Transfer Plans of solution-providing regions in LSDT-1

Deliverable 3.4

20 January 2025

Deliverable number	D3.4
Deliverable name	FI Transferability plans to twins
Related Work Package	WP3
Deliverable lead	Natural Resources Institute Finland (LUKE)
Authors:	Eija Pouta, Luke, eija.pouta@luke.fi Helmi Andersson, City of Turku, helmi.andersson@turku.fi François Chevaux, Cerema, francois.chevaux@cerema.fr Mathilde Vauleon, OFB, mathilde.vauleon@ofb.gouv.fr Hélène Michaud, OFB, helene.michaud@ofb.gouv.fr Lisa Juste, Région Normandie, lisa.juste@normandie.fr Antonios Gasteratos, DUTH, agaster@pme.duth.gr Christos Akratos, DUTH, cakratos@pme.duth.gr Symeon Symeonidis,DUTH, symesyme@pme.duth.gr Parthena Ioannidou, DUTH, paioanni@civil.duth.gr Georgios Koutalieris, ENO,george.koutalieris@enorainnovation.com Iphigenia Kapsomenaki, ENO, iphigenia.kapsomenaki@enorainnovation.com Artemis Tsolaki RDF-EMT, tsolaki.artemis@gmail.com Elina Kasvi, UTU, emkasv@utu.fi Antti Kaseva, TUAS, antti.kaseva@turkuamk.fi Minna Kivimäki, City of Turku Pia Leskinen, TUAS, piia.leskinen@turkuamk.fi Leo Wartelle, Cerema, leo.wartelle@cerema.fr Liga Vodopjanova-Upane liga.vodopjanova-upane@zpr.gov.lv
Contact	Eija Pouta, eija.pouta@luke.fi
Reviewer	Lara Möllney (adelphi)
Project Full Name	Regions for climate change resilience through Innovation, Science and Technology
Project Acronym	RESIST
Grant Agreement Number	101093968
Instrument	Innovation Action
Start date	01/01/2023
Duration	60 months
Type of Delivery (R, DEM, DEC, Other)[1]	R
Dissemination Level (PU, CO, CI)[2]	PU
Date last update	20/01/2025
Website	resist-project.eu

[1] **R**=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent fillings, videos, etc.; **OTHER**=other
[2] **PU**=Public, **CO**=Confidential, only for members of the consortium (including the Commission Services), **CI**=Classified

Revision nº X	Date	Description	Author(s)
0.1	20/11/2024	First draft	all authors, editor Eija Pouta (LUKE)
0.2	03/01/2025	Comments and suggestions from co-authors	all authors, editor Eija Pouta (LUKE)
0.3	06/01/2025	Final edits	all authors, editor Eija Pouta (LUKE)
0.4	06/01/2022	Proofreading	all authors, editor Eija Pouta (LUKE)
0.5	08/01/2025	First internal review	Lara Möllney (adelphi)
0.6	09/01/2025	Coordinator review	Vilija Balionyte-Merle (SINTEF)
0.7	10/01/2025	Second internal review	Gaia Marotta (ERRIN)
0.8	22/01/2025	Operational coordinator review	Catarina Azevedo (INOVA)
1.0	23/01/2025	Final corrections	Eija Pouta (LUKE)

Please cite this deliverable as:
FI Transferability plans to twins Deliverable 3.4 of the RESIST project.

Contents

List of Tables

List of Figures

Key abbreviations

BGF	The Blue Green Factor
BGI	Blue-Green Infrastructure
CBA	The Cost Benefit Analysis
CCA	Climate Change Adaptation
DUTH	Democritus University of Threce
EMT	Eastern Macedonia and Thrace
LSD	Large-scale demonstrators
LSDT	Large Scale Demonstrator Region, and two Twin Regions
NbS	Nature-based Solution /-s
PLUi,	Plan local d'urbanisme intercommunal - local urban planning document
ZPR	Zemgale Planning Region
RTU	Riga Technical University
SWAT	The Soil & Water Assessment Tool
SWF	South West Finland
TUAS	Turku University of Applied Sciences

1. Introduction

1.1. Motivation

The RESIST project is designed to enhance the resilience and adaptive capacity of 12 climate-vulnerable EU regions. This is achieved through the implementation of four large-scale demonstrators (LSDs) of resilient innovations for Climate Change Adaptation (CCA). A significant component of the project is the transfer of know-how and innovative solutions to eight twin regions, through mutual-learning activities.

The effective adaptation cannot solely come from top government levels. The grassroots-driven and long-lasting and impactful change involves quintuple helix stakeholders as regions, civil society, businesses, and local research and entrepreneurial communities. Increased collaboration and knowledge transfer from more experienced to less experienced regions are crucial for achieving the effective adaptation to climate change. Via knowledge and experience transfer, the RESIST project aims to strengthen the resilience of all 12 climate-vulnerable EU regions, accelerate transformation by implementing large-scale demonstrators of resilient innovations and to increase Adaptive Capacity by Promoting the transfer of know-how and innovative solutions to twin regions.
Knowledge transfer forms the solid basis for developing and demonstrating climate change adaptation solutions in LSDs and their subsequent transfer to twinning regions and beyond. Thus, in RESIST, each LSD, together with twinning regions, develops a Transferability Plan where at least two measures per LSD are defined to be transferred to twin regions. Following this approach, the twinning regions selected to demonstrate the innovative solutions that fit best to address their challenges and needs are thoroughly documented in D1.11. This transfer plan sets the detailed activities plan for the twinning regions for the next three-year period.

This transfer plan focuses on Nature-based solutions (NbS) and solutions that support their implementation. Historically, man-made structures like levees, dams, and drainage systems have been used to mitigate natural climate hazards. However, these solutions often prioritise social and economic needs, negatively impacting ecosystems over time. Recently, NbS have emerged, showing promise in risk reduction and biodiversity preservation. NbS are actions that protect, manage, and restore ecosystems to address societal challenges while providing human well-being and biodiversity benefits. However, the adaptation of NbS demands information applicable in the different levels of decision making.

1.2. Overview of planned transfers within RESIST for all regions

The RESIST project addresses climate-related challenges and needs of twelve climate-vulnerable regions in Europe, each with distinct socioeconomic profiles. These regions are Southwest Finland (Finland), Central Denmark (Denmark), Catalonia (Spain), Central Portugal (Portugal), Normandy (France), Eastern Macedonia and Thrace (Greece), Blekinge (Sweden), Zemgale (Latvia), Puglia (Italy), Baixo Alentejo (Portugal), Vesterålen (Norway), and Extremadura (Spain).

As part of the project, adaptation solutions developed by RESIST regions are transferred to other "receiving" project regions. The original project structure organizes the regions into four clusters, each consisting of one more advanced region, known as a Large Scale Demonstrator Region, and two Twin Regions. Each cluster is referred to as an "LSDT". While the Large Scale Demonstrator Regions — namely Southwest Finland, Central Denmark, Catalonia, and Central Portugal — were pre-selected as providing regions, any region within the project could choose to offer solutions for transfer. Figure 1 shows an overview of all planned transfers, which will be implemented within the remaining project time (2025-2027).

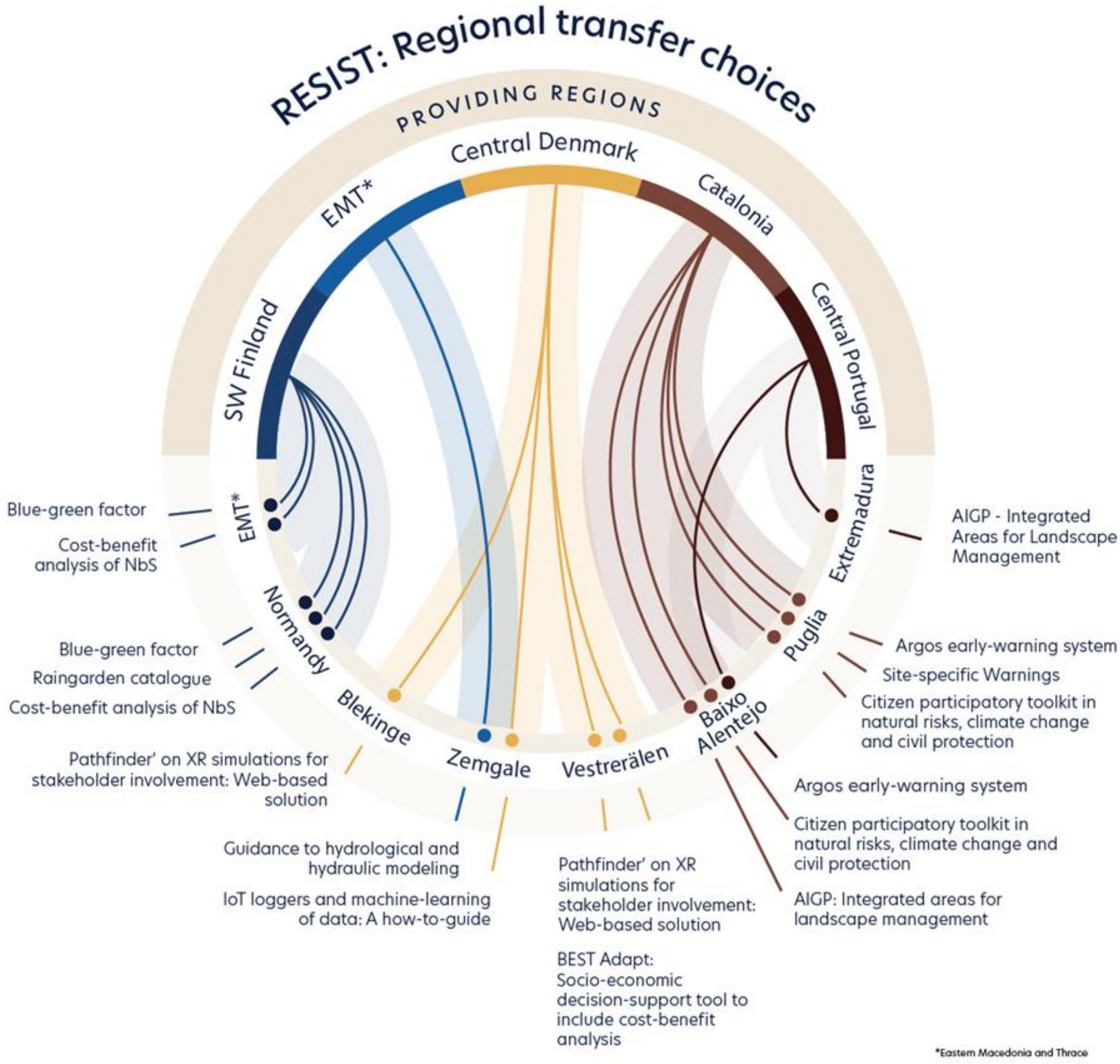

Figure 1: Overview of transfers between the regions.

South-West Finland (LSDT1) is transferring five innovative solutions. These include the "Blue-green factor" (BGF), a policy instrument used to increase blue- and green infrastructure in urban areas, and "Cost-Benefit analysis of NbS", which provides a systematic method for identifying the benefits and costs of Nature-based Solution (NbS) projects over their lifetime. Both solutions are transferred to the regions of Normandy (LSDT1) and Eastern Macedonia and Thrace (LSDT1). Additionally, South-West Finland transfers the “Raingarden catalogue” to Normandy. This catalogue provides valuable insights into raingardens, promoting sustainable water management in residential areas. All three regions belong to LSDT1, no transfers outside the original LSDT are performed by South-west Finland.

Eastern Macedonia and Thrace (LSDT1), a region that joined RESIST as a twin-region, is also contributing a solution to the transfer process. The "Guidance to Hydrological and Hydraulic Modelling" solution is transferred to Zemgale (LSDT3). This solution provides comprehensive guidance for hydrologic and hydraulic modelling, enhancing water management and increasing resilience to flood-related hazards.

Central Denmark (LSDT2) is sharing its expertise with Zemgale (LSDT2) through the solution "IoT Loggers." The solution facilitates the deployment and use of IoT groundwater loggers, supporting effective data collection and analysis. Furthermore, Central Denmark transfers "BEST Adapt: Socio-economic Decision-Support Tool to Include Cost-Benefit Analysis" to Vesterålen (LSDT4). This tool integrates socio-economic factors to enhance informed decision-making in climate adaptation efforts, particularly focusing on flood-related hazards. Additionally, Central Denmark provides the "Pathfinder on XR Simulations for Stakeholder Involvement – Web-Based Solution," an online tool designed to support the selection and implementation of XR solutions for immersive stakeholder engagement. This solution is transferred to both Vesterålen and Blekinge (LSDT2). Central Denmark, therefore, facilitates solution transfers both within and beyond its LSDT.

Catalonia (LSDT3) contributes the "Argos Early-Warning System," an early-warning and decision-support tool designed to assist emergency managers and other stakeholders in anticipating impacts and managing weather-related emergencies more effectively. It also offers the "Citizen Participatory Toolkit in Natural Risks, Climate Change, and Civil Protection," which is a compilation of various formats and methods for engaging citizens in climate adaptation, tailored to different social groups. Both solutions are transferred to Baixo Alentejo (LSDT3) and Puglia (LSDT3). Additionally, Catalonia transfers the "Site Specific Warnings" solution to Puglia, which integrates site-specific warnings into the Argos early-warning system. Catalonia does not transfer solutions outside of LSDT3.

Central Portugal (LSDT4) shares the "AIGP – Integrated Areas for Landscape Management", a comprehensive approach aimed at promoting the collective management and utilisation of agroforestry spaces in smallholdings and areas with high fire risk. This approach is grounded in an integrated territorial strategy that addresses the need for effective landscape planning and management. It aims to increase the area of managed forest at a scale that enhances resilience to fires, boosts natural capital, and in a way that supports the rural economy. This solution will be transferred to Extremadura (LSDT4) and Baixo Alentejo (LSDT3).

1.3. LSDT-1: Parties and content of the transfer plans

In this plan, knowledge transfer is prepared from Southwest Finland to Normandy and Eastern Macedonia and Thrace. The transfer plan is based on the needs assessments for the three regions. In needs assessment the regions identified their challenges and needs for new solutions (RESIST D1.1 and D1.10). LSDT-1 focuses on Nature-based solutions (NbS) and solutions that support their implementation. Southwest Finland stands out as an experienced region in implementing NbS, serving exemplary solutions for other regions. The region's solution portfolio includes testing new approaches, such as catchment-scale stormwater management and setting ecosystem service criteria in infrastructure projects. Stakeholder engagement is a key focus, with in-depth Cost Benefit Analyses (CBA) conducted to highlight the benefits of NbS in economic terms, thereby encouraging investment. Practical tools, like an inspirational catalogue of raingardens, simplify the implementation of NbS for property owners. Advanced digital methods and thorough analysis further support the integration of NbS into urban planning.

Normandy, located in north-west France, covers an area of 29,906 km² and has a population of 3.3 million people. As an ERDF transition region, it boasts diverse economic sectors, including automotive, aviation, and agri-food. Its rich history and cultural heritage have shaped the region's landscape and climate. Normandy experiences a temperate oceanic climate with mild winters and warm summers, though recent decades have seen increased temperatures and more hot days. The region faces environmental challenges, such as coastal erosion and flooding, with significant annual precipitation. NbS have been identified as a promising way of meeting these challenges, but the tools to enhance their implementation and planning are still limited.

Eastern Macedonia and Thrace (EMT), situated in north-eastern Greece, spans 14,157.76 km² and has a population of 608,000 people. It is one of the poorest regions in Europe, grappling with economic and environmental challenges. The region's economy is predominantly agricultural, with high unemployment and a declining GDP. EMT's varied terrain includes mountains, plains, and a 480 km coastline, making it highly susceptible to climate change impacts like flooding and wildfires. Environmental risks such as inland flooding, coastal erosion, water shortages, and droughts are significant concerns that could be solved more with NbS.

This deliverable focuses on NbS to limit environmental risks of flooding, droughts and related events, as well as approaches supporting their implementation. The aim is to plan the knowledge transfer between Southwest Finland and Normandy as well as between Southwest Finland and EMT. In addition, this document describes the knowledge transfer from EMT to Zemgale. This document follows the structure and guidelines developed by adelphi.

In the following transfer the key regions' characteristics will first be presented. Then, the transfer of selected solution will be described, and possible barriers and strategies to overcome them, as well as resources needed and the actual processes of transfer.

1.4. Solution-providing region: Strengths and expertise

In Southwest Finland (SWF) NbS are increasingly being integrated into water management and urban planning, reflecting a broader recognition of their benefits in addressing societal challenges while enhancing biodiversity and ecosystem services. Several projects are currently underway in the region. Despite this progress, there are still challenges to overcome. There is a need for a more systematic approach in decision-making processes, as the use of NbS in watershed planning is still relatively new. Disseminating information on their application in both rural and urban contexts is crucial. In urban planning, a lack of political will to implement and invest in NbS remains a significant barrier. Overcoming this requires a shift in societal attitudes towards making NbS the standard practice. Achieving widespread acceptance and implementation of NbS will require reaching a social tipping point where these solutions become the norm. Overall, while there is positive momentum and several promising projects, overcoming existing obstacles and achieving broader adoption of NbS will require continued effort and advocacy.

Several solutions are used or are under planning in the region. There are also some existing models from other parts of Finland that could be adopted by SWF. The most promising physical solutions, tools and approaches for transfer were identified by SWF project group. They are presented in Table 1.

Table 1: Overview of available solutions by South-West Finland

Solution shortlist		
Name of solution	**Solution type**	**Short description**
1.Two-stage ditch	Physical solution	A 2-stage ditch is an NbS that mimics a natural streambed. It consists of a main channel, where water flows when water volume is low, and floodplains, where water has more room to flow in times of increased water volume. Flood plains provide space and water retention capacity. Vegetation in floodplains prevents erosion and removes nutrients from the water.
2.Blue-green factor	Policy instrument	The Blue Green Factor is a factor-based policy instrument to ensure and maintain desired levels of green and blue in new development projects.
3.Raingarden catalogue	Information provision approach	The catalogue describes alternatives to create raingardens. Raingarden is a nature-based climate change adaptation measure fit for a residential property.
4.River catchment planning	Planning approach	Multi-objective and multi-beneficial catchment –based planning process provides a bottom-

		up approach and holistic view to water management and stakeholder engagement.
5.Watershed modelling	Decision making aid and stakeholder engagement tool	SWAT + watershed modelling helps identifying climate risks with climate scenario testing and choosing the right climate change adaptation methods. The model is constructed and validated with spatial and climatic datasets. It shows potential benefits already before implementation to increase acceptance in decision-making and landowners.
6.Cost-benefit analysis of NbS	Decision making aid	Approach to evaluate the costs and, benefits and efficiency of NbS in economic terms

Their status of implementation and expertise of solutions at SWF vary, and these specificities need to be noted.

