



Climate Resilience Proofing Tool for small-scale projects

18th June 2024

Fani Gelagoti, PhD



WHY USING THE TOOL ?

- 01 To perform a qualitative assessment of **climate threats** potentially affecting the project.
- 02 To observe the various ways the project may be impacted by climatic threats and understand their **potential impacts**.
- 03 To think of different ways to **make the infrastructure resilient** to the potential significant climate risks.
- 04 To comply with the EU Climate Proofing Guidance/ Regulation and become **eligible for European funding** (e.g., InvestEU, CEF, ERDF, JTF).

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WHO CAN USE THE TOOL?



Project Promoters of small-scale projects



Public authorities and implementing bodies to verify the resilience of a project according to the EU climate proofing requirement

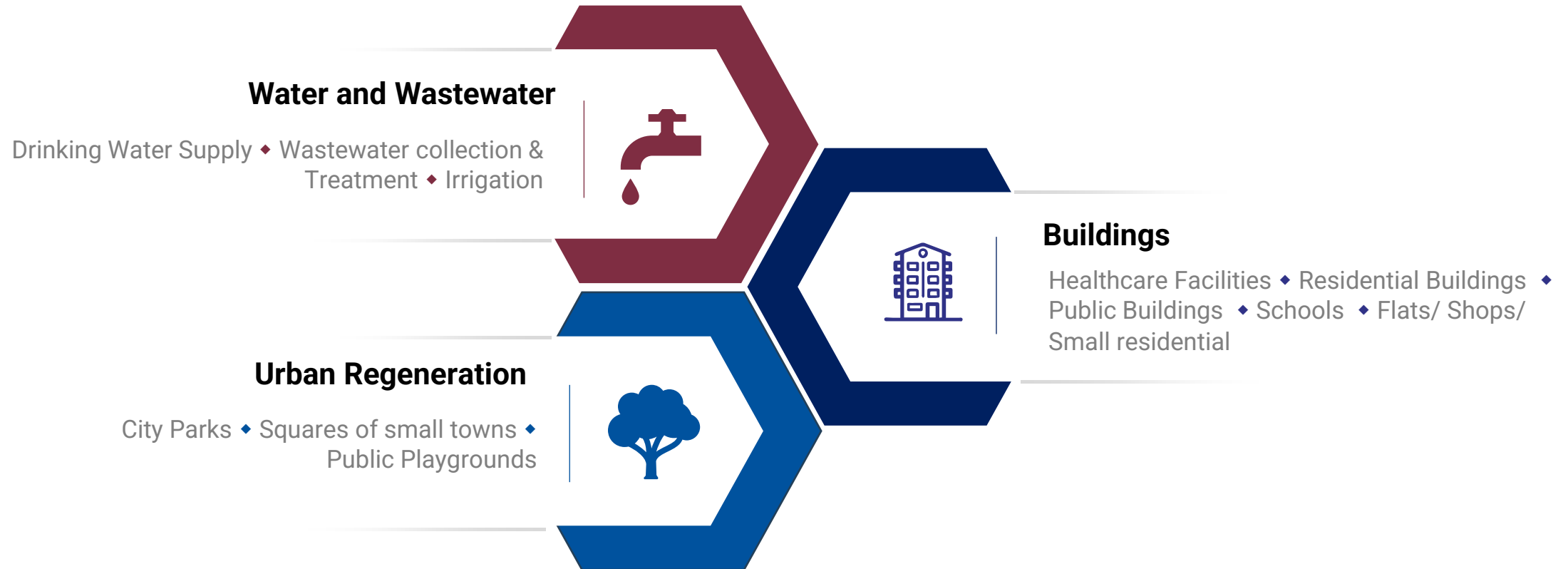


Public or private investors to comprehend the risks they undertake when financing new projects



- A tool specifically designed for non-experts
- Minimum technical background is required

TOOL INSTANCES



SMALL SCALE-PROJECTS

Buildings



Water & Waste



Urban Regeneration



The definitions of small-scale projects are subject to variations based on **country-specific context and regulation.**

KEY FEATURES

An excel-based tool featuring:

A set of questions used to **collect users' experiences with weather events** and based on the responses calculate **exposure scores**.



