:8888/$/). This guidance report first briefly sketches the background and aim of the Portfolio within the BINGO project. Then, the document clarifies some of the concepts underlying the governance research within BINGO of which the Portfolio is part. It presents the data collection method and discusses the scope of the Portfolio related to this method, including its limitations. The last part introduces the main components of the Portfolio and explains how it can be used.

1.1. Background and aim of the Portfolio

The BINGO project analyses the regional hydrological impacts of climate change in Europe and aims to develop regional adaptation strategies to deal with these impacts. Practically, the project focuses on six European research sites that face different climate impacts. The two urban sites of Badelona (Spain) and Bergen (Norway) face an increased risk of flooding and combined sewage overflow (CSO). The Troodos mountains in Cyprus and the lower Tagus transboundary river basin in Portugal constitute strategic water resources and here, the project focuses on the impacts of climate change on water availability and the related water supply to different sectors (e.g., agriculture, industry, drinking water). The research sites of the Wupper river basin (Germany) and the groundwater recharge area the Veluwe (the Netherlands) represent cases of integrated water resource management as multiple functions are supported by these water bodies.

In this project, Work Package 5 (WP5) is tasked with analyzing the governance context of climate change adaptation at the research sites to help regional stakeholders, represented in local “Communities of Practices” (CoPs), prepare for and deal with the impacts of climate change in their regions. The Portfolio intends to provide a first step in this direction.

The Portfolio is aligned to the work done within the BINGO project as a whole. Based on the context-specific risks identified for the research sites, WP5 started out with assessing the current policy and governance context at the six research sites to identify strengths and weaknesses for adaptation to the regional impacts climate change. The results of this analysis were reported in Deliverable 5.4 part 1 (“Report on the assessment of the current situation and recommendations for improvement at the research sites using the three layer framework”), which was submitted in December 2016. In the Portfolio, adaptation measures are collected that can be implemented at the research sites to deal with the expected climate change impacts.

The main aim of the Portfolio is to help the CoP stakeholders choose between the many different adaptation options that are available to deal with the impacts of climate change. By linking the measures to specific risks and sectors, and by specifying the character of the adaptation measures (structural/soft), CoP stakeholders can make a first selection of relevant adaptation measures for their region. They can discuss the feasibility of these measures in the specific context of their region as a first starting point in the development of regional adaptation strategies.

Because of the regional focus of BINGO, the measures included in the database are necessarily bound to the scope of the project (focusing on hydrological impacts) and the risks identified at the project's six research sites, which include drought and the related reduction in the availability and quality of fresh water, (flash) floods and the related risk of CSOs.

While the Portfolio will be of direct use to the BINGO CoP's as the measures deal with the climate risks faced in their regions, the Portfolio may also be useful for a broader audience. The BINGO research sites have been selected on the basis of their geo-hydrological diversity and therefore, the risks faced in these areas are representative to some of the water-related risks faced in other (European) regions. In areas facing similar risks, the database could help regional stakeholders make a first selection of relevant adaptation measures as well.

1.2. Difference between adaptation measures and strategies in BINGO

In the BINGO project, a distinction is made between adaptation measures and adaptation strategies. **Adaptation measures** are specific interventions to address a specific climate risk. This can be a measure that for example prevents a hazardous event from happening, reduces or deflects the impact of a hazardous event, or improves recovery after a hazardous event has happened. Measures can be technical, infrastructural, but also legal, economic or social. So a measure could be building a dam, increasing the price of irrigation water or raising awareness of flood risks.

An **adaptation strategy** refers to a collection of measures linked to specific climate risks. The strategy provides a framework of which the measures are the practical outcome. A strategy consists of:

- Identification of the risks and their impacts
- Strategic goals that need to be achieved
- Measures that help achieve those goals by addressing the risks
- Implementation plan for the measures

The Portfolio includes single **adaptation measures**, based on which CoP stakeholders can develop **adaptation strategies**.

1.3. Data collection

The measures in this database were collected through a two-step approach. First, based on the preliminary identification of regional risks in WP4 of the BINGO project, relevant adaptation measures were selected from existing databases developed within other (European) projects such as Prepared, Climate-ADAPT and CarpathianCC, and an additional internet and literature review of adaptation measures. Where relevant, additional information about these measures was incorporated in the Portfolio as well. Second, measures were added to this list by key stakeholders at each BINGO research site, represented in the CoPs. As a result, this database consists of a combination of general and context-specific adaptation measures that cover a wide range of issues.

While some additional information about the measures is already incorporated in the database at this point (see section 1.4 below), the aim is to further extend the Portfolio with the results generated by the future work of WP5. For example, Task 5.3 will analyze the governance needs connected to the most relevant adaptation measures, information that will be added to the Portfolio at a later stage. Building on the governance strengths and weaknesses identified in D5.4 and the further specification of regional climate risks in other WPs of the BINGO project, the extended database can help CoP stakeholders to develop a tailor-made adaptation strategy that fits their regional context.

1.4. A guidance to the online database

The Portfolio of adaptation measures has been designed in the form of an online database, which can be accessed by the BINGO CoP stakeholders as well as other users interested in adaptation measures for the risks addressed in the BINGO project. The Portfolio is supported by a web-page tool which allows users to select adaptation measures based on the risk(s) they address, the sector(s) that can implement them and the type of measure.



Figure 1 Partial screenshot of the online database

The database distinguishes between four different climate risks:

- Decrease of water quantity due to drought.
- Decrease of water quality due to drought.
- (Flash) floods.
- Decrease of water quality due to increased precipitation, which can lead to CSOs.

Adaptation measures are linked to five different sectors. These sectors have been identified within the BINGO project (see Deliverable 4.1 “Context for risk assessment at the six research sites, including criteria to be used in risk assessment”) as being primarily affected by the regional climate risks. The five sectors identified are:

- Water Resource Management
- Flood Management
- Urban Drainage
- Public Water Supply
- Agriculture

The database distinguishes between two types of measures:

- Structural measures, which include (grey and green) infrastructural and technological adaptation solutions.
- Soft measures, which include procedural and management-type of adaptation measures.

These basic distinctions allow actors to browse through the database and find adaptation measures that are tailored to their specific (regional) needs and interests.

The database provides some additional details about the measures as well. Once selected, a short description is given of the measure, and advantages and disadvantages are listed. This helps actors to understand the scope and possible consequences of the different adaptation measures, and provides a starting point for exploring opportunities for (increased) collaboration between sectors in the development of adaptation strategies.

1.5. Acknowledgments and more information

The database was constructed through a collaborative effort of the KWR Watercycle Research Institute (KWR), Intersus – Sustainability Services (InterSus) and the IWW Water Center (IWW). For questions about the database or the analysis that underpins it, please contact KWR-team:

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