- Blue-green factor has been developed to support and increase implementation and planning of green areas in urban environments in Turku. Since 2021, green efficiency targets have been applied in new planning areas and in some cases, are a requirement for all new building permits. However, BGF needs further development to respond to information needs related to land use planning not only in Turku, but in the whole region.
- Cost-benefit analysis is not actively used in the planning and decision-making of NbS. Instead, it has been used in previous projects in other parts of Finland, e.g., the OPERANDUM-project, where CBA was implemented for lake conservation solutions under conditions of changing climate. Application of CBA at Turku Rauvolanlahti is developed during the RESIST project. The case is a small-scale NbS in an urban environment with specific challenges of integration of resident preferences in the planning process that also have an impact on the implementation of CBA.

2. Transfer Plan – Southwest Finland to Normandy

2.1. Solution-receiving region: Challenges and needs

2.1.1. Key regional needs in the field of climate resilience and climate change adaptation

As described in RESIST_D1.11, Normandy's increasing exposure to storms and heavy rains, and consequently to elevated risks of flooding, runoff and soil erosion, enhances the need to implement solutions of adaptation on its territory. The target measures to reduce climate impacts are the implementation of integrated management of rainwater and discharge quality, as well as the clearing of streams and renaturation projects.

NbS have already been identified as an effective way of meeting these objectives, but the tools needed to assess their real effectiveness are lacking and, consequently, the means to convince decision-makers to implement them. Local stakeholders in Normandy have though expressed a strong interest in receiving a complete information about NbS and key tools that will help decide and deploy NbS on their territory in respect of their own needs and objectives in terms of resilience to climate change.

In addressing these challenges, Normandy plans to customize three solutions from SW Finland:

- The Blue Green Factor (BGF)
- The Raingarden Catalogue
- The Cost Benefit Analysis of NbS (CBA)

The Cost Benefit Analysis of NbS as implemented in SW Finland will serve as a good practice example and from the lesson learned by the Finnish partners, it will be customized into a new methodology for Normandy's local stakeholders. In the context of public budget cuts, this solution will help any local authority that is conducting major planning projects, such as renaturation projects in urban areas and redevelopment of neighbourhoods regularly affected by flooding.

The experience of the City of Turku in the design and application of the BGF is highly valued as it could be a key solution for Normandy's local authorities while planning development works in urban areas. The BGF will guide local stakeholders in the evaluation of the green efficiency of their territory and help them identify impervious surfaces and the volume of stormwater retention structures. Some stakeholders are already invested in projects of renaturation in response to flooding and runoff but still, they need more advanced analysis tools, such as the BGF, able to support the development choices made or to provide more sustainable alternatives.

The Raingarden Catalogue will finally promote this specific nature-based adaptation measure to all local authorities in Normandy. The objective of the transfer is to share good practices with SW Finland while disseminating the catalogue to our target groups, private owners or public institutions.

This transfer will demonstrate that this solution can be implemented by all kinds of stakeholders as part of their stormwater management system.

Finally, the transfer of these three solutions will address the need to strengthen stakeholder engagement and inclusive planning highlighting in-depth information on the vulnerabilities of a territory or development project and increasing qualitative public communication of adaptation solutions.

2.1.2. Solutions chosen for transfer

From the provided solutions in Table 1, the solutions selected by Normandy were Blue-Green Factor, Cost-Benefit Analysis of NbS and Raingarden catalogue, all described in Table 2 below.

Table 2: Overview of chosen transfer solutions from Southwest Finland to Normandy.

Chosen transfer solution from Southwest Finland to Normandy		
Name of solution	**Solution type**	**Short description**
Blue-Green Factor (BGF)	Policy instrument	The Blue Green Factor is a factor-based policy instrument to ensure and maintain desired levels of green and blue in new development projects.
Raingarden catalogue	Information provision approach	The catalogue describes alternatives to create raingardens. Raingarden is a nature-based climate change adaptation measure that is fit for residential property.
Cost-Benefit Analysis (CBA)	Policy instrument	An approach to evaluate the costs and, benefits and efficiency of NbS in economic terms

2.1.3. Additional activities and solutions being developed in Normandy

Beyond the solutions to be transferred, Normandy is developing several CCA solutions in the RESIST project outside the transfers. These solutions listed in Table 3 include information provision related to solutions as well as technological or communicative solutions. The solutions will be developed by the RESIST partners from the Normandy twinning region: the Region Normandy, Cerema and OFB.

Table 3: Overview of additional solutions developed within the recipient region of Normandy.

Additional solutions developed within Normandy		
Name of solution	**Solution type**	**Short description**
Methodological tool: desilting and renaturation	Urban planning study	Cerema is proposing a tool to target the potential for desilting and renaturation on the scale of the town of Barentin, as a possible response to adaptation to climate change. Based on a detailed breakdown of the green and blue framework at the municipal level, the challenges of limiting the risk of runoff and flooding, the nature in the city and the quality of life will be spatialised, and their development prospects will be examined in the light of climate change. The results of this diagnosis will be used to target the potential for soil desilting and renaturation, and the methodology implemented will be capitalised.
Hydrological modelling: desilting and renaturation	Digital tool	The application of the hydraulic model will be developed in order to simulate a scenario with heavy rains (in a climate change context) on the pilot site. This study, based on the massive flood in Lisieux in 2019, has simulated the consequences of channelling the “Petit Lieu” stream. Four scenarios have been developed, including houses and buildings relocation and reopening of the “Petit Lieux” stream. With this data, Cerema is working on the hydraulic modelisation with the HEC-RAS model. The idea is to show the impact of climate change and the possibility of the implementation of NbS in order to avoid flood damage near the “Petit Lieu” stream in Lisieux.
Renaturation of stream riverbank	Urban planning study	Ongoing study on the need for the redevelopment of the riverbank of the « Petit Lieu » stream, the houses’ relocations, and NbS implementation to avoid the next floods in the city of Lisieux. One of the most effective ways of limiting flooding in this area is to open up the Petit Lieu stream. However, the fact that the area has been urbanised for several decades makes it difficult to define and plan the work to be carried out. The prospects for the overall redevelopment of the area (sports facilities, social housing) are nonetheless significant and offer opportunities for an ambitious project. The study currently underway is an attempt to respond to these development issues.
Planting hedgerows with local species	NbS	Actions for preserving hedgerows, planting and managing hedgerows. The aim is to provide an affordable, NbS to soil erosion and runoff. Indeed, the hedge is a typical feature of the Normandy bocage, and the results obtained in Normandy as part of its preservation and development projects can thus be transferred elsewhere, to other European regions and their rural areas.

2.1.4. Systemic perspective on regional adaptation efforts

All solutions being transferred or being transferred to Normandy are technological or communicative tools facilitating decision-making, with the objective to drive local authorities to implement adaptation strategies in the long term.

The transferred solutions from Southwest Finland will actually complete the solutions being developed in Normandy. We carefully chose SWF's solutions because we believe they could enhance the inputs of our local solutions:

- The Blue Green Factor is meant to be transferred first in our pilot site, the City of Barentin, which is also the territory where a solution, a Methodological tool to evaluate the area for desilting and renaturation in an urban area, is being developed by Cerema. The inputs from this study will lead to major planning work in the City of Barentin and in this frame, the BGF tool that will be transferred and customised will help urban planners assessing the green efficiency of the blocks being redeveloped following the study. The objective of combining the study of Cerema with Turku's BGF tool is to enhance the chance of NbS implementation as part of urban planning work. This combined demonstration will be then executed in other Normandy localities engaging in such planning work.
- Similarly, the Cost-Benefit Analysis will be transferred to another pilot site, the City of Lisieux, which is conducting a study on the need for the redevelopment and renaturation of the riverbank of the « Petit Lieu » stream. This study will plan houses' demolition and inhabitants' relocation, and NbS implementation to avoid floods and reduce their consequences. The planning work that will result from the study will be costly and will highly affect the social dimension of the neighbourhood. In this frame, the CBA analysis developed in SWF will complete the study conducted in Lisieux, providing urban planners with a tool able to assess the economic effectiveness of this project of renaturation.
- The hydrological modelling of the flood, the actions for planting hedgerows and the raingarden catalogue are tools providing information and giving awareness that NbS can be implemented as part of local authorities' strategy of adaptation and consequently support reducing risks of floods, runoff and soil erosion on their territory.

The synergies between the solutions transferred from SWF and those currently being developed in Normandy will undoubtedly increase the region's resilience to climate change by providing local stakeholders with key planning tools for implementing NbS.

2.2. Planned transfers

2.2.1. Transfer 1: Blue-green factor

2.2.1.1. Solution description and transfer goals

The Blue-Green Factor solution provided by Southwest Finland is a policy instrument used to increase blue and green infrastructure in urban areas. The solution consists of two elements: the blue-green infrastructure assessment tool (BGF tool) and the use of the tool in urban development (BGF tool implementation).

The BGF tool evaluates the amount and quality of vegetation, in addition to indicatively measuring how much the plot's vegetation, surfaces, and possible stormwater structures delay stormwater. By allowing the user to jointly assess yard, stormwater, and water supply and sanitation plans in one tool, it encourages the use of NbS for vegetation and stormwater management. In practice, the tool consists of a calculation sheet, which utilises data on:

- the plot and planned construction, including target values, and
- planned vegetation, surfaces, and potential stormwater structures.

The calculation result is a numerical value that details the green efficiency of a plot or a block, i.e., it shows the ratio of vegetation and ecologically beneficial surfaces to the built-up area. The BGF also shows the proportion of impervious surfaces and the volume of stormwater retention structures.

In Turku, the BGF tool was developed to support and increase the implementation and planning of green areas in urban environments. Since 2021, green efficiency targets have been applied in new planning areas and in some cases, are a requirement for all new building permits. The baseline target levels for green efficiency are defined in the building code and vary depending on land use. The tool is mainly used by yard planners in zoning areas and in building supervision. The BGF is also used by planning architects in both general planning and detail planning.

Although the BGF tool promotes the use of NbS by giving greater emphasis to solutions that support biodiversity, evaluation completed in the framework of RESIST D3.1. has highlighted the need to further develop the tool to increase the uptake of NbS in urban stormwater management. The BGF tool will thus be further developed in this direction as part of the twinning and transfer work conducted in WP3 in RESIST.

The transfer between SWF and Normandy will focus on both elements of the BGF solution, i.e. the BGF tool and the BGF tool implementation. The transfer process is expected to increase capacity in both regions through mutual learning, with the aim of increasing regional capacity for adaptation to climate change.

In SWF, in turn, the objective of the transfer process is to develop the BGF tool further and thus increase the uptake of NbS not only in Turku but also in the whole region. The benchmarking report highlighted that the lack of clear national guidelines leads to uneven regulations and practices. Smaller municipalities in the SWF region would benefit from the development of a regional or national BGF tool, as it would reduce the need for each municipality to allocate their own resources to develop individual solutions. Thus, the aim is to further develop the local BGF towards a national version in collaboration with other cities and regions during RESIST.

First, nature-based water management methods should be better taken into account in the tool, e.g. by accounting for the storage capacity of bioretention structures and ensuring the genuine permeability of surfaces with proper storage layers. Moreover, the calculation sheet is not entirely equitable, as different interpretations can be used to achieve the required factor outcome in various ways. To address this, Turku University of Applied Sciences (TUAS) is conducting an analysis in an area where the Blue-Green Factor has been implemented to evaluate how the planned measures align with reality. The analysis is expected to produce results that can benefit the customization efforts in Normandy.

Moreover, further developing the BGF in SWF will require cooperation with local and regional stakeholders, including businesses. For instance, training sessions for building control and urban planning departments, utilising the results from the BGF analysis of TUAS, are being planned for 2025. Insights from this stakeholder work will be shared with Normandy to support the local stakeholder work conducted in the twinning region.

For Normandy, the main goal of the transfer is to provide local authorities in charge of urban planning (municipalities or associations of municipalities) with a tool in favour of NbS that are meant to be used while preparing for their public planning phase. More specifically, it is planned to create a customized version of SWF's BGF tool, considering local needs and conditions in Normandy. Then, the implementation phase will be divided into two phases:
firstly, at a local scale, while testing the customised BGF tool in a designated pilot site, the city of Barentin, which is a member of the Caux-Austreberthe municipal community, and secondly, with the dissemination of a finalised version of the tool at the scale of the Normandy Region or further.

As mentioned above, the first step of the envisaged level solution demonstration in Normandy is identified with the City of Barentin. Cerema is currently leading an R&D study for the local watershed syndicate, in the territory of Barentin, associated with the municipal community and the Normandy Region, which aims to target the potential for desilting and renaturation in the territory. This pilot site was selected because it constitutes a node in terms of ecological continuity, and the heavy urbanisation increases the flooding and run-off risks created by the topography. Measures have already been taken in the area, with a PPRI (Plan de prévention du risque inondation – flood risk prevention plan) approved in 2022, flood prevention initiatives and a multi-year river management plan validated in 2019. In this framework, the inputs from the R&D study will result in planning redevelopment work in the areas identified. Moreover, this multi-factorial study is being conducted in parallel with the PLUi revision (Plan local d'urbanisme intercommunal - local urban planning document) by the Caux-Austreberthe municipal community and which defines all the planning rules that apply to development and construction projects on its territory. Thus, the BGF solution could be an additional tool guiding the City of Barentin through its planning projects following the study, and integrating the BGF in the PLUi will ensure its use and that a more sustainable solution is available while elected representatives and urban planners undertake their projects.

During the second step of the customised BGF tool implementation, the RESIST partners in the Normandy Region and, on a larger scale, Cerema will make the tool their own and fully adapt it to be used in larger territories than the municipal community level. Finally, in order to ensure the successful implementation and further uptake, the transfer will also focus on promoting the BGF tool to public and private stakeholders (elected representatives, municipality services, industries, building companies, etc.) who will have to use it as required in the PLUi. Their awareness regarding the use of the BGF will increase the chance of adapting it and will, therefore, enable Normandy and SWF to collect essential feedback from various stakeholders. This promotional activity will also highlight the need for the implementation of sustainable adaptation actions and NbS on the Normandy territory.

2.2.1.2. Measures to overcome barriers and customization needs

There are some differences between the regions of Southwest-Finland and Normandy, which might impact the transfer of the BGF solution. Obvious differences are related to the environmental, political and legal dimensions.

The main risks related to climate change, that should be considered when customising the BGF solution for Normandy region, are increased exposure to storms and hurricanes, as well as elevated risk of flooding and landslides, impacting inhabitants, housing and infrastructure, and thus continuity of economic activities. Given its position in the Austreberthe and Saffimbec watersheds, the pilot site chosen for the BGF transfer is actually facing high risks of flooding and runoff, which is already affecting its population. In fact, over 12 natural disaster decrees have been issued in the City of Barentin over a period of almost 30 years (1993-2020). The territory and population's exposure to these risks led to order the study conducted by Cerema and to the planning of urban development work to adapt to climate change.

In terms of policy, and similarly to Finland, there are three levels of local government in France: municipalities (and inter-municipalities), departments and regions. Each level is given specific responsibilities and is entitled to conduct actions in designated areas. In this frame, the transfer of the BGF tool will involve the participation of both regional and municipality/intermunicipality levels. Indeed, the Normandy Region will work with the Caux-Austreberthe municipal community, the City of Barentin, and Austreberthe and Saffimbec watershed Syndicates to transfer the BGF tool. This cooperation between local authorities is essential, as municipalities and intermunicipalities are in charge of urban planning, housing, environment (with PCAET, Plan Climat Air Energie Territorial - territorial climate-air-energy plans). Their involvement during the testing and dissemination phase will ensure the proper implementation of the BGF tool at the most local level, as closely as possible, to public and private stakeholders of the Normandy territory.

Finally, the transfer of the BGF tool in Normandy will have to comply with different legal frameworks that are binding to local authorities' actions: Regional Scheme for Planning, Sustainable Development and Territorial Equality (SRADDET), Territorial Climate-Air-Energy plans (PCAETs), Master Plan for Water Development and Management (SDAGE), Territorial Coherence Scheme (SCoT) and the Local and Intercommunal Urban Planning document (PLUi). As the Blue Green Factor is a factor-based policy instrument guiding local authorities to reach desired levels of green and blue in new development projects, it made perfect sense to integrate the BGF into the PLUi more specifically because it defines all the planning rules that apply to development and construction projects on a given territory. Thus, the use of BGF will be at least legally binding while planning development project in each territory integrating this tool in its PLUi, ensuring at the same time that local stakeholders get acquainted with this solution of adaptation. In Table 4 the barriers of adaptation and customisation need are identified. **Error! Reference source not found.**Table 5 below, key elements of the solution profile are highlighted.

Table 4: Measures to address barriers and customization needs.

NAME OF THE SOLUTION: Blue green factor			
Type of barrier	**Barrier description**	**How can the barrier be overcome?**	
		Measure to address barrier.	**Customisation of solution**
Climate and geography	Different climates and urban structures may require adjustments to the Blue-Green Factor model used elsewhere.	Comparison of urban structures and climate between SWF and Normandy, to find out if the tool must be adapted and if so, how.	Implement local data about hydrological, hydraulic, biodiversity and climatic models. This data-driven approach will allow for better calibration of the BGF tool, ensuring it accurately reflects the regional water flow, land use, and urban layouts. The data used will come from existing data and from Cerema's R&D study.
Technical will	Lack of technical support or competing priorities can slow or prevent implementation into the existing technicians' agenda and tools.	Presentation and communication to motivate and involve all the actors.	Cerema and the Normandy region must engage in close collaboration with the municipal community. Organize workshops and community engagement sessions to actively involve local public actors.
Political will	Lack of political support or competing priorities can slow or prevent implementation into the existing planning document.	Presentation and communication to motivate and involve all the actors.	The Cerema and Normandy region must engage in close collaboration with the municipal community. Organize workshops and community engagement sessions to actively involve local public actors.
Public reaction	Resistance, for example, from local communities or experts	Convince and get on board the private sector, university experts, NGOs, etc.	In a second step, the BGF tool should be co-designed with local actors such as architects, construction companies or urban developers. Organize workshops and community engagement sessions to actively involve local stakeholders, including residents, experts, and civil society organisations, in the co-creation of BGF solutions. Address concerns through open dialogue and tailored solutions to reflect community needs and preferences. Promote public-private partnerships and provide financial incentives, such as tax breaks or grants, for businesses that adopt green infrastructure projects or contribute to regional adaptation plans.
Urban planning policy	Integration into city planning	Communicate upstream with elected representatives to	This barrier, for now, only concerns the first pilot site but is highly limiting. As a matter of fact, the BGF transfer must meet the current timeline of the city planning document's revision.

		integrate the tool into their planning documents.	
Financial support	Lack of financial support from local authorities to implement the BGF tool or to implement the recommendations issued by the BGF tool.	Communicate with elected representatives to integrate financial support to the BGF implementation and ensure its use by local stakeholders. Estimate the additional workload that will be required by the local authorities to provide Finnish experience feedback.	Organize promotion sessions towards the local authorities, design a specific call for proposals or integrate the use of BGF into an existing one.

Table 5: Solution profile for Blue-green factor (BGF) tool, customized to Normandy.