A set of questions used to **collect users' experiences with weather impacts** on similar projects/ structures and based on the responses calculate **sensitivity scores**.



A comprehensive list of **cost-efficient interventions 'Adaptation measures'** (particular to the hazard classes considered) that can be applied to increase climate resilience.



Build-in functions that can automatically compile the **risk profile of the project** to different hazard classes and threats – before and after implementation of the adaptation measures.



KEY ADVANTAGES

01

Easy to implement

Can be applied by non-experts. It requires minimum input from the user.

02

Online Resources

It employs online Climate Datasets to project the climate conditions of the future

03

Flexibility

It can support different type of assessments (based on available resources and expertise)

04

Insightful

Users can try different adaptation strategies combining different interventions (based on the available budget) and 'run a check' of their efficiency.

USER GUIDE



Introduction to the Tool



Illustrative presentation of climate impacts



Description of Tool Capacities & Limitations



Step-by-step instructions



Glossary of Climate Adaptation terms



CLIMATE RESILIENCE PROOFING OF BUILDINGS

A TOOL FOR PROJECT PROMOTERS

WHAT IS CLIMATE-PROOFING FOR BUILDINGS?



A PLANNING CONSIDERATION

Climate proofing is the action taken to protect buildings and their occupants from climate change related events. The process aims to increase the resilience of buildings and minimize the potential negative impacts of climate change by employing, if required, an array of adaptation measures.



A 4-STEP PROCESS

that includes: (1) recognition of potentially harmful weather conditions for the building and their occupants (currently and in the future), (2) identification of sensitive building components that are most prone to sustain damage or cease operation when exposed to climate change related events; (3) understanding of their potential consequences and the likelihood of experiencing them; (4) adaptation planning



A LIFE-CYCLE APPROACH

that foresees the integration of adaptation measures in the planning, design and operation of the building.

WHY PERFORM CLIMATE-PROOFING?

- To proactively advise on measures and strategies that aim to increase the building's ability to withstand extreme weather events and adapt to the changing climate conditions of the future.
- To fulfill the requirements set out in the legislation for several EU funds such as InvestEU, Connecting Europe Facility (CEF), European Regional Development Fund (ERDF), Cohesion Fund (CF) and the Just Transition Fund (JTF).
- To reduce the economic losses from weather and climate-related extremes.
- To ensure continuity of operation even under adverse climate conditions.
- Because the implementation of adaptation measures is less expensive when performed at the early planning stage of the project.

HAZARD CLASSES

WATER HAZARDS

Extreme rainfall causing flooding
River and coastal floods submerging low-lying areas
Long term **changes in the precipitation**



EXTREME WINDS

Wind Gusts, Tornadoes
Hurricanes



TEMPERATURE HAZARDS

Heatwaves and prolonged periods of droughts
Cold spells, extreme snowfalls
Wildfires
* Changes in the **average annual temperatures** and number of days with zero-crossing

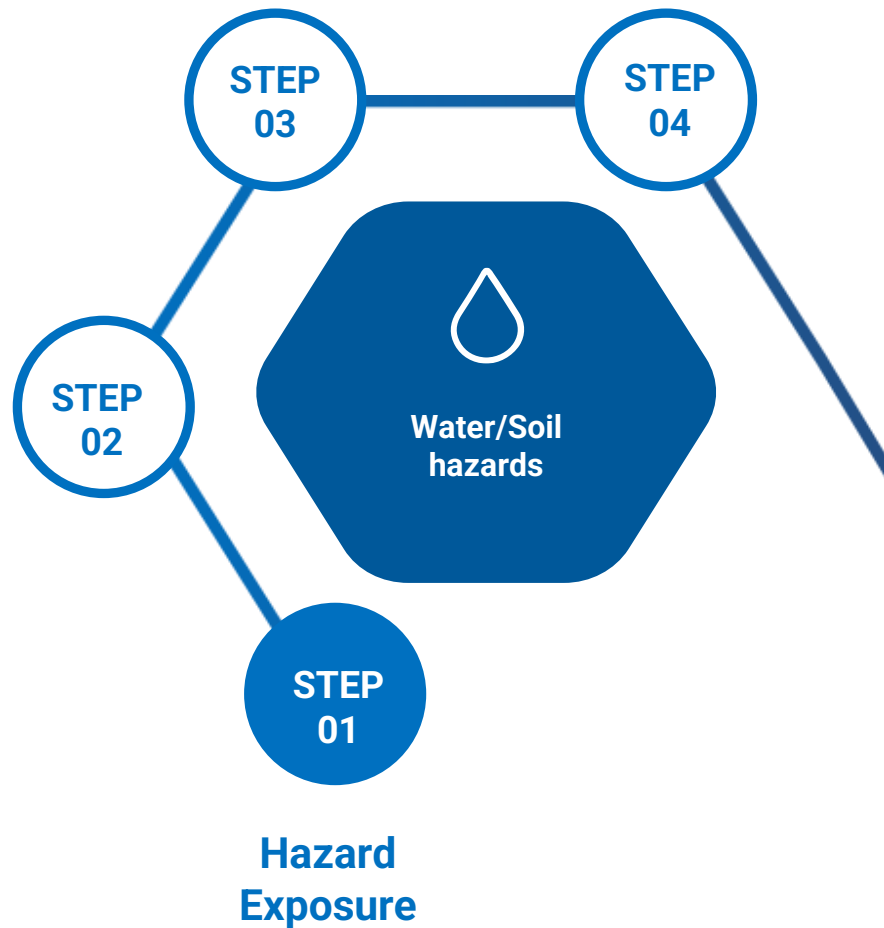


SOIL HAZARDS

Landslides & land subsidence
* **Seawater intrusion** in the groundwater table of coastal areas

TOOL NAVIGATOR

Assessment is performed in consecutive cycles & steps



STEP
01

Hazard Exposure

► Flooding

Questions	[0-3]
	Provide Score
Is the building constructed on a floodplain, wetland or a low-lying barrier?	3
Is the building constructed on a river-bank?	3
Has the area experienced significant flooding in recent history?	3
Are the access routes or the supply chain of the facility crossing flood plains?	2

Flood Exposure Score: **2.75**

Climate Change Projections

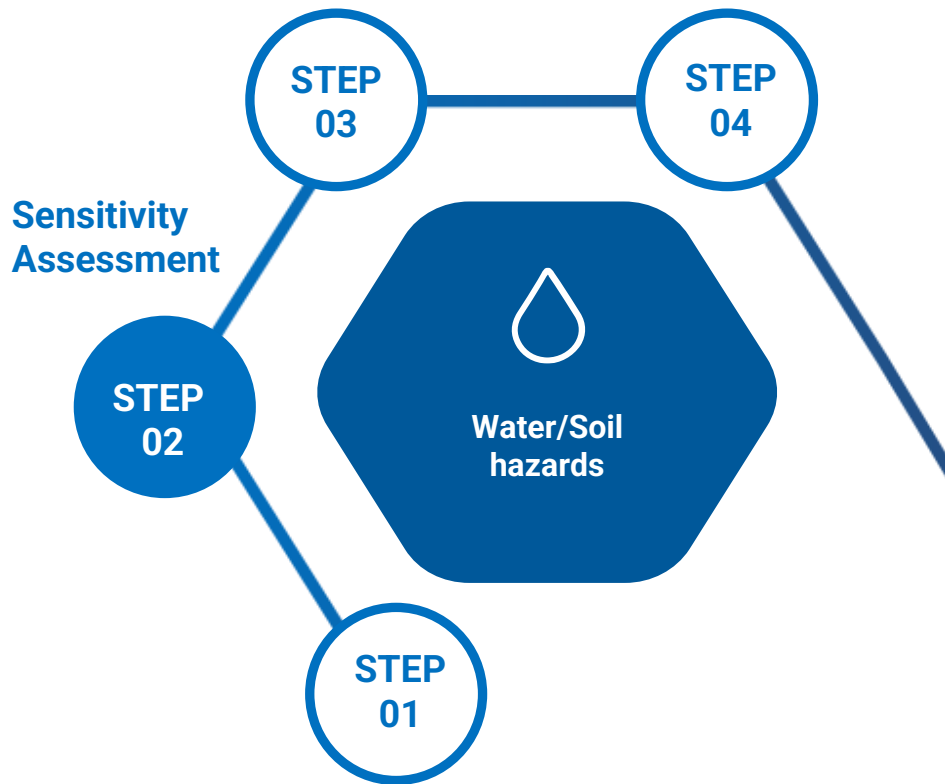
Questions	[0.8-1.5]
	Provide Score
All sites: Will the region experience heavier and more frequent storms in the future?	1.3
Low-lying regions closed to river and lakes: Is the risk of river flooding expected to increase?	0
Coastal sites: Is the risk of coastal flooding expected to increase?	0