NAME OF SOLUTION: Blue-Green Factor (BGF) tool		
Short description of the adaptation solution The Blue Green Factor (BGF) is a factor-based policy instrument to ensure and maintain desired levels of green and blue in new development projects. In practice, the blue-green factor is a three-step spreadsheet: The plot and planned construction data with target values are entered as initial data. Then, the amount of vegetation, surfaces and possible stormwater structures are described on the actual calculation tab. Finally, the numerical value of the green coefficient is presented as the result. In addition, the proportion of impervious surface area and the volume of stormwater retention structures are also shown.	**Type of solution** Policy instrument	**Solution provider region** Southwest-Finland
VALUE PROPOSITION		
Target group The blue-green coefficient is a tool primarily used in urban planning and construction supervision. BGF is a plot- and block-level planning tool. Urban planners in local authorities are the primary target group, and to get started in Normandy, these will be the Caux-Austreberthe urban planners at the pilot site. Moreover, the blue-green coefficient is also a checking tool for the private sector, i.e. designers who create yard plans in an urban area.	**Main benefits for the target group (purpose)** The expected outcome is the increase of green spaces in urban areas. Application of the BGF permits to share the costs of adaptation between the public and the private sector and encourages the use of NbS for vegetation and stormwater management. Successful use of the BGF protects water resources and infrastructure by reducing run-off and infiltrating rainwater, thus increasing resilience.	**Social and environmental co-benefits for the target group and other groups** Improve public health through ecosystem service: filtering air and water pollution, reducing heat islands and increasing recreational spaces. Protect infrastructures and habitations from extreme meteorological events and increase property values. Increase chance of survival for flora and therefore fauna thanks to better water resources. Protect biodiversity by reconstituting ecologic corridors. Store carbon in large, long-lived trees.
SOLUTION DETAILS		

<table>
<tr><td>Climate impacts addressed
Stormwater flooding, loss of green in urban areas, urban heat island in the surrounding environment.
Vegetation balances small and local climates, i.e., heat, windiness, humidity, and air quality
Green yards support the diversity of urban nature and the connection of green areas
Along with the decentralised management of stormwater, the quality of discharge water bodies is also nurtured.</td><td>Delivered results
A tool ready to be used by the local authority's urban planners as part of the PLUi, and a working method that will enable it to be implemented in other areas thanks to feedback from experience.
At the same time, the tool's performance and feedback from public and private users will be monitored.</td><td>Spatial scope
The spatial scope of the BGF implementation will primarily focus on the Caux-Austreberthe community of municipalities. The next step is to extend the transfer to the whole Normandy region.</td></tr>
<tr><td colspan="3">VALUE CREATION AND DELIVERY</td></tr>
<tr><td>Key resources
Personnel months to adapt the tool and communicate about it with stakeholders.
Expertise (e.g. one factor in the Excel is biodiversity (should use local plants to improve biodiversity)) and data to adapt the Excel file itself.
Expertise and feedback from BGF users (Finland and Normandy during the implementation)</td><td>Key activities
Adapt the values and the tool itself (if you want, you can add point for biodiversity etc.)
Collect experiences from piloting (policy adapted to results from the study)
Promotion of the customised solution to other local authorities, and implementation of the solution in other territories
Measure the efficiency of the tool (implementation of NbS/retention, etc)/indicators/user feedback.</td><td>Project owner and key partners
The project is owned by the team implementing it in the receiving region (Cerema, Normandy Region and OFB).
Key partners are the public actors using it in their planning documents.</td></tr>
<tr><td colspan="3">COSTS AND PLANNING</td></tr>
<tr><td>Estimated costs (implementing and operating)
Personnel months of realisation and assessment to adapt the tool, find stakeholders and help with training new users. Approximately 1PM for Cerema and 1PM for the Region Normandy each year.
Communication and organisation of events promoting the tool and the transfer (workshop, presentation with public and private actors). Approximately 2 events could be organised each year.</td><td>Revenues / monetised benefits
Savings and monetised benefits as implementation lead to less flooding damage.
Higher rental prices and real estate prices thanks to improved living conditions created by nature in the city.
Local companies might benefit if they provide the solutions needed for the new approach to urban development.
Fewer medical costs thanks to health benefits with the improvement of the living environment: better</td><td>Time frame for planning and implementation until fully functional
As the solution must be integrated into urban planning documents, the implementation will take years to be fully functional and even more so in other territories than the pilot site.
Hence, before the end of the RESIST project probably only one or two territories will be using the BGF. In the long term, the project owners aim to implement the tool in the entire region.</td></tr>
</table>

	air quality, mental and social health improvement, more physical activities, etc.	
CONTEXT		
Necessary prerequisites Ideally, the transfer of the BGF matches with the municipality and community of municipalities' revision of their urban planning legal framework. Indeed, the integration of the BGF in such a legal document would ensure the success of the transfer and the proper use of the tool, but unfortunately, this process of revision is quite heavy and does not happen frequently. At the pilot site in Barentin, local authorities are currently revising or planning to revise their urban planning documents very soon and are thus the right candidates for the transfer.	**Success factors** The success of the transfer will depend on active communication with local stakeholders and engaging in a genuine dialogue. The communication activities shall focus on promoting a tool that is designed for all and that "must" be used when implementing adaptation strategies. Moreover, information sessions will be organised to present the BGF but mostly to train key stakeholders on its proper use.	**Limiting factors** Limiting factors include the capacity of local authorities to develop control teams that are able to review plans and assess their feasibility. These same teams should be able to follow up on the implementation phase of the development work that was evaluated through the BGF. Another limiting factor could be the level of know-how among planners and architects, and their ability to integrate the BGF in their planning work. Finally, existing buildings or protected buildings might impact the use of the tool and its effectiveness.

2.2.1.3. Resources and costs

The resources planned for the transfer of the BGF to Normandy include personnel months to adapt the tool and communicate about it with stakeholders, as detailed in **Error! Reference source not found.**Table 6. While Cerema will be in charge of the technical parts of the transfer, Region Normandy will come into support when engaging stakeholders in dialogue and undertaking communication activities around the use of BGF. Further resources could be required while adapting the component dedicated to local biodiversity in the customised BGF. Indeed, we would have to find the proper expertise and the data to adapt the tool and the calculation applied in the Excel file.

The costs identified to ensure the transfer of the BGF in Normandy are below in Table 6.

Table 6: Planned costs for the BGF.

Planned costs	**Details**	**Sources of funding (RESIST budget or other)**
Staff costs	Personnel months for: -Customization (adapting the tool to local conditions and needs in Normandy) -Promoting the customised tool to public and private stakeholders -Assessing the tool during its implementation phase Altogether, approximately 1PM for Cerema and 1PM for the Region Normandy	Staff costs from RESIST when people from SWF and Normandy (Cerema and Normandy Region) work on the customisation and implementation of the BGF tool.
Promotional events	To ensure the BGF tool is successfully implemented in Normandy, promotional events will be organised to raise public and private stakeholders' awareness of the use of such a tool. These promotional events will be workshops and information sessions for public and private actors.	Subcontract costs as planned in the RESIST budget

2.2.1.4. Planning the transfer

Objective, purpose, results and planned activities

The overall objective, purpose, results and planned activities to build the BGF are described in Table 7.

Table 7: Logframe Matrix for the BGF.

Transfer project description	Indicators	Source of verification	Assumptions
Overall objective Increase of green areas and NbS in urban areas	Number of green areas Number of local projects undertaken Number of NbS implemented	Survey among/interviews with local authorities, urban planners monitoring and feedback, R&D studies conducted by local authorities to plan redevelopment projects, including measures of adaptation	
Improved stormwater management due to reduced run-off and rainwater infiltration	Relative reduction of flooding, run off and soil erosion in areas where BGF has been applied.	Hydrological and bioclimatic modelling, urban planners monitoring and feedback, R&D studies conducted by local authorities to plan redevelopment projects, including measures of adaptation	
Reduced loss of biodiversity by the reconstitution of habitats and ecological continuities thanks to the BGF tool's recommendations	Number of NbS implemented	Survey among/interviews with local authorities and urban planners	
Raised awareness among local authorities regarding their green efficiency and the permeable surfaces in their urban areas	Percentage of local authorities that demonstrate a high level of awareness of the climate resilience effect of green areas and NbS	Survey among/interviews with local authorities	
Purpose Local authorities use the BGF as a decision support tool and are fully engaged in conducting development works to reduce the risks of flood, runoff and soil erosion.	Number of urban planners in local authorities applying the BGF Frequency of the BGF application	Survey among/interviews with local authorities	The transfer of the solution will be completed only if local authorities are willing to integrate the BGF into their urban planning schemes and if the BGF is then properly

			implemented (used and applied to urban areas)
Urban planners have increased knowledge about NbS projects in the region	Percentage of urban planners with an overview of the number of public or private planning projects contributing to climate change adaptation	Urban planners monitoring and feedback, local authorities' reports (construction permits, mapping of urban areas, etc.)	The transfer of the solution will be completed only if local authorities are willing to integrate the BGF into their urban planning schemes and depend on the local stakeholder's engagement to take into account the BGF result in their projects.
Local stakeholders are oriented and motivated to carry out more beneficial and exemplary projects.	Number of stakeholders with awareness of climate risks and NbS' potential to reduce these Number of local non-governmental NbS projects implemented	Survey among/interviews with local stakeholders	
Results BGF tool is adapted to the regional context is up and running as an Excel tool.,.	Fully functional BGF Excel tool	Project report	
Local authorities (elected officials and technicians such as urban planners) are provided with and have been introduced to the tool.	Number of local authorities introduced to the tool	Project report	
Events promoting the tool and the transfer (workshop, presentation with public and private stakeholders) have been conducted	2 events organised each year	Project report	
Activities The tasks needed to deliver the BGF in Normandy are: The customisation, technical adaptation and improvement of the BGF for the Normandy Region. BGF implementation in Normandy's pilot site Caux-Austreberthe community.			First, we assume that the customised solution will answer our pilot site's needs and then other local authorities' needs. It also depends on local authorities' will to integrate the BGF into their urban planning schemes and that local stakeholders will mainly take the BGF into account while engaging in their planning

Promotion of the customised solution to other local authorities and implementation of the solution in other territories Improve the transferred tool based on user feedback. Follow-up of the BGF implementation in Normandy.			projects. All these factors will be successful if the promotion phase is widely conducted and effective all over Normandy.

Next steps

The next steps to be planned are:

- Meeting with Caux-Austreberthe community to convince them about the BGF transfer in their planning document.
- BGF tool technical adaptation
  - City of Turku feedback (BGF creation and daily use)
  - Caux-Austreberthe community feedback (planning document daily use)
  - Finnish private actors feedback about BGF use
  - Tool adaptation (translation, numerical value, adaptation of the biodiversity factor...)
  - User testing
- Implementation in the Caux-Austreberthe community
- Evaluation and continuous improvement
- Communication to implement the BGF in other territories and regions

Timeline until 2027

Activities January 2025 - May 2025

- **Customisation of the BGF tool for the pilot site and Normandy:** Technical adaptation of the tool with the help of the City of Turku (feedback regarding the conception, the daily use etc.) taking into account local regulations in terms of Urban Planning in France and Normandy. This task includes activities of translation, adaptation to numerical values, integration of local factors related to biodiversity in Normandy and user testing
- **Milestone 1 (April 2025):** BGF customised and ready for the implementation phase

- **Preparing the implementation of BGF in the pilot site designated for this transfer:** This task includes discussing with different local stakeholders (the Caux-Austreberthe municipal community, the City of Barentin, and Austreberthe and Saffimbec watershed Syndicates) to ensure the application of the BGF tool once customised (testing phase) and the integration of the BGF application in the local urban planning schemes ensuring its right use in the future redevelopment work

- **Milestone 2 (May 2025):** Pilot site engaging in using BGF and integrating it in the local urban plan (We cannot predict when the local urban plan integrating the BGF will be voted and applied on the pilot site territory, but we aim at engaging the elected officials and their urban planners teams to begin testing the customised BGF and implement it into their local urban planning projects.)

Activities May 2025 - December 2025

- **Implementation phase of the BGF solution in the pilot site designated for this transfer:** Urban planners use the customised BGF and collect feedback to approve the solution or improve it before further implementation in Normandy.
- **Milestone 3:** Feedback from the first pilot site regarding their use of the BGF

Activities September 2025 - May 2026

- **Promotion of the customised solution to other local authorities in Normandy**
- **Milestone 4:** Regular information sessions with local stakeholders promoting the BGF
- **Milestone 5:** List of local authorities which have shown an interest in implementing the BGF

Remaining activities until the end of the RESIST project (2027)

- **Implementation and follow-up of the BGF to other sites in Normandy**
- **Milestone 6:** Report on the BGF application in Normandy

Meetings with SW Finland all along the transfer:

- January 2025: Launch of the transfer and review of the timeline
- March 2025: Presentation of the customised BGF
- June 2025: BGF implementation progress and feedback on discussion with local stakeholders from the Barentin pilot site
- October 2025: BGF implementation progress in the Barentin pilot site
- December 2025: Feedback on Information session for local stakeholders and transfer report on the BGF implementation in the pilot site of Barentin
- Following the transfer of the BGF in the pilot site of Barentin, other meetings could be organised until the end of the RESIST project in order to discuss the implementation of the solution in the Normandy region in general. The number of meetings needed shall be set following the information sessions about BGF that will help the Region Normandy and Cerema to assess the number of local authorities that are willing to implement the BGF.

2.2.2. Transfer 2: Raingarden catalogue approach

2.2.2.1. Solution description and transfer goals

The transferred solution is a raingarden catalogue, with the primary goal of sharing knowledge about raingardens and guiding water management in residential areas toward more sustainable practices. In SWF, the catalogue will include information on the implementation, functionality, benefits, and requirements of a raingarden, specifically in private yards. In addition, it will showcase actors in the area who are implementing or planning raingardens. The catalogue aims to lower the threshold for homeowners to choose raingardens as part of their stormwater management system, thereby helping to mitigate the effects of climate change. The main target group of the solution in SW Finland is then the private homeowners, while Normandy will target local authorities in charge of urban and rural planning and whose development works could also benefit from raingarden implementation.

Raingarden is a nature-based climate change adaptation measure that is fit for residential property.
Raingarden provides:
***Water retention** (decreasing storm water flow peaks & flooding), regeneration of ground water, (aesthetic values, biodiversity)*
Stormwater from property is directed to vegetated water retention and filtration system. Filtered water can be collected and redirected to the stormwater system. Part of the water will infiltrate or evaporate.

The transfer between SWF and Normandy includes the concept of a raingarden catalogue developed in the RESIST project, as well as the exchange of lessons learned in the utilisation of the catalogue. Transfer targets in the increased use and co-development of the method for broader impact.

The main objective of the transfer for Normandy is to design a raingarden catalogue for local authorities in charge of urban and rural planning and will, therefore promote widely the use of NbS in order to limit the runoff and flooding in public or private areas. Raingarden is a nature-based adaptation measure that needs to be widely promoted to local authorities in charge of planning in Normandy so that they can integrate raingardens into their strategy of adaptation. This solution was interesting because it could fit all types of territories in Normandy, as its implementation is possible in rural, urban or industrial areas.

SWF and Normandy will work together to define more precisely what content will be displayed in the raingarden catalogue. Both regions should agree on the general information provided in the catalogue (presentation of the scientific and technical context, what are raingardens, and what are the benefits, requirements and functionalities) and then adapt the rest of the document to local regulations and climatic conditions that differ from one region to another.

Thus, Normandy intends to provide a series of various success stories of raingarden implementations and will have to identify examples of such projects to exhibit them in the catalogue. The point will be to highlight raingarden use in different types of areas – urban, rural, industrial – the use of local species of vegetation for specific needs, or the type of infrastructure depending on the type of raingarden used. Finally, the catalogue will have to integrate future predictions of climate change in Normandy so that local stakeholders are provided with a solution that already meets the challenges of tomorrow.

Normandy will work closely with its 4 pilot sites so that the catalogue meets their expectations regarding the planning of raingardens in their territories (public or private areas). They will be invited to share their good practices, the limits they already face regarding their implementation and sustainability, and their strategy of dissemination to ensure the use of the catalogue on their territories. Their feedback will enable Normandy to provide all its territory a final version of its raingarden catalogue.

2.2.2.2. Measures to overcome barriers and customization needs

The weather and vegetation in the provider and recipient regions differ to some degree, and therefore raingardens in the areas are different. This must be considered in the catalogue itself in many ways, including the information about raingardens and the visualisations. Also, the political dimensions, customs and practices of organisations and companies, as well as regulations for land use, are different. These all affect the transferability and will lead to customisation. Public authorities and private houseowners may also have different levels of knowledge on the raingardens in SW Finland and Normandy.

The above-mentioned differences between the provider and recipient regions, and barriers described in **Error! Reference source not found.**Table 8 challenge the transfer and lead to the need for customisation.

In Normandy, the raingarden catalogue will be disseminated to local authorities engaging in the implementation of NbS as part of their strategy of adaptation. Thus, the customisation of the raingarden catalogue from the SWF solution will have to take into account all the differences listed between SWF and Normandy that could turn into a barrier while implementing the solution. The following measures in Table 8**Error! Reference source not found.** explain how we plan to overcome these barriers, but the main measures to be addressed are the difference of the target group (designed for local authorities and not for private landowners) and the integration of local conditions (local species of vegetation, soil, infrastructure).

Table 8: Measures to address barriers and customization needs.

Rain garden catalogue approach			
Type of barrier	Barrier description	How can the barrier be overcome?	
		Measure to address barrier	Customisation of solution
Political dimension	The political actors and their scope of actions are different. The involvement of other local authorities is needed in Normandy to act as intermediary actors between the Normandy Region and the public and private stakeholders.	Involvement of other actors at the local level – municipalities and inter-municipalities – to help design and disseminate the raingarden catalogue in the region.	The catalogue will be designed to be used by local authorities in Normandy to support local projects undertaken by public or private actors.
Language and regional differences	The catalogue will be produced in the local language, as it is intended for the local citizens. The companies featured in the catalogue are also regionally specific.	Translation of the catalogue into the local language. Local companies can also be contacted.	The catalogue will require customisation of the language and the featured companies.
Environmental conditions	The climate and environmental conditions vary due to the different geographical locations.	Collect images of local rain gardens that have plants suitable for the local conditions. The text of the catalogue can be translated directly.	Consider the different climate and environmental conditions when visualising the catalogue.
Habits & manners	Organisations and companies can have different approaches, which implies that the methods for contacting them and engaging them may vary.	Discussion on identifying both the differences and similarities of the local customs beforehand.	The receiving region identifies the most suitable approaches and customises the catalogue accordingly. They will also choose the most appropriate methods for cooperation.
Planning regulations	The regulations regarding rain gardens in law and construction may differ between Finland and France.	Recognising the regulatory obstacles that need to be considered in the transfer.	Customising the catalogue to comply with the regulations.

Financial regulations	The regulations regarding the use of public funds may differ between Finland and France (partnership with specific companies, costs of communication and dissemination).	Recognising the regulatory obstacles that need to be considered in the transfer.	Customising the catalogue to comply with the regulations.
Communication	The corporate identity and style guide will differ from the SWF catalogue to Normandy's version.	Discussing the obligations in terms of communication in each region and identifying the common parts of the catalogue that need to be preserved.	Customising the catalogue to comply with the communication rules (corporate identity and style guide).