Future Flood Exposure Score: **3.00**

►► Next Water-related Hazard

TOOL NAVIGATOR

Assessment is performed in consecutive cycles & steps



STEP 02

Sensitivity Assessment

- Select Assessment Type: Single-Component or Multiple-Components
- Select Project Type (from available categories)
- Select 'Active' Components

➤ Sensitivity

Question	Example from Buildings	
	Score	User input
Based on past experience, will the asset remain functional or (sustain minor damage) in a flood?	[0: Yes 3: No]	3
Does the design prevent water from entering the building interior?	[0: Yes 3: No]	3
Can the building withstand high water levels and hail?	[0: Yes 3: No]	3
Is the building elevated or is the office/shop located at a higher floor?	[0: 2nd floor or higher 1 = 1st floor 2: GF 3: Basement]	2
HIGH		2.75

➤ Adaptive Capacity

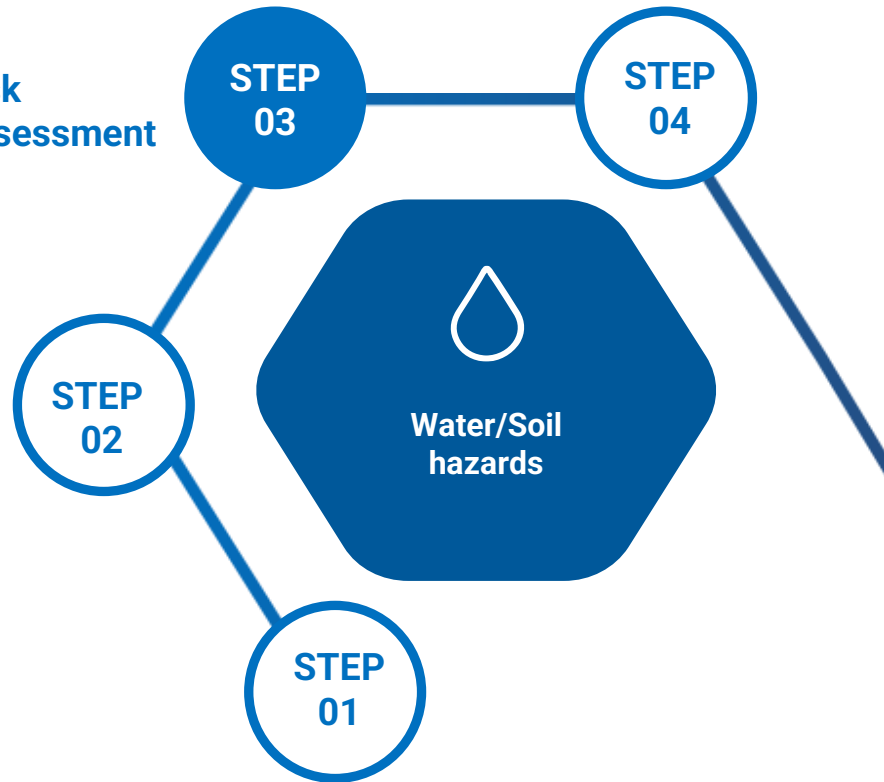
Question	Score	User input
Have any of the recommend adaptation measures of been included in the design?	3: All 2: Some 1: Few 0:No]	1
Is the building/flat equipped with battery-powered pumps?	[0: Yes 3: No]	0