The key elements of the raingarden catalogue are described in **Error! Reference source not found.**Table 9. It will act as a promotional and decision-making tool in Normandy. With the catalogue dissemination, Normandy will support local authorities in the implementation of their adaptation strategy while enhancing the use of raingardens on their territory. By promoting this NbS, we aim to increase the number of raingardens in Normandy over the coming years.

Table 9: Solution profile for raingarden catalogue, customised to Normandy.

NAME OF SOLUTION: RAINGARDEN CATALOGUE		
Short description of the adaptation solution The first key component of the solution is a tangible raingarden catalogue that is distributed to homeowners or local authorities in charge of urban planning. The second component is either an approach to engaging companies in the project or a focus on raingarden implementation success stories. The final key component is an approach to distribute the catalogue effectively.	**Type of solution** Physical, possibly also digital solution	**Solution provider region** Southwest Finland
VALUE PROPOSITION		
Target group The target group of Normandy's raingarden catalogue is local authorities. They will be using the catalogue in Normandy to implement raingardens as part of their planning projects (conducted with private or public stakeholders).	**Main benefits for the target group (purpose)** The target group (local authorities) will be given awareness that this nature-based adaptation measure exists and that it can be implemented on their territories, whether they are in urban, rural or industrial areas.	**Social and environmental co-benefits for target group and other groups** • Provides water retention and regenerating ground water: better stormwater management system. • Protects infrastructures and habitations from extreme meteorological events and increase property values. • Reduces risks of flooding, runoff and soil erosion, and consequently all costs that would result from them.
SOLUTION DETAILS		
Climate impacts addressed Flooding during heavy rains, drought, and heat risks in urban/semi-urban areas.	**Delivered results** The result of the solution is increased awareness and interest in raingardens, which is expected to result in a greater number of raingardens in the area. Increase of raingarden implementations.	**Spatial scope** The transfer will first involve Normandy's four pilot sites, which are local authorities (municipalities / intermunicipalities). Their contribution will help design a catalogue that will then be disseminated all over the regional territory.
VALUE CREATION AND DELIVERY		
Key resources The key assets for the solution are the working hours required for customisation and the printing costs of the catalogue. It will also be necessary to work closely with local experts on raingarden implementation (technicians of stormwater management systems, public funding agencies	**Key activities** Discuss common content with SWF • Identify success stories to highlight the benefits of raingarden implementation and collect experiences from pilot sites	**Project owner and key partners** The project is owned by the team implementing it in the receiving region (Cerema, Normandy Region and OFB). Key partners: Local authorities in the four pilot sites

etc.) to collect data required for the customisation of the catalogue.	• Presentation and communication with local stakeholders • Involve experts of local species of vegetation to be included in the catalogue • Discuss the design of the catalogue with the communication service of the Normandy Region	
COSTS AND PLANNING		
Estimated costs (implementing and operating) The estimated costs include personnel months for the customisation of the catalogue (preparing the content, collecting scientific and technical information for the adaptation to Normandy's local conditions), promoting the catalogue during information sessions, workshops, and technical meetings, and evaluating the catalogue's impact (follow-up of the raingarden implementation projects in Normandy). The transfer will also include costs related to the organisation of promotional events, such as room booking, catering, etc. Printing costs and digital design services are also planned.	**Revenues / monetised benefits** Not available	**Time frame for planning and implementation until fully functional** The raingarden catalogue will be ready in Normandy by month 34, and its dissemination will continue for the rest of the RESIST project and beyond.
CONTEXT		
Necessary prerequisites None, except basic IT skills.	**Success factors** The success of the solution depends on the willingness of local authorities to implement this nature-based measure. Success will then depend on communication actions to promote and disseminate the catalogue to the target group. The success of the transfer will also rely on the active participation of local authorities (Normandy's four pilot sites) with the design of the catalogue answering their needs as precisely as possible.	**Limiting factors** The limiting factors include the lack of involvement or interest of local authorities in raingarden implementation. The success could be limited if we do not find enough exemplary implementation of raingardens in Normandy, consequently reducing the persuasive impact of the catalogue. The wrong format of the catalogue could also limit the success of the transfer. The raingarden catalogue should be accessible and understandable by elected representatives and technicians working for local authorities.

2.2.2.3. Resources and costs

Required/planned resources are working hours required for customisation and communication resources for design, printing and the final dissemination of the catalogue (Table **Error! Reference source not found.**10).

Table 10: Planned costs for the transfer of the raingarden catalogue.

Planned costs	Details	Sources of funding (RESIST budget or other)
Staff costs	1,5 Personnel Months for: • Customization of the catalogue (a. collecting information for the content, general, scientific and technical information, b. collecting data regarding existing raingarden project, c. use of local species of vegetation; design of the catalogue) • Promoting the customised catalogue to local authorities in Normandy • Assessing the catalogue use: collecting data regarding new raingarden projects in Normandy	Staff costs from RESIST when people from SWF and Normandy work on the customisation and dissemination of the raingarden catalogue.
Promotional events	Organisation of at least 2 information sessions/workshops to promote raingardens and provide target groups with the catalogue	Subcontract costs as planned in the RESIST budget
Printing costs	As part of the dissemination phase, copies of the catalogue will be printed and distributed to local authorities.	Subcontract costs as planned in the RESIST budget

2.2.2.4. Planning the transfer

Objective, purpose, results and planned activities

The raingarden catalogue's purpose is to lower the threshold for local stakeholders to choose to implement raingardens as part of stormwater management. Therefore, it aims to reduce stormwater flood damages, enhance sustainability and help to mitigate climate change impacts (**Error! Reference source not found.**Table 11).

Table 11: Logframe Matrix for the planned transfer of the raingarden catalogue.

Transfer project description	Indicators	Source of verification	Assumptions
Overall objective Reduced storm water flood damages and mitigation of climate change impacts in places where raingardens have been implemented	Number of solved and mitigated storm water-related issues or problems	Information is collected from local authorities through questions and surveys.	-
Purpose Increased understanding, awareness and acceptance of raingardens among local authorities in Normandy	Level of general knowledge regarding raingarden implementation, their benefits and sustainability. Number of local stakeholders aware of and using the raingarden catalogue	Information is collected from local authorities through questions and surveys.	The transfer of the solution will be completed only if local authorities are willing to implement green infrastructure and more particularly raingarden in their planning schemes.
Local authorities increasingly favour raingarden solutions, resulting in more widespread implementation.	Number of raingardens implemented in the region, within and beyond the four pilot sites		
Results The raingarden catalogue has been published.	Published raingarden catalogue	Project report	The transfer of the solution will be completed only if local authorities are willing to implement green infrastructure and more particularly raingarden in their planning schemes. Their participation in the communication activities dedicated to the raingarden implementation and the dissemination of the catalogue will demonstrate their interest in the solution.
Local authorities have participated in workshops or information sessions dedicated to raingardens.	Number of local authorities participating Number of technical meetings organised by local authorities to discuss this opportunity within the community.	Information is collected from local authorities through questions and surveys.	
Public understanding and interest in raingardens have increased.	Level of knowledge about raingardens.	Survey/interview with the public	
Activities The key activities begin with engaging local authorities (municipalities, intermunicipalities) in the	The activities of the transfer will be completed with the design and dissemination of a catalogue dedicated to		The success of the activities relies on the interest of local authorities towards raingardens as a

project. Next, the raingarden catalogue should be developed into a tangible and visually appealing product. Finally, the catalogue should be effectively distributed.	raingardens and the effective organisation of information sessions/workshops or meetings with local authorities in order to promote raingardens and the catalogue.		solution of adaptation and how effectively the catalogue will be spread widely to them.

Next steps

SWF: The transfer will begin with meetings with Normandy representatives. Following this, information will be shared with France whilst the catalogue is being finalised. The first draft will be completed by February 2025, with the entire catalogue finalised by June 2025. Additionally, the description of stakeholder cooperation will also be completed by that time. The ultimate deadline for the catalogue in SW Finland is at the end of 2025.

Normandy: Begin the transfer with regular meetings between SWF and Normandy in order to monitor the design and dissemination of their catalogue. Both regions will share feedback, and obstacles met for each milestone achieved. Normandy will carry out the following activities to provide a first draft by June 2025 and a final version by October 2025:

- Reaching local authorities to evaluate their knowledge and practices regarding raingarden implementation
- Identifying good examples of raingarden implementation in Normandy
- Collecting information regarding local species of vegetation that should be highlighted in the catalogue (with Cerema collaboration)
- Collecting information from SWF regarding general knowledge of raingarden as edited in their catalogue
- Working with the Communication Department of the Normandie Region to take into account current regulations for the design and printing of the catalogue
- Final design and printing of the catalogue
- Promoting the catalogue: distributing it to local authorities during information sessions or meetings with elected officials or technicians.

Timeline until 2027

Activities 12/2024-3/2025:

- **SWF:** Spreading information to local companies that offer services related to the design and construction of rain gardens can be effectively done through various social media channels. Direct outreach to companies is also a valuable approach, as it allows for a more personal connection and specific targeting of relevant businesses. Additionally, designing a visually appealing catalogue can attract attention and enhance interest, especially if the design aligns with the natural and sustainable aspects of rain garden projects.

- **Normandy:** Reaching out to local authorities - first, our pilot sites and, in a second time, other local authorities in Normandy – to evaluate their level of knowledge regarding raingardens and identify their potential needs and barriers while planning raingarden implementation. We would also identify existing raingardens in Normandy to complete our list of success stories. Finally, collecting data regarding the local species of vegetation that would be required in raingardens projects in Normandy.
- **Milestone 1** (March 2025, SWF): We have reached a sufficient number of companies, and the content of the catalogue has taken shape.
- **Milestone 2** (March 2025, Normandy): We have a good overview of what local authorities need and what kind of obstacles they may have met before while planning raingarden implementation. From this, we are able to finalise our list of selected good practices examples of raingarden implementation undertaken by local authorities in Normandy. We also have a list of local species of vegetation to be highlighted in the catalogue.

Activities 4/2025-5/2025:

- **SWF:** The actual implementation of the catalogue, layout design, and process will be carried out in collaboration with the participating companies.
- **Normandie:** Normandy should then collect the general information regarding raingarden as edited in SWF's catalogue in order to integrate it into its own version. The general information part will then be followed by the section giving success stories in Normandy. Once all the data is collected, we shall begin to work with the Communication Department of the Normandy Region to launch the design of the catalogue while taking into account the specific rules regarding our corporate identity and style guide.
- **Milestone 3** (May 2025, SWF): SWF has a ready first version of the catalogue ready
- **Milestone 4** (May/June 2025, Normandy): Normandy has a first draft version of its catalogue.

Activities 6/2025-8/2025:

- **SWF:** We deliver the catalogue in related events and consider how it could be developed further. Hopefully, the catalogue will inspire the construction of rain gardens, and we will see new implementations in the area.
- **Normandy:** Keeping up with designing the catalogue, collecting feedback from our pilot sites and validating internally a final version.

Activities from 9/2025 and beyond:

- **SWF:** A new version of the catalogue will be developed over the fall, potentially including new companies or recently completed gardens. We will continue distributing the catalogue at various meetings and events.
- **Normandy:** Following the validation of the final version of the raingarden catalogue, the next steps will then involve its printing and dissemination to local authorities in Normandy. The dissemination strategy will begin through information sessions focusing on NbS and raingarden implementation, where the target group of the catalogue will be invited and provided with the catalogue. Following these sessions, Normandy will keep in touch with

participants to assess their will to integrate raingarden as part of their strategy of adaptation and collect the data regarding new raingarden implementation projects in the region.

- **Milestone 5** (October 2025, Normandy): Final version of Normandy's raingarden catalogue
- **Milestone 6** (2025-2026, Normandy): Information sessions with elected officials and technicians from local authorities regarding raingarden implementation and follow-up of their planning projects integrating raingardens.
- **Milestone 7** (2025-2026, SWF): Raingardens implemented in the area

2.2.3. Transfer 3: Cost-benefit analysis

2.2.3.1. Solution description and transfer goals

Cost-benefit analysis (CBA) provides a systematic and transparent method for identifying the benefits and costs of projects over their lifetime, supporting efficient resource allocation and rational decision-making. An alternative is considered economically efficient if its net benefits are positive, meaning benefits exceed costs.

CBA evaluates the economic efficiency of projects or policies from society's perspective, assessing their monetary values over the project's lifetime. Benefits are increases in human well-being, and costs are reductions. For a project to pass, its net benefits must be positive. CBA measures a policy's economic efficiency or contribution to social welfare and can support science-based policy decisions. There are nine general steps in a CBA (Boardman et al. 2017[3]):

- Specify the set of alternative projects
- Decide whose benefits and costs count
- Identify the impact categories, catalogue them, and select measurement indicators
- Predict the impacts quantitatively over the life of the project
- Monetise all impacts
- Discount benefits and costs to obtain present value
- Compute the net present value of each alternative
- Perform sensitivity analysis
- Make a recommendation

CBA involves determining and monetising project impacts, discounting benefits and costs to present values, and conducting sensitivity analysis on key assumptions. Benefits and costs are evaluated in terms of changes to human welfare, with policy outputs measured as willingness to pay or accept compensation and inputs as opportunity costs.

[3] Boardman A., Greenberg, D., Vining, A. and D. Weimer, 2017, *Cost-Benefit Analysis, Concepts and Practice*, Prentice Hall.

Environmental projects, such as those involving NbS, often have various impacts, some monetised using market prices or cost-based methods, and others with economic valuation methods for environmental impacts. Market values are observable for ecosystem services sold on markets, like timber production, while non-use benefits, like recreation, lack market prices. Most environmental impacts of NbS have non-market values.

In the transfer, we will implement the cost-benefit analysis together with SWF and Normandy so that both regions follow the steps of CBA and learn and exchange experiences in meetings during the process. The cost–benefit analysis will be implemented and reported at a Normandy pilot site during the RESIST project and used as a model for further analysis on other sites of the receiving region after the project.

2.2.3.2. Measures to overcome barriers and customization needs

Context of NbS is similar between regions and does not induce difficulties for the transfer. Key barriers (Table 12) in Normandy include a shortage of economic expertise and difficulties in monetising non-market ecosystem services like biodiversity. Institutional capacity may also be a challenge, with local agencies potentially needing more expertise for complex CBA processes. Cultural differences in governance and decision-making and uncertainty and risk aversion could slow the adoption of new solutions.

The CBA solution will be customised for Normandy by emphasising the local costs of chosen solutions and local governance specificities.

Table 12: Measures to address barriers and customization needs.

NAME OF THE SOLUTION: Cost-benefit analysis			
Type of barrier	Barrier description	How can the barrier be overcome?	
		Measure to address barrier	Customisation of solution
Knowledge barrier	Shortage of examples	Identification of previous cases	Collection of relevant solutions
Knowledge barrier	Shortage of economic expertise	Discussions during the transfer process together with SWF and EMT experts	Timetable of Teams meetings
Decision barrier	Impact area is uncertain	Precise modelling	Stakeholder discussions
Knowledge barrier	Modelling expertise is limited, impacts are uncertain	Expert opinions may fulfil the gaps	Uncertainties are expressed in CBA
Data barrier	Data sources of costs are weak	Collection of local cost estimates	Adelphi handbook may provide more cost estimates
Data barrier	Data sources for benefits are unclear	Validate benefit categories with local stakeholders	Find benefit estimates together with SWF and EMT
Data barrier	Value information needs to be found	Adelphi handbook and discussions with SWF and EMT	Local application of value estimates needs to be created

The key elements of CBA are described in **Error! Reference source not found.**Table 13. The CBA will be provided for the local public stakeholders and decision makers (municipality, inter-municipality, watershed syndicate). CBA benefits the local processes by providing a thorough deliberation and discussions of benefits and costs of NbS. It is also aimed to motivate other territories of Normandy to consider NbS.

Table 13: Solution profile for CBA, customized to Normandy.

NAME OF SOLUTION: Cost benefit analysis		
Short description of the adaptation solution CBA provides a systematic and transparent method for identifying the benefits and costs of projects over their lifetime. We apply cost benefit analysis to the pilot site of Lisieux: re-opening the river le Petit Lieu**.**	**Type of solution** Decision making support	**Solution provider region** Southwest Finland
VALUE PROPOSITION		
Target group The solution is developed for the local public stakeholders involved in decision-making (municipality, inter-municipality, watershed syndicate). The region is also involved.	**Main benefits for the target group (purpose)** Information on the costs and benefits of implementing the NbS Assisting the decision-making process Convincing citizens and facilitating public discussion of NbS	**Social and environmental co-benefits for target group and other groups** More thorough deliberation and discussions of benefits and costs Motivate other territories of Normandy to implement NbS
SOLUTION DETAILS		
Climate impacts addressed - Flooding - Increase in temperature	**Delivered results** More detailed information on the costs and benefits of implementing the NbS. CBA provides information on whether the planned NbS are worth implementing, indicated by higher benefits than costs.	**Spatial scope** Upstream/downstream vision: - Work area (river length to be channelled and opened is approximately 350 m) - Watershed
VALUE CREATION AND DELIVERY		
Key resources Researchers' time, staff effort to find cost and benefit information, modelling time and effort**.**	**Key activities** Performing the steps of CBA (see above) Model calibration and validation Meetings (online or on-site) with stakeholders	**Project owner and key partners** - The project is owned by the team implementing it in the receiving region (Cerema, Normandy Region and OFB). - Local stakeholders
COSTS AND PLANNING		

Estimated costs (implementing and operating) Costs of implementing CBA: staff effort in RESIST project, if needed more expertise might be looked for (estimated 3 person months (PMs) per region).	**Revenues / monetised benefits** Better information basis for decision-making (hard to monetise)	**Time frame for planning and implementation until fully functional** CBA (in SWF month 36) in the case of Normandy month 48, to enable learning from SWF experiences
CONTEXT		
Necessary prerequisites Basic economic skills Data regarding the costs of solutions Data on benefits and their value Uncertainty of future benefits and costs (long-term benefits)	**Success factors** Local stakeholder involvement	**Limiting factors** Available information on costs and benefits.

Resources and costs

The costs include personnel costs in both regions. The estimated number of person months is 3 PMs per region (around 60 days). Normandy partners will adapt resources with the CBA method chosen by SWF.

2.2.3.3. Planning the transfer

Objective, purpose, results and planned activities

The ultimate goal of reducing flood and drought damages will be achieved by assessing various NbS options (see **Error! Reference source not found.**4). To apply the cost-benefit analysis (CBA) method for evaluating the NbS implemented in Normandy, a step-by-step CBA approach will be used. The findings will be documented to serve as a model for other local cases and organisations evaluating NbS.

The main aim for the Normandy region is to implement and assess the CBA methodology to guide decisions on environmental and NbS projects. This involves systematically evaluating the economic efficiency of these projects by comparing their long-term benefits and costs and creating a model that can be used at other sites in the region. The expected outcome is a detailed CBA report for Normandy, which will act as a tool for rational resource allocation and evidence-based policy decisions. Planned activities include a collaborative transfer process with the receiving region, where both regions will follow the nine steps of CBA. This process will include identifying alternative projects, monetising impacts (especially non-market values), conducting sensitivity analysis, and using the results to make informed recommendations. The results and experiences from this process will be shared through meetings, building capacity and ensuring the methodology is tailored to Normandy's specific environmental and socio-economic context. The CBA will also serve as a model for further analysis at other regional sites, potentially extending beyond the RESIST project's duration.