Updated Sensitivity Score: **HIGH** **2.3**

- Repeat the process for all 'Active' Components & Interconnected Infrastructure

TOOL NAVIGATOR

Assessment is performed in consecutive cycles & steps



STEP 03

Risk Assessment



Single-Component Assessment

Component	Sensitivity	Exposure	Risk	
	[0-3]	[0-3]	[0-9]	[Low Medium High]
Single Component - Simplified Assessment	2.3	3.0	6.87	High

Multiple-Component Assessment

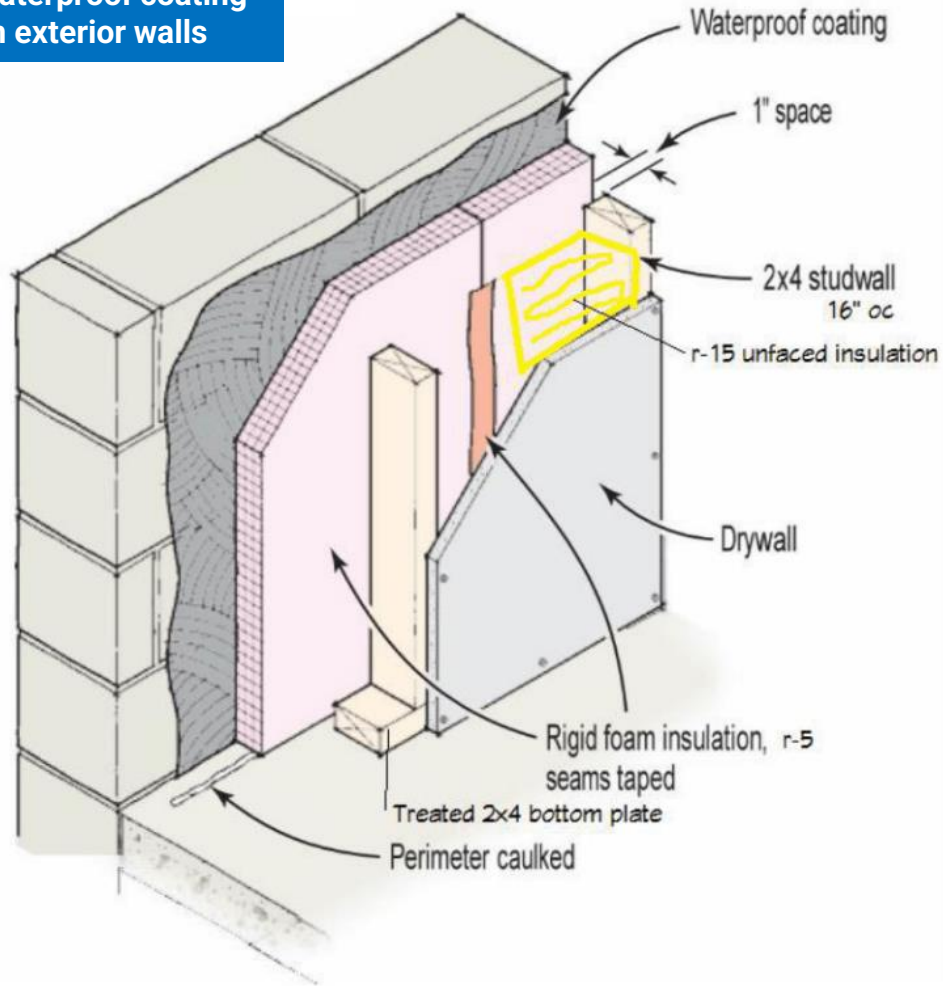
Component	Sensitivity	Exposure	Risk	
	[0-3]	[0-3]	[0-9]	[Low Medium High]
Building Shell	3	2.25	6.75	High
Heating Ventilation & Air-conditioning	3	2.25	6.75	High
IT equipment and Networks	2	2.25	4.5	Medium
Classrooms	1	2.25	2.25	Low
Indoor gym	3	2.25	6.75	High
Computer Labs	2	2.25	4.5	Medium
Schoolyard	2	2.25	6.75	Medium