Table 14: Logframe Matrix for CBA.

Transfer project description	Indicators	Source of verification	Assumptions
Overall objective Enhance regional resilience to floods and droughts through the implementation of NbS, contributing to sustainable	Number of established and replicated new NbS Amount of CBA information provided for NbS decisions	CBA reported through regional environmental monitoring and RESIST evaluation reports, Flood prevention action programs reports	

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

development and climate adaptation.	Severity of flood impacts on human activities		
Purpose Regional decision-makers, local authorities, and stakeholders have access to clear, actionable insights on the costs and benefits of NbS.	Access to detailed economic evaluations, including cost, benefit, and net value analyses to support informed resource allocation and project prioritisation.	Regional publication databases, government portals, and project documentation repositories.	It is assumed that the availability of accurate data on NbS impacts and stakeholder engagement will be consistent and that regional authorities will prioritise the implementation of findings in their decision-making processes.
Increased investment into NbS, improving environmental resilience, economic growth, and community well-being.	Number of NbS projects implemented, including CBA	Survey among/ interviews with local and regional stakeholders, Regional funding portal	
Results The CBA report for the NbS to be implemented in the Normandy region has been published and disseminated to local authorities, stakeholders, and decision-makers, resulting in its integration into policy frameworks and project planning.	The report and findings can be accessed through regional publication databases, government portals, and project documentation repositories.	Feedback will be collected through structured interviews to ensure that the practical experiences and insights from the implementation process are integrated into the reporting and decision-making.	The key assumption is that reliable data on environmental impacts and economic factors will be available and that local stakeholders will actively engage in providing feedback throughout the project's implementation.
Dissemination and communication events and products for local and regional decision-makers.	Number of communication events Downloads of/demand for communication products		
Activities Step by step implementation of CBA together between the regions of LSDT. The steps are specified in 3.3.2.1.			Assumptions include the accuracy of data on environmental impacts, the ability to quantify non-market values, stakeholder cooperation, and external economic conditions that may affect project viability and CBA results.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Next steps

The transfer will start in the beginning of 2025 with the Teams meetings between Luke, EMT participants and Normandy representatives. In the meeting schedule of transfer is built in details to follow the Steps of CBA. The initial plan is to have one meeting per month. OFB will be the main responsible party for transferring the cost-benefit analysis of NbS to Normandy.

Timeline until 2027

Transfer of CBA takes place in 2025 with the steps defined in **Error! Reference source not found.**5 and the results will be reported in the first half of 2026.

The draft for timing of transfer of CBA.

Table 15: The draft for timing of transfer of CBA.

Timing	Step to conduct CBA
January 2025	Discussions with the local stakeholders
February 2025	Teams meeting with SWF to specify the set of alternative projects.
February 2025	Teams meeting with SWF to decide whose benefits and costs count.
March 2025	Identify the impact categories, catalogue them, and select measurement indicators.
April 2025	Predict the impacts quantitatively over the life of the project.
May 2025	Monetise all impacts
June 2025	Discount benefits and costs to obtain present value
September 2025	Compute the net present value (NPV) of each alternative.
October 2025	Perform sensitivity analysis
November 2025	Make a recommendation
December 2025-April 2026	Reporting

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

3. Transfer Plan – Southwest Finland to Eastern Macedonia and Thrace

3.1. Solution-receiving region: Challenges and needs and climate adaptation solutions

3.1.1. Key regional needs in the field of climate resilience and climate change adaptation

The Eastern Macedonia and Thrace (EMT) region faces significant challenges in climate change adaptation, improving its risk assessment frameworks and integrating more comprehensive, long-term strategies, as captured in Region's Need Assessment (D1.11). The region is exposed to climate-related risks, including increasing temperatures, prolonged droughts, flooding, and coastal erosion. Current climate risk assessments at the regional level could be strengthened by more clearly defining risk frameworks and considering both slow-onset climate trends and sudden extreme events. Additionally, one of the EMT region's most urgent needs is the integration of vulnerability dimensions, such as socio-economic status and gender, into climate adaptation planning. Current plans, such as the Regional Adaptation Action Plan (RAAP) and River Basin Management Plans, provide a strong foundation for addressing climate risks, but they lack adequate consideration of highly vulnerable groups and the risks of maladaptation. Finally, EMT faces a key challenge in bridging the gap between individual, short-term adaptation measures and the need for a long-term, cross-sectoral strategy. While the region has made progress with local adaptation measures, it needs a coherent, systemic approach to climate adaptation that can scale across sectors and regions.

The selected transfer solutions within the RESIST project will help EMT overcome challenges, address needs, and develop a more robust climate risk framework. These solutions include:

1. The Blue-Green Infrastructure (BGF) tool
2. Cost-Benefit Analysis (CBA)

The transfer of the BGF tool will contribute to creating more systemic solutions by integrating NbS into the broader regional planning framework. This will help EMTs design long-term, cross-sectoral climate resilience strategies that can address current and future climate risks while avoiding maladaptation. Additionally, customizing the BGF tool to meet EMTs specific needs will ensure that regional vulnerabilities are incorporated into the planning process. Furthermore, stakeholder engagement processes will be designed to be inclusive and collaborative, addressing the region's need for greater participation and promoting more equitable outcomes.

The Cost-Benefit Analysis (CBA) will serve as a collaborative tool between the LSDT1 partners, enhancing mutual understanding of project impacts and their valuation. By involving stakeholders in each step of the CBA process, from identifying relevant benefits and costs to analysing their monetised values, will promote knowledge exchange and capacity building. This partnership will enable the EMT region to tailor the analysis to their unique social, economic, and environmental context, ensuring that the CBA reflects region-specific priorities and constraints. Moreover, the CBA approach will also provide a structured framework for long-term planning and decision-making in the EMT region. By presenting the CBA findings as a report, stakeholders can use it as a reference to evaluate and prioritise future projects, fostering a culture of evidence-based policy-making, while regional leaders can confidently make more informed choices to maximise welfare and sustainable development. The knowledge shared through the RESIST project will also provide critical insights for scaling and upscaling these solutions, ensuring EMTs can build a resilient future with clear implementation roadmaps.

3.1.2. Solutions chosen for transfer

From the provided solutions in Table 1 the solutions selected by EMT were Blue-green factor provided by TUAS partner, implemented by DUTH with support of ENORA and RDF-EMT and Cost-benefit analysis of NbS provided by LUKE, implemented by DUTH with support of ENORA and RDF-EMT as described in **Error! Reference source not found.**6.

Table 16: Overview of chosen transfer solutions in EMT.

Chosen transfer solution from SWF to EMT		
Name of solution	**Solution type**	**Short description**
Blue-green factor	Policy instrument	The Blue Green Factor is a factor-based policy instrument to ensure and maintain desired levels of green and blue in new development projects. Implemented by DUTH with support of ENORA and RDF-EMT.
Cost-benefit analysis of NbS	Decision making aid	Approach to evaluate the costs and, benefits and efficiency of NbS in economic terms. Provided by LUKE partner (SWF). Implemented by DUTH with support of ENORA and RDF-EMT.

3.1.3. Additional activities and solutions being developed in EMT

In the EMT region, additional activities under the RESIST project focus on nature-based and technological solutions to address local environmental challenges (Table 17). Notably, EMT is developing solutions such as Leaky Dams, which involve strategically anchored logs to slow river flows and manage floodwaters upstream, as well as Retention Ponds that provide added floodwater storage in agricultural areas. River Restoration for Flood Control and Floodplain and Riparian Woodland Creation enhance water cycle stability, promote biodiversity, and improve erosion control, all aimed at reducing flood risks. Furthermore, Earth Observation Analytics uses satellite data and vegetation indices to allow for advanced monitoring of landscape changes, supporting proactive flood management and enhancing urban greenery.

These initiatives address several pressing needs and challenges in the EMT region, particularly climate impacts like heavy rainfall, river floods, and biodiversity loss. Flood management solutions, such as leaky dams and woodland creation, are essential for reducing flood risks in vulnerable areas and safeguarding local ecosystems from degradation. Retention ponds and sustainable drainage systems help mitigate soil and water pollution, while regenerative agriculture promotes soil health and water infiltration to enhance drought resilience. Lastly, Earth Observation Analytics supports real-time data monitoring, allowing for early warnings and informed responses to storm impacts and vegetation health, ultimately strengthening the region’s climate resilience and environmental sustainability.

Table 17: Overview of additional solutions developed in EMT by the region partners.

Additional solutions developed in EMT		
Name of solution	**Solution type**	**Short description**
Leaky Dams	Nature-based/simulation	A flood mitigation technique where logs are anchored across streams to slow river flow, store floodwaters, and protect downstream areas.
River Restoration for Flood Control	Nature-based/simulation	Re-naturalization of riverbed to enhance water cycle, control erosion, and reduce flood risk.
Floodplain and Riparian Woodland Creation	Nature-based/simulation	Woodland creation to intercept rainwater, promote infiltration, and delay flood flows.
Retention Ponds	Nature-based/simulation	Topographic depressions in agricultural areas to store floodwater and control pollution.
Detention Basins	Nature-based/simulation	Vegetated depressions designed to store and slow runoff, allowing sediment and pollutant settling.
Sustainable Drainage Systems (SuDS)	Nature-based/simulation	Systems that use natural features to reduce surface runoff and manage downstream flood risks.

Regenerative Agriculture	Nature-based/simulation	Land management technique promoting soil health and water infiltration, reducing runoff and flood risks.
Earth Observation Analytics (vegetation indexes)	Technological	Utilisation of satellite data to monitor landscape changes and support early warning for storm impacts.

3.1.4. Systemic perspective on regional adaptation efforts

Changes in the frequency and intensity of extreme weather events are one of the primary effects of climate change anticipated to impact all regions of Greece, including the EMT region. These changes are expected to have significant consequences for various sectors, such as agriculture, fisheries, human health, water resources, biodiversity, ecosystems, and infrastructure. Initial estimates suggest that the water resources and agriculture sectors are the most susceptible to climate change in the EMT, with total damage anticipated from future climate change scenarios estimated at around €200 million. The EMT climate change adaptation strategy aims to enhance the resilience of key sectors against extreme events like floods and droughts, as well as pressures on water resources, by developing alternative adaptation measures and technologies, along with methods for assessing the effectiveness and costs of these measures. The solutions developed in the region and those transferred can support the goals of the EMT adaptation strategy, strengthening efforts to make regions more resilient to climate change. In particular, the transferred BGF tool and CBA with locally developed NbS and Earth Observation Analytics will form a comprehensive approach to managing key risks such as flooding, biodiversity loss, and drought resilience across both urban and rural areas.

Nature-based projects such as leaky dams, retention ponds, regenerative agriculture, and floodplain woodland creation reduce flood risk and enhance water retention and erosion control. At the same time, NbS, like river restoration and sustainable drainage systems, address EMT's unique water management needs, helping the region meet its adaptation goals of reducing vulnerability and promoting ecosystem health. The BGF tool strengthens urban resilience by utilising structured green infrastructure. It showcases the adaptability and effectiveness of green solutions against water-related challenges such as floods, water pollution, and water scarcity while improving their acceptance. A cost-benefit analysis offers quantified data on the costs and benefits of proposed NbS, aiding in their comparison, prioritisation, and evaluation. Both tools help enhance the environmental and climate assessment of regional investments by expanding them into a comprehensive system of sustainability performance. This shift arises from the growing demand among international donors to document and validate the market, environmental, and social impacts associated with their funding. Technological tools like Earth Observation Analytics offer convenient access to meteorological and climate forecasts providing early warning capabilities at the regional level. These tools are essential for both civil protection and the agricultural sector, as they enhance early warning and safeguard citizens from extreme events, while also improving the management of water resources. They also help meet the EU's requirement for the development of integrated climate services at both national and regional levels across Europe. These solutions effectively support the EMT's regional climate adaptation strategy by tackling critical challenges and creating a multi-layered, cross-sectoral framework that aligns with EU resilience objectives.

3.2. Planned transfers

3.2.1. Transfer 1: Blue-green factor

3.2.1.1. Solution description and transfer goals

The Blue-Green Factor solution provided by Southwest Finland is a policy instrument from the city of Turku, used to increase blue- and green infrastructure in urban areas. The solution consists of two elements: the blue-green infrastructure assessment tool (BGF tool) and the use of the tool in urban development (BGF tool implementation).

The BGF tool evaluates the amount and quality of vegetation, in addition to indicatively measuring how much the plot's vegetation, surfaces, and possible stormwater structures delay stormwater. By allowing the user to jointly assess yard, stormwater, and water supply and sanitation plans in one tool, it encourages the use of NbS for vegetation and stormwater management. In practice, the tool consists of a calculation sheet, which utilises data on:

- the plot and planned construction, including target values, and
- planned vegetation, surfaces, and potential stormwater structures.

The calculation result is a numerical value, which details the green efficiency of a plot or a block, i.e. it shows the ratio of vegetation and ecologically beneficial surfaces to the built-up area. The BGF also shows the proportion of impervious surfaces and the volume of stormwater retention structures.

In Turku, the BGF tool was developed to support and increase implementation and planning of green areas in urban environments. Since 2021, green efficiency targets are applied in new planning areas and are a requirement for all new building permits. For housing, the application starts with terraced houses, i.e. single household areas are excluded from the application. The baseline target levels for green efficiency are defined in the building code and vary depending on land use. The tool is mainly used by yard planners in zoning areas and in building supervision, and by planning architects in both general planning and detail planning.

Although the BGF tool promotes the use of NbS by giving greater emphasis to solutions that support biodiversity, evaluation completed in the framework of RESIST D3.1. has highlighted the need to further develop the tool to increase uptake of NbS in urban stormwater management. The BGF tool used in Turku will thus be further developed in this direction as part of the twinning and transfer work conducted in WP3 in RESIST.

The transfer between SWF and EMT will focus on both elements of the BGF solution, i.e. the BGF tool and the BGF tool implementation. The transfer process is expected to increase capacity in both regions through mutual learning, with the aim of increasing regional capacity for adaptation to climate change.

For EMT, the main goal for the transfer is to create a customised version of the BGF tool, which considers local needs and conditions, and to create a plan for its implementation in the region. Ultimately, the aim of the transfer process, reaching beyond the RESIST project, is to implement the customised BGF solution in the region fully.

Additionally, the transfer process will need to comply with national regulations in Greece with an emphasis on urban and rural development planning. The focus will be on promoting sustainable adaptation to climate risks and environmental resilience.

The envisaged level of solution demonstration in the EMT region will involve several key stages. Initially, hydrological modelling will be conducted to assess the specific customisation needs of the BGF tool, ensuring it is tailored to the local environmental conditions and climate challenges of the region. Based on this analysis, a customised version of the BGF tool will be developed to address these unique conditions. A detailed implementation plan will be created, outlining the steps for full solution deployment in the region. While significant progress is expected during the RESIST project, the completion and implementation of the solution may extend beyond the project's lifetime, with ongoing efforts required to fully deploy and demonstrate the customised BGF tool in practice.

For SWF, in turn, the objective of the transfer process is to further develop the BGF tool and thus increase the uptake of NbS in not only Turku but more broadly. The benchmarking report highlighted that the lack of clear national guidelines leads to uneven regulations and practices. Smaller municipalities in the SWF region would benefit from the development of a regional or national BGF tool, as it would reduce the need for each municipality to allocate their own resources to develop individual solutions. Thus, the aim is to further develop the local BGF towards a national version in collaboration with other cities and regions during RESIST.

First, nature-based water management methods should be better taken into account in the tool, e.g. by accounting for the storage capacity of bioretention structures and ensuring the genuine permeability of surfaces with proper storage layers. Moreover, the calculation sheet is not entirely equitable, as different interpretations can be used to achieve the required factor outcome in various ways. To address this, the University of Applied Sciences is conducting an analysis in an area where

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

the Blue-Green Factor has been implemented to evaluate how the planned measures align with reality. The analysis is expected to produce results that can benefit the customization efforts in EMT. Moreover, further developing the BGF in SWF will require cooperation with local and regional stakeholders, including businesses. For instance, training sessions for building control and urban planning departments, utilising the results from the BGF analysis of TUAS, are being planned for 2025. Insights from this stakeholder work will be shared with EMT to support the local stakeholder work conducted in the twinning region.

3.2.1.2. Measures to overcome barriers and customization needs

There are several differences between the regions of Southwest-Finland and Eastern-Macedonia and Thrace, which should be considered in the transfer process.

Compared to SWF, the EMT region's geography is more varied, with a mix of coastal areas, mountainous regions, and agricultural plains. The region is highly exposed to climate change impacts such as droughts, extreme heat, and flooding. Coastal areas are vulnerable to rising sea levels, while inland areas face flash floods and water scarcity risks. BGF implementation in EMT must focus on water retention, flood management, and addressing extreme heat in urban and rural areas. The diverse topography presents both challenges and opportunities for customised BGF solutions.

National regulations and EU Directives shape the legal framework in EMT, but there are often delays in translating national legislation into effective local policies. In EMT, cultural values related to architecture and urban planning tend to prioritise historic preservation and traditional development approaches, which may sometimes clash with modern green infrastructure initiatives. However, there is growing recognition of the need to incorporate climate resilience into planning, and recent legal reforms are starting to support more sustainable development practices, creating an opportunity for BGF integration.

Similarly to SWF, the EMT region operates under a more centralised governance system. Regional authorities have a mandate over broader regional planning, while local authorities often handle urban planning and zoning at the city or municipal level with oversight from national guidelines. Blue-Green Infrastructure (BGI) policies in EMT are still emerging, focusing on integrating sustainability and resilience into regional development strategies. However, due to the regional approach, coordination between different levels of government and across municipalities may present a challenge in ensuring cohesive implementation of the BGF tool.

In EMT, the private sector will have an important role as an implementor of the BGF. Businesses, particularly in the agricultural and tourism sectors, are important economic drivers. However, in contrast to Turku, where the building code regulations directly require private companies to include green infrastructure elements in their development projects, EMT does not yet have similar mandates. Instead, private sector involvement here is largely voluntary, and many businesses are not yet accustomed to incorporating environmental planning as a standard practice. However, there is growing interest in sustainable development, especially with EU-funded programs promoting green growth, which could increase private sector engagement in future BGF initiatives.

Moreover, in EMT, the social structure is diverse, with rural areas experiencing higher levels of ageing populations and economic vulnerability, particularly in agriculture-dependent communities. Vulnerable groups include low-income families, agricultural workers, and older people, who may be disproportionately affected by climate change impacts like extreme heat and flooding. Central stakeholders for BGF implementation in EMT include regional authorities, local municipalities, agricultural cooperatives, construction companies, engineers and environmental NGOs. However, public awareness and engagement in ecological planning may be lower than in SWF. Furthermore, in EMT, access to technology is uneven, especially in rural areas where digital infrastructure may be less developed. This could challenge the dissemination and implementation of the BGF tool, particularly regarding capacity-building and training for local stakeholders. However, efforts are underway to enhance digital literacy and infrastructure in the region, which could improve the overall technological capacity needed for BGF implementation.