Interconnections

Component	Sensitivity	Exposure	Risk	
	[0-3]	[0-3]	[0-9]	[Low Medium High]
Supply Network	0	2.25	0	Low
Transport Links	0	2.25	0	Low
Municipal storm & sewer systems	0	2.25	0	Low

TOOL NAVIGATOR

Waterproof coating on exterior walls



STEP
04

Adaptation Measures

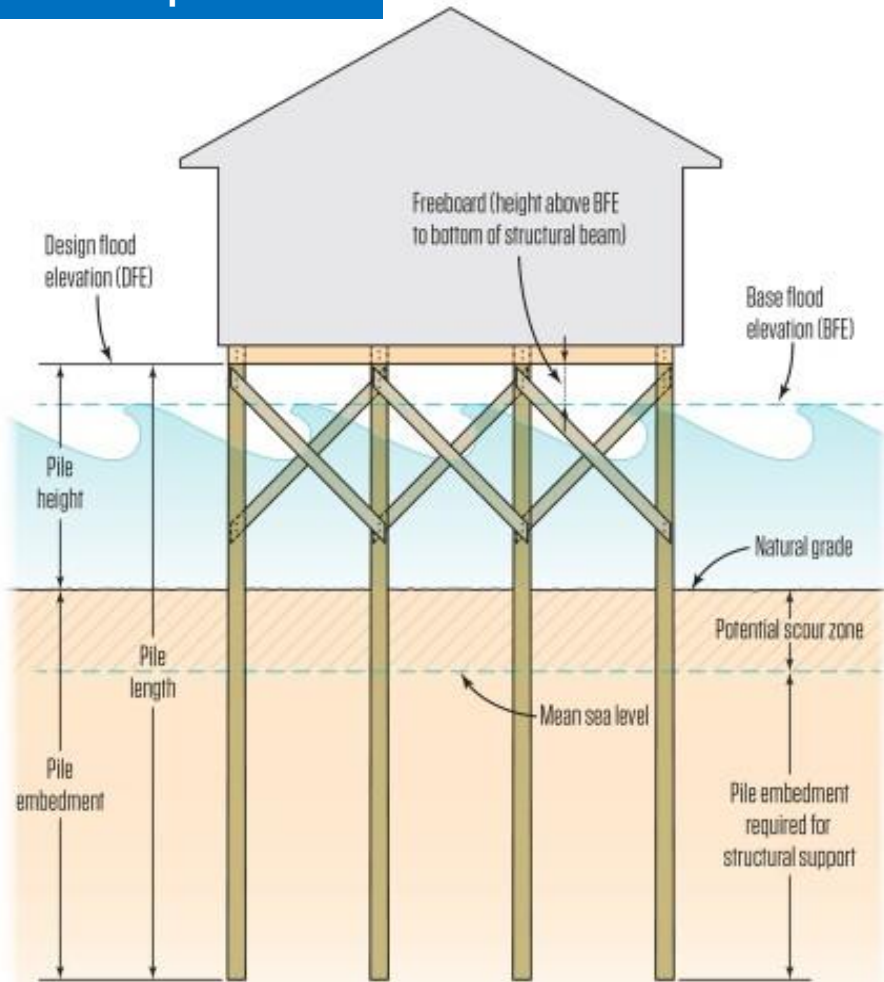
➤ Review/ Select Adaptation Measures for Flood

Adaptation Measures	Efficiency	Cost Estimate
Ensure that the building is seated outside future storm paths and floodplains	High	Inexpensive (if performed during the planning stage)
Suspend , raise, or floodproof E&M equipment and pipes above the base flood elevation level	Low	Inexpensive
Install a pumping system ensuring availability of backup power	Low	Inexpensive
Apply foundation/roof waterproofing (e.g., vapor barriers; land drainage)	High	Inexpensive
For buildings located in coastal regions: apply open foundation design and increase the free-board space above future flood levels.	High	Expensive
Extend the fuel storage capacity for main and backup generators	High	Inexpensive