Potential barriers and challenges for transferring the BGF solution to EMT, including measures to overcome them, are detailed in Table 188. The identified barriers are related to the implementation of the BGF tool and the customisation needs of the infra-assessment tool itself.

Table 18: Measures to address barriers and customization needs.

NAME OF THE SOLUTION: Blue-green factor tool			
Type of barrier	**Barrier description**	**How can the barrier be overcome?**	
		Measure to address barrier	**Customisation of solution**
Political will	Lack of political support or competing priorities within the regional government can delay or prevent the implementation of the Blue-Green Infrastructure (BGF) solution. Local authorities may prioritise economic or social development projects over climate adaptation strategies, making it difficult to gain momentum for the BGF tool.	Integrating BGF implementation into existing regional development plans can align climate adaptation goals with other priorities, ensuring that they become a strategic priority. Securing commitments from local and national policymakers and highlighting the long-term socio-economic benefits of BGF, such as improved public health and economic	The EMT Region should engage in close collaboration with the Greek Ministry of Civil Protection and Climate Change to align the BGF solution with national climate resilience strategies and obtain institutional backing. A clear communication strategy outlining the co-benefits of BGF, such as reduced flood risks and enhanced public spaces, can help garner political

		resilience, can help build political support.	support across different sectors.
Climate and geography	The EMT region's unique climate and urban structure may not directly align with the original Blue-Green Factor model designed for other regions, such as Southwest Finland. Different hydrological patterns, topographies, and climate-related challenges (e.g., droughts and floods) require careful adaptation of the model.	Conduct localised evaluations and simulations (hydrological and hydraulic simulation) to assess how the BGF model functions in EMT's specific environmental context. Tailoring the tool to reflect local climate dynamics, such as rainfall patterns, ensures that it meets the region's specific needs.	Implement hydrological and hydraulic simulations, using Earth observation data and climate models, to adjust the BGF method for the EMT region. This data-driven approach will allow for better calibration of the BGF tool, ensuring it accurately reflects the regional water flow, land use, and urban layouts.
Cultural/historical values	The EMT region contains urban areas with significant cultural and historical heritage, which may restrict the types of modifications that can be made in terms of green infrastructure. Local architectural and historical preservation regulations may limit the extent to which BGF solutions can be implemented in these spaces.	Developing BGF solutions that respect and complement the historical and cultural context of the region is key. By involving heritage experts and adapting the BGF measures to blend with the historical environment, it's possible to implement green solutions that enhance, rather than detract from, the cultural landscape.	Work with urban planners and cultural heritage authorities to design BGF elements that are compatible with local preservation rules. Ensure that public spaces are enhanced in ways that maintain historical aesthetics while contributing to climate resilience.
Businesses' reaction	Local businesses may be hesitant to adopt or support new environmental measures, particularly if they are perceived as costly or disruptive. The lack of immediate financial returns on climate adaptation investments could make businesses resistant to participating in BGF initiatives.	Engaging the private sector through workshops and showcasing the economic benefits of BGF, such as reduced flood risks and improved property values, can help increase business support. Offering financial incentives or subsidies for BGF investments could further motivate adoption.	Create an outreach presentation to engage businesses in the planning and implementation of BGF measures, highlighting the environmental and community benefits of green infrastructure. Foster public-private partnerships to encourage collaborative efforts and showcase successful case studies where businesses have contributed to regional adaptation plans, demonstrating the positive impact and value of green infrastructure for both business

			sustainability and regional resilience.
Public reaction	Local communities or experts may resist BGF implementation due to concerns about changes in land use, potential disruptions, or scepticism about the effectiveness of such measures. Public opposition can slow down project adoption and create barriers to stakeholder engagement.	Educational workshops, participatory planning, and transparent communication about the benefits of BGF for climate resilience and public well-being can help overcome resistance. Involving local communities from the early stages of planning can build trust and support for the project.	Create a workshop and community engagement session to bring together residents, experts, and civil society organisations. These sessions allow local stakeholders to learn about Blue-Green Infrastructure (BGF), share insights, and collaborate on solutions tailored to their community's needs, fostering ownership, trust, and practical support for BGF initiatives. Address concerns through open dialogue and tailor solutions to reflect community needs and preferences.

Taking barriers and customisation needs into account, a customised solution profile of the BGF solution is created. The customised solution profile is presented in Table 199 below.

Table 19: Solution profile for Blue-green factor, customised to Eastern-Macedonia and Thrace.

NAME OF SOLUTION: Blue-Green Factor tool		
Short description of the adaptation solution BGF is a factor-based policy instrument to ensure and maintain desired levels of green and blue in new development projects. In practice, the blue-green factor is a three-step spreadsheet: 1) The plot and planned construction data with target values are entered as initial data. 2) The amount of vegetation, surfaces and possible stormwater structures are described on the actual calculation tab. 3) The result is the numerical value of the green coefficient. In addition, the proportion of impervious surface area and the volume of stormwater retention structures are also shown.	**Type of solution** Policy instrument	**Solution provider region** Southwest-Finland
VALUE PROPOSITION		
Target group The BGF tool is primarily developed for urban planners, municipal civil protection staff, and engineers involved in construction supervision. It is intended to guide the planning and assessment of green infrastructure at the plot and block level in urban areas. Additionally, the tool is valuable for private landowners and businesses by providing a framework for incorporating sustainable yard and land-use	**Main benefits for the target group (purpose)** Urban designers and planners can ensure that yard and urban space designs incorporate sufficient green and water elements, improving environmental sustainability, managing stormwater, and reducing the urban heat island effect.	**Social and environmental co-benefits for target group and other groups** Improved public health through cleaner air, reduced heat, increased recreational spaces, higher property values, and enhanced ecosystem services such as better stormwater management and wildlife habitats.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

designs that contribute to climate resilience. By helping to ensure that new developments meet environmental standards, the BGF tool will support both public authorities and private stakeholders in creating more sustainable, adaptive urban environments.		
SOLUTION DETAILS		
Climate impacts addressed Stormwater flooding, loss of green in urban areas, urban heat island effect. • Vegetation balances small and local climates, i.e., heat, windiness, humidity, and air quality • Green yards support the diversity of urban nature and the connection of green areas • Along with the decentralised management of stormwater, the quality of discharge water bodies is also nurtured.	**Delivered results** The transfer will result in a customised BGF tool, which considers local conditions and prerequisites. In addition, a plan for adopting the BGF tool in the region will be investigated.	**Spatial scope** The spatial scope of the BGF implementation will primarily focus on urban areas within the EMT region. These areas are most vulnerable to climate-related risks, such as flooding and urban heat, and offer the greatest potential for integrating NbS through the BGF tool. While the main focus is on urban centres, consideration will also be given to the surrounding peri-urban areas to ensure a cohesive approach to climate resilience across the region.
VALUE CREATION AND DELIVERY		
Key resources Key resources for delivering the BGF solution include access to detailed urban planning data, such as land use, infrastructure, and hydrology. This information is essential for customising the tool to local conditions and addressing specific climate risks effectively.	**Key activities** Key activities involve conducting site assessments to customise blue-green solutions for the EMT region's unique needs and providing training sessions for municipal staff and stakeholders. Adapting solutions to local climate and geography, along with active stakeholder engagement, will help overcome barriers and support the effective implementation of the BGF tool.	**Project owner and key partners** The project is owned by the regional planning authority, with key partners being local municipalities. These municipalities help implement the BGF solution, ensuring it aligns with local planning and zoning needs.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

COSTS AND PLANNING		
Estimated costs (implementing and operating) The estimated costs for implementing and operating the BGF solution mainly include staff costs for researchers conducting modelling, data analysis, and monitoring. Additional expenses will cover stakeholder engagement, capacity building, and data integration. Costs will vary based on project scale and customisation needs. Personnel resources are estimated to be approximately 1,050 working hours, which accounts for 7 PMs	**Revenues / monetised benefits** Blue-Green Infrastructure boosts property values by enhancing environmental quality, reducing flood risks, and improving urban aesthetics. This leads to higher real estate prices, increased rental income, and greater tax revenues, offering clear monetised benefits.	**Time frame for planning and implementation until fully functional** The full implementation of the BGF tool will take several years. During RESIST, the focus is on developing the initial version of the tool and securing policymaker support, along with planning for full implementation. After RESIST, the focus will shift to refining the tool and executing the full-scale implementation based on the developed roadmap.
CONTEXT		
Necessary prerequisites Successful implementation of the BGF tool in EMT requires available regional data, including climate, hydrological, geographic, and socio-economic information.	**Success factors** Strong stakeholder engagement, through inclusive and collaborative processes, ensures that diverse perspectives are considered, fostering local ownership and support for the successful implementation of the BGF solution.	**Limiting factors** Limiting factors include regulatory barriers, lack of public and political support, resistance within the building sector, and constraints due to historical or cultural preservation values that may restrict BGF implementation.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

3.2.1.3. Resources and costs

The successful transfer and implementation of the BGF solution in the EMT region will require an estimated **1,050 working hours approximately, which accounts to 7 PMs**. The resource allocation includes **200 hours** dedicated to mapping and assessing existing blue-green spaces, ensuring that the region's specific environmental conditions are accurately documented. **300 hours** are allocated for hydrological and hydraulic simulations to customise the BGF tool for EMT's climate and geography. Collaboration with urban planners and heritage authorities is planned for **150 hours** to ensure that cultural and historical values are preserved in the green infrastructure projects. Additionally, **120 hours** will focus on community engagement workshops to gather input from local stakeholders, while **100 hours** will be spent on aligning policies with national and regional frameworks. Business outreach efforts are estimated at **80 hours**, aimed at fostering support and partnerships, and **100 hours** are designated for promoting public-private collaborations to ensure long-term sustainability.

The estimated costs for implementing and operating the BGF solution primarily involve staff expenses for researchers conducting environmental modelling, data analysis, and ongoing monitoring. Additional costs include community engagement activities, stakeholder workshops, and capacity-building initiatives to integrate the solution effectively. Funding for these activities will be partly covered by the RESIST budget, which will support initial simulations, policy alignment efforts, and technical customisation of the tool.

Operating costs, including maintenance of green infrastructure post-project, will be supported through regional funds and partnerships to ensure the project's sustainability beyond the RESIST timeline.

3.2.1.4. Planning the transfer

Objective, purpose, results and planned activities

Table 20 describes the overall objective, purpose, results and activities as well as planned indicators to verify the implementation.

Table 20: Logframe Matrix for the BGF in EMT.

Transfer project description	Indicators	Source of verification	Assumptions
Overall objective The overall objective is to enhance regional	Number of BGI projects implemented	Regional climate risk assessments,	

climate resilience by implementing Blue-Green Infrastructure (BGI), focusing on sustainable water management, reducing flood risks, and improving urban living conditions in line with regional development goals.	Localised qualitative evaluations of green spaces and tested NbS, as well as participatory planning sessions with targeted groups.	hydrological and hydraulic simulations, Earth observation data, and interviews/workshops with stakeholders	
Purpose Increase green spaces that enhance urban liveability, reduce flood risks, and contribute to climate adaptation.	The purpose will be considered achieved when there is a significant increase in green spaces and a measurable reduction in flood risks.	Sources of information and methods for collecting and reporting this data will include urban green space mapping (Earth Observation), flood risk assessment (hydrological & hydraulic simulations), and community feedback surveys.	Assumptions include the successful adaptation of the BGF tool to local conditions and sufficient stakeholder engagement in both the planning and implementation phases.
Raise awareness of stakeholders, local communities and city planners about the benefits of more sustainable and resilient urban infrastructures.	An adequate number of workshops with stakeholders, citizens, and decision-makers.		
Introduce to designers a new checking tool for green efficiency in urban planning.	Successful meetings with city planners and private sector professionals, such as civil engineers, environmental architects, and consultants in climate adaptation.		
Results The transfer process will result in increased acceptance and readiness to adopt the customised BGF tool among stakeholders.	Effective stakeholder engagement will be assessed by the number of participants in surveys and workshops, along with how their feedback is incorporated into the BGF design.	Results can be verified from surveys, workshops, and public engagement feedback.	Success depends on political support, funding, and public engagement, along with favourable climate conditions for implementation.
Once transferred and customised from SWF,	Successful implementation of the	Spatial analysis tools (e.g. GIS), Earth	

the BGF solution aims to increase permeable surfaces and green infrastructure coverage in urban areas, enhancing climate resilience.	BGF tool will be monitored using key indicators such as increased green infrastructure, a higher share of green urban areas and the expansion of green spaces.	Observation data, and NbS simulations. Urban planning reports and EMT's case study report within the RESIST project.	
Additionally, it seeks to boost public awareness and involvement in sustainability practices.	Public awareness and involvement in sustainability practices can be indicated by the number of users of the tool.	Interviews with contact points in municipalities and industry.	
Activities The key activities for delivering the BGF solution in the EMT region include mapping and assessing current blue-green spaces to establish a baseline for future projects, followed by the design and modelling of targeted green infrastructure using hydrological and hydraulic simulations to customise solutions for local needs. Community engagement and awareness campaigns will actively involve stakeholders, ensuring their participation and support in the implementation of the BGF tool. Additionally, the completion of tailored hydrological simulations with site-specific adjustments will demonstrate the tool's effective adaptation to EMT's unique climate challenges. Finally, modelling and evaluating			The implementation assumes active stakeholder and public engagement, sustained political and financial support for green infrastructure projects, and the availability of accurate climate data and modelling tools to assess environmental impacts effectively.

environmental impacts will assess how well the proposed infrastructure addresses climate risks such as flooding and drought, ensuring long-term resilience.			

Next steps

The following steps involve securing the necessary equipment and stakeholder involvement to advance the BGF transfer process. Critical equipment includes hydrological and hydraulic modelling tools and data collection devices for accurate environmental assessments. The collaboration will primarily involve local stakeholders, such as EMT region officials, urban planners, heritage authorities, community leaders, and representatives from the Ministry of Environmental Protection and Climate Change, to ensure policy alignment. The planned collaboration formats include monthly online coordination meetings for ongoing updates, in-person workshops for stakeholder engagement and community input, and formal written reports to document findings, model results, and policy recommendations. These collaborative steps will ensure that the BGF tool is tailored to the region's needs and that all relevant stakeholders are actively involved in the adaptation process. In addition to local collaborations, ongoing engagement with Southwest Finland (SWF) will be essential for successfully transferring the BGF tool. Planned meetings will focus on exchanging best practices in stakeholder workshops, policy integration, and technical adaptations to align the tool with EMT's specific context. This collaboration will ensure effective customisation and implementation.

Timeline until 2027

The transfer of the BGF solution is planned over a two-year timeline in 2025 and ending during 2027, with distinct milestones to mark progress within the RESIST project and extended goals for post-RESIST continuity. In Q1 2025, the project will begin with mapping and assessment of current blue-green spaces in EMT, followed by initial stakeholder engagement workshops to establish local buy-in. By Q2 2025, hydrological and hydraulic simulations will be underway to customise the BGF model for EMT's unique environmental needs. Concurrently, collaboration with the Ministry of Environmental Protection and Climate Change will begin to ensure alignment with regional policies. In Q3 2025, business outreach presentations and public-private partnerships will be initiated to secure long-term local support, culminating in a mid-project review to evaluate progress and address any challenges.

By the end of 2025, major RESIST-funded milestones will be achieved, such as completing environmental simulations, securing initial stakeholder engagement, and initiating policy alignment. The BGF tool's pilot implementation will begin in Q1 2026, followed by ongoing evaluation and adjustments based on feedback. By the conclusion of RESIST in Q4 2027, the primary customisation of the BGF tool, stakeholder collaboration framework, and preliminary policy adaptations will be completed. Post-RESIST, from 2028 onward, the focus will shift to maintaining and expanding BGF applications through regional partnerships, monitoring the tool's impact on climate resilience, and seeking additional funding to support operational and maintenance costs. This phased approach ensures that RESIST lays a foundation for sustainable adaptation while allowing room for continued development and upscaling.

3.2.2. Transfer 2: Cost-benefit analysis

3.2.2.1. Solution description and transfer goals

Cost-benefit analysis (CBA) provides a systematic and transparent method for identifying the benefits and costs of projects over their lifetime, supporting efficient resource allocation and rational decision-making. An alternative is considered economically efficient if its net benefits are positive, meaning benefits exceed costs.

CBA evaluates the economic efficiency of projects or policies from society's perspective, assessing their monetary values over the project's lifetime. Benefits are increases in human well-being, and costs are reductions. For a project to pass, its net benefits must be positive. CBA measures a policy's economic efficiency or contribution to social welfare and can support science-based policy decisions.

There are nine general steps in a CBA (see also Figure 1) (Boardman et al. 2017):

1. Specify the set of alternative projects
2. Decide whose benefits and costs count
3. Identify the impact categories, catalogue them, and select measurement indicators
4. Predict the impacts quantitatively over the life of the project
5. Monetize all impacts
6. Discount benefits and costs to obtain present value
7. Compute the net present value (NPV) of each alternative
8. Perform sensitivity analysis
9. Make a recommendation

CBA involves determining and monetising project impacts, discounting benefits and costs to present values, and conducting sensitivity analysis on key assumptions. Benefits and costs are evaluated in terms of changes to human welfare, with policy outputs measured as willingness to pay or accept compensation and inputs as opportunity costs.

Environmental projects, such as those involving NbS, often have various impacts, some monetised using market prices or cost-based methods, and others with economic valuation methods for environmental impacts. Market values are observable for ecosystem services sold on markets, like timber production, while non-use benefits, like recreation, lack market prices. Most environmental impacts of NbS have non-market values.

In the transfer process of CBA at LSDT1, the cost-benefit analysis (CBA) will be conducted in collaboration with the receiving region. This approach ensures that both SWF and EMT follow the CBA steps together, allowing them to learn from one another and share experiences during meetings throughout the process. The primary goal is to provide quantified information on the costs and benefits of adaptation solutions, aiding in the comparison, prioritisation, and evaluation of the proposed NbS. Additionally, there are several indirect objectives to address. These include reducing existing knowledge gaps related to the cost control and efficiency of NbS, tackling the issue of maladaptation, integrating adjustment measures into broader economic policies, assessing the cross-sectoral impacts of NbS, and addressing financing challenges.

In the transfer process of CBA at LSDT1, we will implement the cost-benefit analysis together with the receiving region so that we both follow the steps of CBA and learn and exchange experiences in meetings during the process.

The cost-benefit analysis will be implemented on one pilot site in the receiving region and reported to be available to local decision-makers during the RESIST project. The transfer will facilitate the future use of CBA as a model for further analysis on other sites in the region after the RESIST project.

3.2.2.2. Measures to overcome barriers and customization needs

The EMT region differs from the provider SWF region in its predominantly rural and agricultural economy, with significant natural assets like wetlands and coastal areas. Different from the provider region, EMT faces challenges with sustainable resource management and biodiversity conservation. Additionally, EMT's lower income levels and limited infrastructure development may affect the allocation of resources for environmental projects compared to the more urbanised or industrialised provider region.

Key barriers (**Error! Reference source not found.**) in EMT include financial constraints that limit resources for environmental projects and difficulties in monetising non-market ecosystem services like biodiversity. Institutional capacity may also be a challenge, with local agencies potentially needing more expertise for complex CBA processes. Cultural differences in governance and decision-making and uncertainty and risk aversion could slow the adoption of new solutions.

The CBA solution will be customised (Table 2222) for EMT by emphasising non-market benefits like biodiversity, integrating the local economic context, and offering capacity-building workshops. Scenario planning will address uncertainty, and efforts will be made to secure alternative funding, such as EU grants or partnerships, to overcome financial barriers.

Table 21: Measures to address barriers and customization needs.

CBA			
Type of barrier	**Barrier description**	**How can the barrier be overcome?**	
		Measure to address barrier	**Customisation of solution**
Information barrier	Shortage of examples applying CBA on Nature-based projects for flood risk mitigation.	Collect relevant case studies and best practices from similar contexts.	Tailor the collected examples to match the specific environmental and economic conditions of the EMT region.
Information barrier	Shortage of economic expertise in statistic tools, such as CBA.	Provide economic training and capacity-building workshops for local experts.	Research for simplified economic tools and guides that are suitable for the local context and can be used by non-experts.
Stakeholder input needed	Absence of evaluation mechanisms and a clear definition of project objectives	Work with stakeholders to refine and clearly define project goals.	Ensure that project definitions are aligned with local priorities and reflect the unique environmental challenges of EMT.
Uncertainty of NbS	Uncertainty of the relevance of the project's adaptation solutions to local needs.	Engage stakeholders in discussions to assess and confirm project relevance.	Adapt project goals to address the most pressing local needs, ensuring stakeholder buy-in.
Uncertainty of NbS	Impact area is uncertain, questioning the selection of NbS location and undermining their effectiveness.	Conduct preliminary research and mapping to identify likely impact areas.	Focus on local ecosystems and industries most affected by environmental changes in areas of interest in EMT.
Information barrier	Limited modelling expertise, specialisation in specific computational models, and a lack of experience in NbS simulation.	Via workshop will provide training to local teams.	Use simplified models that can be adapted for EMT's available data and technical capacity.
Information barrier	Data sources for the costs of NbS applications, including capital expenditures and operation and maintenance costs, are weak.	Use Adelphi's Catalogue of innovative adaptation solutions with focus on NbS and Fire Smart Landscapes Catalogue of Innovative Adaptation Solutions, with an emphasis on NbS and the Fire Smart	Customise cost data collection methods to EMT's specific context, using local and regional sources.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

		Landscapes Handbook, as a reference to identify and gather relevant cost data.	
Information barrier	Data sources for the additional environmental, economic, and social benefits generated by NbS (ecosystem services) are unclear.	Develop data collection frameworks using the Adelphi handbook for guidance.	Focus on gathering benefit data relevant to EMT's environmental and economic sectors.
Information barrier	Value information about NbS benefits translated into monetary units needs to be found.	Use the Adelphi handbook to identify methodologies for valuing non-market benefits.	Adapt valuation methods to reflect EMT's specific environmental services and community needs.
Stakeholder input needed	There is a reluctance of stakeholders to participate and a general lack of awareness.	Increase engagement through targeted outreach, emphasising the project's local benefits.	Tailor messaging to show how the project directly impacts local stakeholders' interests in EMT.
Acceptance barrier or decision makers' input needed	Shortage of interest by information users, i.e. decision makers on NbS applications and benefits	Demonstrate the project's potential long-term benefits and provide easy-to-understand reports.	Focus on policy-relevant outcomes that address EMT's regional priorities to capture decision-makers attention.

Table 22: Solution profile for cost-benefit analysis, customized to EMT

NAME OF SOLUTION: Cost-benefit analysis		
Short description of the adaptation solution The adaptation solution for the EMT region focuses on implementing cost-benefit analysis (CBA) to evaluate and optimise the use of NbS in mitigating climate impacts such as floods and improving water quality.	**Type of solution** Decision making support	**Solution provider region** Southwest Finland
VALUE PROPOSITION		
Target group The solution is developed for **municipal and regional authorities** in the EMT region, focusing on public decision-makers responsible for environmental management and adaptation planning.	**Main benefits for the target group (purpose)** The main benefit for the target group is access to detailed information on the costs and benefits of implementing NbS, which will support better decision-making regarding resource allocation and project implementation.	**Social and environmental co-benefits for target group and other groups** The solution fosters more thorough discussions on costs and benefits, improving transparency and leading to enhanced social and environmental outcomes, such as reduced flood risks and improved ecosystem services.
SOLUTION DETAILS		
Climate impacts addressed The solution addresses climate impacts related to flooding and aims to enhance water quality through the implementation of NbS.	**Delivered results** The key result will be a comprehensive cost-benefit analysis that quantifies the economic and social value of NbS in the EMT region, enabling better project prioritisation.	**Spatial scope** The spatial scope includes the areas of interest (Kosynthos and Laspias) of the EMT region, with the potential for replication across other municipalities facing similar environmental challenges.
VALUE CREATION AND DELIVERY		
Key resources Key resources include researcher time, staff efforts to gather cost and benefit data, and local expertise in environmental and economic assessments.	**Key activities** The main activities involve the steps of CBA: defining project alternatives, identifying costs and benefits, discounting to present values, and conducting a sensitivity analysis to address uncertainties.	**Project owner and key partners** The project owner is the regional authority of EMT.

COSTS AND PLANNING		
Estimated costs (implementing and operating) The estimated costs include staff effort within the RESIST project, approximately 3 person months (3PMs) per region.	**Revenues / monetised benefits** The main monetised benefit is a better information base for decision-making; while difficult to quantify directly, this can lead to reduced environmental damage costs and more efficient resource allocation.	**Time frame for planning and implementation until fully functional** The CBA in the EMT region is expected to be fully functional by month 48, with learnings incorporated from Southwest Finland's CBA process, which will be completed by month 36.
CONTEXT		
Necessary prerequisites Key prerequisites include access to specific cost and benefit data on NbS projects, expertise in CBA methodology, and simulation tools for predicting environmental impacts.	**Success factors** Success will depend on the ability to present results effectively to stakeholders, ensuring the social and economic benefits are clear and leveraging simulation expertise to project potential outcomes.	**Limiting factors** Limiting factors include potential challenges in data availability for non-market benefits and the uncertainty of long-term environmental impacts that may affect CBA accuracy.

3.2.2.3. Resources and costs

The costs include personnel costs in both regions. The estimated number of person months (PM) is **three person months per region**.

3.2.2.4. Planning the transfer

Objective, purpose, results and planned activities

The final objective of decreased food and drought damages will be obtained with an evaluation of different NbS alternatives (Table 23). To transfer the CBA approach to evaluate the NbS implemented in EM, the stepwise approach for CBA will be followed. The analysis will be reported to provide a model for other regions and other organisations evaluating NbS.

The overall objective for the EMT region is to implement and evaluate the CBA methodology to guide decision-making on environmental and NbS projects. The purpose is to systematically assess the economic efficiency of these projects by comparing their long-term benefits and costs, providing a model that can be applied to other sites in the region. The expected result is a comprehensive CBA report for the EMT region, which will serve as a tool for rational resource allocation and science-based policy decisions. Planned activities include a collaborative transfer process with the receiving region, where both regions will follow the nine steps of CBA. This will involve identifying alternative projects, monetising impacts (especially for non-market values), performing sensitivity analysis, and using the results to make informed recommendations. The results and experiences gained from this process will be shared through meetings, helping build capacity and ensure the methodology is tailored to the EMT region's specific environmental and socio-economic context. The CBA will also be used as a model for further analysis on other regional sites, potentially extending beyond the RESIST project's lifetime.

Table 23: Logframe Matrix for the planned transfer.

Transfer project description	Indicators	Source of verification	Assumptions
Overall objective Enhance regional resilience to floods and droughts through the simulation of NbS, contributing to sustainable development and climate adaptation.	Number of tested NbS Degree of flood risk reduction (e.g. reduction of the flood extent) Quality of ecosystem services improvement (e.g. biodiversity index).	Feedback from environmental monitoring, hydrological and hydraulic modelling, NbS simulation and ecosystem services assessment.	

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Purpose Regional decision-makers, local authorities, and stakeholders will have access to clear, actionable insights on the costs and benefits of NbS. This comprises information on detailed economic evaluations, including cost, benefit, and net value analyses to support informed resource allocation and project prioritisation.	Number of local authorities and decision-makers participating in workshops that offer guidelines and comprehensive information about the costs and benefits of NbS and CBA. Number of productive meetings held with targeted stakeholder groups and local communities concerning the costs and benefits of NbS.	Feedback obtained from local administrators and stakeholders during interviews, surveys, and progress reports.	It is assumed that the availability of accurate data on NbS impacts, and stakeholder engagement will be consistent and that regional authorities will prioritise the implementation of findings in their decision-making processes.
Increased investment into NbS, improving environmental resilience, economic growth, and community well-being.	Number of NbS case studies where CBA has successfully been applied.	Verification sources can include publications and reports from projects that have effectively implemented CBA on NbS strategies.	
Results Case study report on CBA that thoroughly describes the typology followed (9 steps) for the economic assessment of the proposed NbS is published.	The report and findings can be accessed through regional publication databases, government portals, and project documentation repositories.	Feedback will be gathered through structured interviews, surveys, and workshops with local stakeholders to verify that the practical experiences and insights from the implementation process are integrated into reporting and decision-making.	The key assumption is that reliable data on environmental impacts and economic factors will be available, and that local stakeholders will actively engage in providing feedback throughout the project's implementation.
Prioritisation of the selected NbS within the RESIST project based	Number of NbS projects implemented within RESIST including a CBA	Project report	

on the outcomes of the CBA.			
Dissemination and communication events with local stakeholders are undertaken.	Number of workshops with decision-makers that convey reliable data on costs and benefits, taking into account regional environmental and economic factors.	Report on workshop results; Survey among/ interviews with local and regional stakeholders	
Activities Step by step implementation of CBA together between the regions of LSDT. The steps specified in 3.3.2.1.			Assumptions include the accuracy of data on environmental impacts, the ability to quantify non-market values, stakeholder cooperation, and external economic conditions that may affect project viability and CBA results.

Next steps

Transfer will start in the beginning of 2025 with the Teams meeting between Luke, EMT participants and Normandy representatives (Table 24). In the meeting schedule of transfer is built in details to follow the Steps of CBA.

Table 24: The draft for timing of transfer.

Timing	Step to conduct CBA
January 2025	Discussions with the local stakeholders
February 2025	Teams meeting with SWF to specify the set of alternative projects.
February 2025	Teams meeting with SWF to decide whose benefits and costs count.
March 2025	Identify the impact categories, catalogue them, and select measurement indicators.
April 2025	Predict the impacts quantitatively over the life of the project.
May 2025	Monetise all impacts
June 2025	Discount benefits and costs to obtain present value
September 2025	Compute the net present value (NPV) of each alternative.
October 2025	Perform sensitivity analysis

November 2025	Make a recommendation
December 2025-April 2026	Reporting

Timeline until 2027

The transfer of CBA will take place in 2025 as planned in Table 24, and the results will be reported in the first half of 2026.

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

4. Transfer Plan – Eastern Macedonia and Thrace to Zemgale

4.1. Solution-providing region: Strengths and expertise

4.1.1. Key regional expertise in the field of climate resilience and climate change adaptation

Greece faces several climate risks, and the establishment of efficient, acceptable solutions is a priority. Each risk leads to numerous negative aftereffects on human well-being and environmental health, ecosystem biodiversity, agriculture, tourism, energy demand and supply, and generally all sectors of society and economy. As our experience accumulates about the possibilities of climate change adaptation, the difficulties of the necessary institutional adaptation are recognised. A series of factors such as the uncertainty of the effects of climate change and the effectiveness of adaptation measures combined with the complexity and sensitivity presented by the Mediterranean basins (climate variability, land uses, water scarcity, biodiversity, etc.) contributed to the preference of NbS. Several projects in other sub-regions (Thessaly, Central Greece, Attica and the Aegean Islands) investigate the impact of nature-based approaches to flood risk management based on regional conditions and needs. Flood risk assessment in EMT, as well as the sub-regions mentioned above, is grounded in fieldwork and monitoring systems that provide real-time data enhancing the development of hydrological and hydraulic modelling frameworks. In addition, key performance indicators are applied in conjunction with hydrological modelling to assess the impacts of NbS in other contexts, e.g. water quality. While simulation processes evidence the impacts of different NbS on flood mitigation and climate resilience, there are still barriers preventing NbS implementation and integration into adaptation strategies and policies. Transfer activities within the RESIST project aim to overcome these barriers, advance NbS knowledge, bridge the NbS research-implementation gap, integrate NbS in policy, raise awareness, and build thorough stakeholder dialogues. All the previous information is highlighted in the Region's Need Assessment (D1.11), about the priorities and challenges guide the alignment of innovative solutions with regional needs.

4.1.2. Overview of solutions available for transfer

The selection of the solution available for transfer (Table 25) was carried out based on the experience and expertise of EMTs group in flood risk assessment to support transfer plan activities within ZPR in field of NbS variety and hydrological and hydraulic modelling. Based on the needs and characteristics of the Zemgale region, the creation of a hydrological model was considered essential to provide the public and decision-makers with tools to identify the risks that occur in nature under the influence of climate change.

Table 25: Overview of solutions shortlisted by EMT.

Solution shortlist		
Name of solution	**Solution type**	**Short description**
Guidelines on hydrological/ hydraulic modelling & NbS simulation	Decision making aid and stakeholder engagement tool	Thorough documentation of academic expertise for the development of a coupled hydrological/hydraulic model (HEC-HMS/HEC-RAS) to simulate the impact of NbS interventions during extreme flood events and under projected climate scenarios. Implemented by DUTH
Earth Observation Analytics	Technological	Utilisation of satellite data to monitor landscape changes and support early warning for impacts. Implemented by ENORA
NbS catalogue	Information provision approach	The catalogue describes alternative NbS for flood mitigation. It provides detailed description of a list of NbS along with information about simulation techniques. Implemented by DUTH

4.2. Solution-receiving region: Challenges and needs

4.2.1. Key regional needs in the field of climate resilience and climate change adaptation

The Zemgale region, located in the southern part of Latvia, experiences both the Baltic Sea and continental climates. The proximity of the Baltic Sea provides a temperate climate; however, it also creates various climate changes and linked challenges in the region highlighted in the Region's Need Assessment (D1.11). The Baltic Sea influences temperature fluctuations. It retains heat in the winter, thus creating more moderate temperatures than other regions of Latvia. Consequently, compared to other inland areas, Zemgale can experience milder winter conditions. The Baltic Sea can also refresh the air on the hottest summer days. However, the region is still subject to continental climate conditions, which can cause greater temperature fluctuations and periods of drought. The Baltic Sea influences the distribution and frequency of precipitation. Precipitation near the sea can be higher than deeper inland Latvia. The region may experience increased fog, rain, and snow in winter, which is due to the influence of the maritime climate. Climate change is causing warmer climate trends. In the Baltic Sea coastal regions, including Zemgale, this may lead to more frequent hot summers, warmer winters and changes in seasonal precipitation, which causes an unexpected high level of rainwater flow. As a result of these changes, a rise in sea level is possible, which may affect coastal areas and coastal villages in the Zemgale region, creating flood risks. Overall, the climate of the Baltic Sea creates not only positive but also challenging consequences in the ZPR. In the long-term climate change may have wider consequences for agriculture, natural resources and regional development.

Zemgale region is located in the area of high spring floods and there are several flood risks in the Lielupe and Daugava River basins, including risks related to river floods and risks of flooding of hydroelectric power plants and other hydraulic structures. Zemgale, particularly the Bauska municipality, is a region susceptible to flooding due to its geographical location, hydrological characteristics, and increasing frequency of extreme weather events linked to climate change. Addressing these challenges requires a comprehensive approach. Within the region, there are significant differences in the availability of various natural resources, which are determined by both natural conditions and human economic activity. It is important to mention that the Zemgale region is generally situated at an elevation of only 30 to 50 meters above sea level. This region, characterised by its gentle slope and the presence of clayey and impermeable rocks, has developed the densest river network in Latvia, averaging 0.27 kilometres of river per square kilometre. Given the flat terrain of the Zemgale region, it is crucial to study soil sampling and moisture dynamics. Additionally, creating a hydrological and hydraulic model is crucial to provide the public and decision-makers with tools to identify the risks posed by climate change related to ground flooding and rainwater management.

Several flood control measures have been taken in Zemgale, but much remains to be done, and the risk of flooding is one of the common vulnerabilities shared with EMT. We consider NbS to be an innovative tool for managing precipitation in areas designated for industrial, residential, and public development according to municipal regulations. Hydrological and hydraulic modelling incorporating NbS will provide useful insights into the flooding process, supporting the selection of more effective and adaptive measures and enhancing practical flood risk management. In addition, testing NbS performance under future climate scenarios will increase region’s experience in climate change adaptation practices and strategies.

4.2.2. Solutions chosen for transfer

The region faces similar challenges related to climate change adaptation in institutional strategies in Latvia as does EMT in Greece. We find it relevant to elaborate hydrological models with different scenarios to help stakeholders both – public and private, to get into right decision-making flow and understanding the impact of climate change on daily decisions. Through the RESIST project, Zemgale has established a new work scenario for the rainwater management system in Bauska municipality, where ZPR and the new partner Riga Technical University's Water Systems and Biotechnology Institute will collaborate. We see the implementation of NBS for rainwater flood risk management as a highly potential solution in the Zemgale planning region. In general, this would support the introduction of new technologies in rain flood water management.

Due to Zemgale's need for rainwater management during extreme precipitation and floods in areas without direct connections to riverbanks, we find it relevant to adopt experience in hydrological and hydraulic modelling using the HEC-RAS and HEC-HMS programs (Table 26). Additionally, Zemgale finds it beneficial to explore various NbS implementations for modelling different scenarios.

Table 26: Overview of chosen transfer solutions from EMT to Zemgale.

Chosen transfer solution from EMT to Zemgale		
Name of solution	**Solution type**	**Short description**
Guidelines on hydrological/ hydraulic modelling & NbS simulation	Decision making aid and stakeholder engagement tool	Thorough documentation of academic expertise for the development of a coupled hydrological/hydraulic model (HEC-HMS/HEC-RAS) to simulate the impact of NbS interventions during extreme flood events and under projected climate scenarios.

4.2.3. Additional activities and solutions being developed within the receiving region

Zemgale is part of LSDT2 as a Twinning region with Central Denmark. The small-scale demonstration area is located in the Lielupes River basin. Currently, it is covered with grass and bushes, resembling meadows where rainwater is collected. The local land use and construction regulations classify this area as being designated for public and industrial construction, adjacent to low-rise residential zones and agricultural land. Due to frequent floodwaters, entrepreneurs interested in establishing their activities may be sceptical about potential positive outcomes and are slow to act on their plans. Hence, the area poses challenges for sustainable business development, particularly regarding the construction of necessary facilities. In order to address this challenge, IoT loggers data collection system will be developed as transfer activity with Central Denmark.

As a preventive measure to reduce the risk of flooding in flat areas with low water absorption, ZPR considers it innovative and useful to study and design a technical project of NbS for rainwater

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

flooding. During the project, Zemgale region has the opportunity to gain a deep insight into the NbS synergy in implementation, which are needed when negotiating possible future development in a particular area. Therefore, after having complete investigation on hydrological data, including IoT logger given data, as well as having received guidelines regarding several type of NbS, there will be decision made if NbS is relevant solution to improve the condition in particular area for water flood management in regard to CCA risks. Thereafter the appropriate NbS solution will be chosen and preparation of technical project for implementation after the end of RESIST project will be made.

These activities would broaden the scope and perspective of engaged stakeholders on what needs to be considered and addressed in identifying and building resilience to climate change (Table 27). During the project and based on the experience gained, a list of proposals for regional and national legislation will be drawn up by ZPR - such as local conditions for the use and development of the area (local level) and national construction law and relevant regulations. ZPR will use the findings and outcome from RTU done research work about different scenarios of hydrological models to prepare proposals on building conditions in flood risk zones.

Dynamic monitoring of soil moisture will be conducted together with other project activities by RTU and will provide an idea of soil moisture and its water absorption properties which is important to understand for decision-makers. This is an important indicator for compliance with construction conditions in the case of new buildings. When developing a new territorial development plan, it is important to take this into account to ensure the sustainable existence and development of both buildings and the territory as a whole.

Table 27: Overview of additional solutions developed in Zemgale.

Additional solutions developed within the recipient region Zemgale.		
Name of solution	**Solution type**	**Short description**
NbS technical project	Project of physical solution	In collaboration with the university, a technical project on NbS will be designed using data collected during the two transfer plan activities.
IoT loggers	Digital tool	An IoT network of groundwater level loggers will be developed. This would serve as a pilot project to inspire other communities on how to prepare for climate change on a daily basis.
Guidelines for local, regional and national level legislation in regard to CCA and society resilience building	Best practice guidelines/ policy tool	A list of conditions, based on the transferred activities and knowledge within Resist Project, that need to be adapted or implemented in relevant/appropriate legislation, so that governments can create a more resilient future and mitigate the adverse impacts of climate change.

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Soil moisture dynamic monitoring	Decision making aid	By taking soil samples and using soil moisture sensors to analyse the physical infiltration of water into the soil, RTU and Zemgale will create a digital platform for the potential impact of stormwater flooding on building structures.

4.2.4. Systemic perspective on regional adaptation efforts

From the state system perspective, the Latvian National Development Plan 2021-2027 has set as priority the "Quality development of the living environment and land", which aims to improve the quality of the living environment for balanced regional development. Infrastructure and the environment must find the best relationship of coexistence. Moreover, in the Development Program of the Municipality of Bauska 2022-2028, it is stated that the goal is to have sustainable and intelligent environmental management as well as dynamics of the business environment, human capital potential and mobility. This includes a scientific approach to regional development.

From the environmental point of view, based on the regional characteristics, the land area is generally flat, where two river basins (Lielupe and Daugava) are usually under the influence of various floods and climatic conditions. Therefore, the area around these rivers is classified as flood prone and in many places, there are restrictions on building. The above-mentioned challenges constitute the local adaptation effort to climate change and form the basis of the regional adaptation strategy.

There is already a Horizon 2020-funded project, IMPETUS (activities for year period 2021 – 2025), which aims to turn climate commitment into action. The IMPETUS project also explores the synergies between mitigating climate change, supporting regional socio-economic growth and stability, and transitioning regions to environmental sustainability and resilience. The main activity of ZPR in this project is to build up the hydrological models for the Lielupe and Daugava river basins and gives the opportunity for the Jelgava city municipality to build up an early warning system. The experience and best practices will be transferred to Bauska municipality where applicable.

In particular, the transferred and regionally developed opportunities and activities within the RESIST project can provide a deeper investigation for the nuanced needs of local government. Zemgale will involve the research team from Riga Technical University Water System and Biotechnological Institute to collaborate in the identification and monitoring of groundwater level, precipitation measures and soil moisture dynamic observation. These activities will provide a basic scientific and technological approach that the municipality has been lacking for some time. The establishment of hydrological and hydraulic models will support the monitoring of water flow in the river and inland areas of the municipality. To give a hand to the municipality in managing water storage after heavy rains, the NbS approach will give innovative impact on developing limit of environmental risks of flooding. CCA will increase community awareness of NbS implementation and provide a new scale water management tool, while IoT loggers and ML app approach can raise awareness in the public and private sectors about climate adaptation and provide insight into tools to address climate change at the local level.

4.3. Planned transfers

4.3.1. Transfer 1: Guidelines on hydrological/hydraulic modelling & NbS simulation

4.3.1.1. Solution description and transfer goals

Modelling approaches have become an indispensable tool for quantifying the impacts of NbS interventions. Although NbS are widely recognized as adaptation measures that address societal challenges, providing both human well-being and biodiversity benefits, there is still a relatively immature research field with many remaining questions about their effectiveness on flood mitigation. Thus, evidence from empirical, modelling, and integrated studies are crucial to fill the knowledge gap. Modelling can provide answers for different NbS scenarios and quantify their impact on flood flows, while testing climate projections can prove their effectiveness on climate resilience.

This transfer solution includes the development of training materials that provide step-by-step guidance on how to develop a coupled hydrologic/hydraulic model using HECHMS and HECRAS (open-source software). HECHMS and HECRAS are standard hydrologic and hydraulic models developed by the US Army Corps of Engineers that are widely used and accepted, while research in recent publications indicates the applicability and reliability of these models to NbS simulation. The guidelines for the HECHMS model will contribute to the design of flood hydrographs under climate change scenarios, and how the produced hydrographs will be manually coupled to a 2-dimensional hydraulic model built in HECRAS to assess flood extend and flood depth. At the same time, the training material will include how to achieve the simulation of NbS by processing hydrological or hydraulic parameters in the coupled hydrological/hydraulic model, depending on the type of NbS measure. Finally, detailed instructions will be provided on how to perform calibration and validation to assess model performance, validate results and produce a model that is accurate and properly represents a real-world river system.

The main objective of the solution is to transfer the know-how to build a well-performing model based on regional characteristics and needs, to explore flooding processes with or without NbS interventions and evaluate their effectiveness. Quantitative pre-implementation results of the model will be used to increase the use of this tool in decision-making and stakeholder engagement. Additionally, the modelling method can be used to assess the impact of location and scale on the effectiveness of NbS, a knowledge both important for Cost-Benefit Analysis and for optimal NbS placement and performance.

4.3.1.2. Measures to overcome barriers and customization needs

In terms of transfer, several differences can be identified between EMT and the Zemgale region that affect the modelling process. Compared to EMT, Zemgale is an agricultural region with a high percentage of stands of pine, spruce trees, and deciduous forests. It consists of flat plains with poor drainage resulting in bogs and a dense network of rivers. Thus, watershed delineation would be challenging due to low slopes and network density, highlighting the need for high-resolution terrain data, and revised Land Use/Land Cover mapping layers. Hydrological modelling in the Zemgale region must consider local land, soil, and climate characteristics, while also incorporating extensive monitoring data and hydrological variables.

The Zemgale region is frequently exposed to several spring floods and river floods affecting agricultural lands, urban areas, and infrastructure such as roads and hydropower plants. Therefore, a more detailed 2D hydrodynamic model should be considered to better depict flood propagation in diverse environments (human and natural) with different runoff capacities. Running the model requires a basic knowledge of hydraulics and increased computational effort. The lack of scientific knowledge in modelling could be a challenge, with the Zemgale group potentially needing more expertise to perform the simulations.

Moreover, a key barrier (Table 288) in the Zemgale region may be the availability of monitoring data to assess model performance and establish validity. Model calibration/validation is an important and standard procedure that requires an adequate number of observations, which the Zemgale region should be able to provide, otherwise, alternative calibration approaches must be evaluated.

Hydrological/hydraulic modelling should be customized for the Zemgale region by emphasizing on regional hydrologic features and needs and offering capacity-building guidance, while efforts will be made to provide alternative (scientifically sound) calibration approaches to ensure model reliability (Table 299).

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

Table 28: Measures to address barriers and customization needs.

NAME OF THE SOLUTION: Guidelines on hydrological/ hydraulic modelling & NbS simulation			
Type of barrier	**Barrier description**	**How can the barrier be overcome?**	
		Measure to address barrier	**Customization of solution**
Dataset availability	Lack of accurate and accessible baseline data at local level and inconsistency in monitoring variables, methods, and assessment tools can pose significant challenges. Models should be utilized with revised data and from reliable sources.	Instructions on how to: 1) integrate the hydrological/hydraulic model into regional features and conditions; 2) enhance current datasets and retrieve additional satellite (earth-observation) and terrestrial (non-space) data from Open Access Scientific Data Hubs; 3) incorporate data from other activities within RESIST project (e.g. groundwater level).	The Zemgale region should liaise with local organizations and agencies to gain access to different types of data and compile a detailed database. Utilize digital portals, primarily focusing on satellite data, and become acquainted with online tools to obtain any additional data necessary for the effective functioning of the models.
Absence of calibration/validation data	Many of the models currently used for climate-related parameters lack proper validation. The absence of high-quality calibration and validation data can significantly compromise the scientific quality of these models.	Guidance on how to: 1) utilize various calibration and validation metrics to enhance calibration and validation processes; 2) explore alternative calibration methods based on related research and published studies; 3) familiarize with the automatic calibration model capabilities.	The Zemgale region should choose the most suitable metrics and adjust calibration/validation techniques on the available data. Study and copy “out of the box” calibration approaches, such as door-to-door interviews where participants can describe water depth in a particular region and for a specific flooding event (citizen engagement). Trained how to implement the automatic calibration options provided by the models.
Knowledge gap	The development and performance of an advanced 2-dimensional computational model requires a background in basic hydrological and hydraulic principles.	Instructional materials that clearly detail all processes essential for the comprehensive development of the models, and enhance the understanding of hydrological and hydraulic concepts.	Attending a series of step-by-step online training seminars to gain the scientific knowledge necessary to build and run the models, and correctly interpret the results.

Table 29: Solution profile for Guidelines on hydrological/ hydraulic modelling & NbS simulation, customized to Zemgale.

NAME OF SOLUTION: Guidelines on hydrological/ hydraulic modelling & NbS simulation		
Short description of the adaptation solution Transfer of know-how to build and perform an advanced hydrological/hydraulic model to assess the effectiveness of NbS in mitigating climate impacts, such as flooding.	**Type of solution** Decision making support	**Solution provider region** Eastern Macedonia and Thrace region
VALUE PROPOSITION		
Target group The solution is developed for **municipal civil protection** in the Zemgale region, focusing on municipal operational information centres for flood monitoring and adaptation planning.	**Main benefits for the target group (purpose)** The primary goal of the solution is to gain knowledge and skills in hydrological and hydraulic modelling, enabling the production of quantitative results on the effectiveness of NbS.	**Social and environmental co-benefits for target group and other groups** The social and environmental co-benefits produced by the solution are flood risk reduction and ecosystem services preservation.
SOLUTION DETAILS		
Climate impacts addressed Climate impacts addressed by the solution are flash floods and river floods (pluvial and fluvial flooding).	**Delivered results** The delivered result will be a complete documentation with guidance on how to integrate a 2D model that performs NbS simulations, evaluates their impacts, and supports flood risk management and decision-making.	**Spatial scope** The spatial scope refers to the areas of interest within Zemgale region that can be potentially replicated in other Latvian municipalities facing similar environmental challenges.
VALUE CREATION AND DELIVERY		
Key resources Key resources include researchers' time, staff efforts to collect data and create training seminars, and academic expertise in hydrology and hydraulics.	**Key activities** Key activities of the solution include training sessions on compiling the required input data, development and operation of a coupled hydrological/hydraulic model, calibration and validation of model performance, NbS simulation, and effectiveness assessment.	**Project owner and key partners** The project owner is the Zemgale planning region and the key partner involved in delivering the solution is Democritus University of Thrace of EMT region. Another partner will be the Riga Technical University's Water System and Biotechnology Institute.
COSTS AND PLANNING		
Estimated costs (implementing and operating) The estimated costs include staff effort within the Resist project. From the budget allocated to the ZPR within the	**Revenues / monetized benefits** ZPR will have tools, knowledge and best practise pilot territory where to present showcase for other municipalities how to deal with	**Time frame for planning and implementation until fully functional** The solution in the Zemgale region is expected to be fully functional by

RESIST project, EUR 26250 will be transferred to the EMT.	rainwater floods in other vulnerable areas for sustainable development. The proposed solution can lead to the implementation of NbS that provide various environmental co-benefits, including flood mitigation, improved water and soil quality, erosion control, enhanced biodiversity, and increased groundwater recharge. Training sessions/workshops held during the solution's development will contribute to knowledge dissemination, education, and gathering, providing significant social and cultural benefits. The completion of the solution helps generate income for individuals in various fields, including academics, researchers, public sector employees, and private companies.	month 51, while learnings incorporated from EMT region's will be completed by month 48.
CONTEXT		
Necessary prerequisites Key prerequisites include the completion of modelling and NbS simulations of the pilot sites in the EMT region, to integrate them as concrete examples in the training sessions with ZPR, and a relevant background in modelling applications and simulation tools on the part of the ZPR.	**Success factors** Key success factors could be completing the training material within the set timeframe (from the EMT side), adapting the knowledge imparted and developing corresponding models with a satisfactory level of performance (from the ZPR side).	**Limiting factors** Limiting factors include potential challenges related to the necessary prerequisites, the level of preparedness of the EMT region with regard to its own commitments in the field of modelling and NbS simulation, as well as the ability to accept and the degree of understanding of the knowledge transferred from the ZPR side.

4.3.1.3. Resources and costs

The resources planned for transferring of the solution to ZPR include staff costs. In particular, ZPR will share its RESIST budget with EMT region, the partner DUTH, in the amount of 26 250 euros, which includes the cost of 6 person months (6 PMs), as detailed in Table 30Table 30.

Table 30: Planned resources and costs.

Planned costs	Details	Sources of funding (RESIST budget or other)
Staff costs	Personnel months for: - Data collection and preparation of training seminars (2) - Provision of academic expertise in hydrology and hydraulics (2) - Researcher time to present training seminars (2)	The personnel costs will be covered by the RESIST budget.

4.3.1.4. Planning the transfer

Objective, purpose, results and planned activities

The overall objective of the Zemgale region is to develop and run a coupled hydrological/hydraulic model and perform NbS simulations to evaluate their effectiveness in reducing flood risk.
The goal is to provide Zemgale with the knowledge required to create advanced computational models that integrate different types of NbS for flood mitigation so that ZPR can apply this methodology to other municipalities of the region.

The expected result is that the model will serve as a framework for flood risk management and decision-making. Planned activities include a collaborative transfer process with the receiving region. The Zemgale region will follow a step-by-step methodology to conduct NbS simulations using a coupled hydrological and hydraulic model. This process includes collecting the necessary input data, calibrating and validating model performance, simulating NbS and using the results to improve flood risk assessment. The results and experiences gained from this process will be shared through meetings, helping build capacity and ensure the methodology is tailored to the Zemgale region's characteristics and needs. The modelling framework can also be applied to other regional sites, possibly extending beyond the RESIST project's duration.

Table 31: Logframe Matrix for the planned transfer.

Transfer project description	Indicators	Source of verification	Assumptions
Overall objective Enhance regional resilience to floods and support decision-making	Key performance indicators (KPIs) that can measure the	Reports on NbS modelling within the RESIST project, as well	

by developing advanced computational models that perform NbS simulations and evaluate their effectiveness.	performance and impact of NbS for flood risk reduction (e.g. baseflow index or standardised streamflow, “area for flood retention” indicator, flood peak reduction).	as RESIST evaluation reports.	
Purpose Knowledge and expertise in building and running an advanced hydrological/hydraulic model to assess the effectiveness of NBS in flood mitigation.	Number of presentations prepared and provided to the receiving region. Number of training sessions successfully completed. Number of people who participated and received the transferred knowledge on modelling and NBS simulation. Number of internal meetings to coordinate the transfer process.	Information about the training seminars can be found in the RESIST project documentation repositories. Presentations, participants, and internal meetings could be verified with a progress report that includes photographic documentation, short videos, and minutes.	It is expected that there will be a basic level of familiarity with simulation tools, as well as a satisfactory level of knowledge of the basic principles of hydraulics and hydrology.
Results A comprehensive documentation with step-by-step instructions on hydrological/ hydraulic modelling and NBS simulation for civil protection staff and decision-makers.	A survey will be conducted after the end of the training seminars to evaluate the solution transfer process. Number of Q&A carried out at the end of each training session.	Sources of information may include reports from the receiving region, focusing on key points of the transferred solution, as well as internal evaluation reports from the Resist project. Feedback from the survey. Report with the Q&A results after each session, evaluating the whole process from both the providing region (EMT) and the receiving region (ZPR).	The main assumption is that the guidelines provided during the training sessions can be customised based on regional characteristics and needs and for different NBS types.
An advanced model tailored to the needs of the Zemgale region, providing information on the performance and effectiveness of the NBS, which will be used for the proper	Number of applications carried out by the ZPR using the guidelines given during the training sessions.		

Co-funded by the European Union
Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

implementation of other activities within the RESIST project (e.g. CBA).			
Activities The main tasks involved in delivering the solution include collecting training materials, creating presentations for the training sessions, creating surveys and Q&As to evaluate the process and results, and organising internal meetings.			Assumptions include that there will be sufficient time to complete the transferability and that there will be no external economic conditions that could affect the viability of the project and the results of the transferable solution.

Next steps

The next steps include mainly online meetings between the EMT and the ZPR, which will take place from 2025 onwards. The meetings will aim to organise and prepare the two regions for the transfer of the solution in 2026.

Timeline until 2027

The solution transfer will take place in 2025-2026, and the results will be reported by the end of that year.

Table 32: Timeline of the transfer.

Timing	Step to conduct Guidelines on hydrological/ hydraulic modelling & NbS simulation
July 2025	Teams meeting with EMT to set up a schedule for the training sessions and coordinate the transfer process.
July 2025-December 2026	Data collection ZPR and RTU
September 2025	Initiating the training sessions.
October 2025 – June 2027	Development of models ZPR and RTU

October-December 2025	Teams meeting with EMT to evaluate and discuss the process so far.
January 2026	Survey to evaluate the process so far and Teams meeting with EMT to set up a schedule for the rest of the training sessions.
February - April2026	Teams meeting with EMT to evaluate and discuss the process so far.
May 2026	Survey to evaluate the process so far and Teams meeting with EMT to set up a schedule for the rest of the training sessions.
June-August 2026	Teams meeting with EMT to evaluate and discuss the process so far.
September 2026	Final survey to evaluate the whole process.
November 2026	Report
April 2026 - March 2027	Development of model by use of HECRAS and HECHMS tool (RTU
January – June 2026	NbS facilitated by ZPR
April-December 2026	Analyse regarding local needs processed related NbS by ZPR
April – December 2026	Soil Analyses made by RTU
July – December 2027	Summary of activities and results
November - December 2027	Final report and presentation

RESIST

Co-funded by the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

More information at resist-project.eu

Twitter:
@RESISTProject

LinkedIn
resist-project