Excerpt from Buildings

TOOL NAVIGATOR

Building with increased free-board space



Note: pile layout, bracing, and pile-to-beam connections must be designed by an engineer

#1

STRATEGY

STEP 04 Adaptation Measures

Review/ Select Adaptation Measures for Flood

Adaptation Measures	Efficiency	Cost Estimate
Ensure that the building is seated outside future storm paths and floodplains	High	Inexpensive (if performed during the planning stage)
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For buildings located in coastal regions: apply open foundation design and increase the free-board space above future flood levels.	High	Expensive
Extend the fuel storage capacity for main and backup generators	High	Inexpensive

Excerpt from Buildings

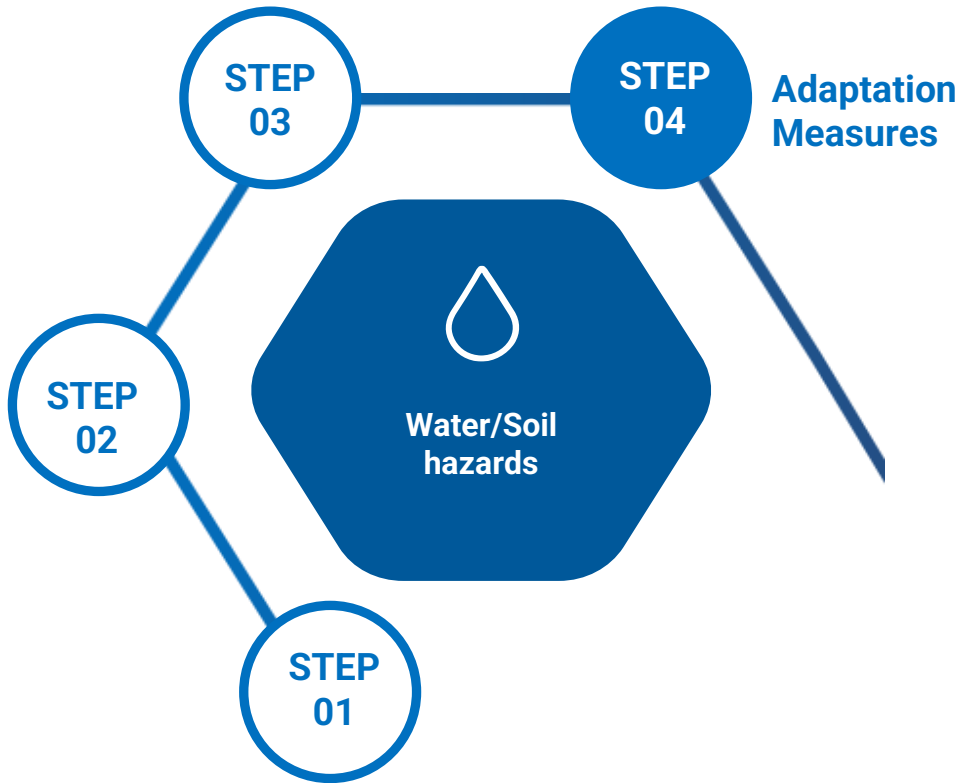
Check Performance of Adaptation

	Building Shell	HVAC	IT equip.	Classrooms	Gym	Computer Labs	School yard
	High	High	Medium	Low	High	Medium	Medium
Foundation water-proofing	High				High	High	
Residual Risk	Low	High	Medium	Low	Low	Low	Medium

Unmitigated Risks

TOOL NAVIGATOR

Assessment is performed in consecutive cycles & steps



#2
STRATEGY

STEP 04 Adaptation Measures



➤ Review/ Select Adaptation Measures for Flood

Adaptation Measures	Efficiency	Cost Estimate
Ensure that the building is seated outside future storm paths and floodplains	High	Inexpensive (if performed during the planning stage)
Suspend , raise, or floodproof E&M equipment and pipes above the base flood elevation level	Low	Inexpensive
Install a pumping system ensuring availability of backup power	Low	Inexpensive
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For buildings located in coastal regions: apply open foundation design and increase the free-board space above future flood levels.	High	Expensive
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Excerpt from Buildings

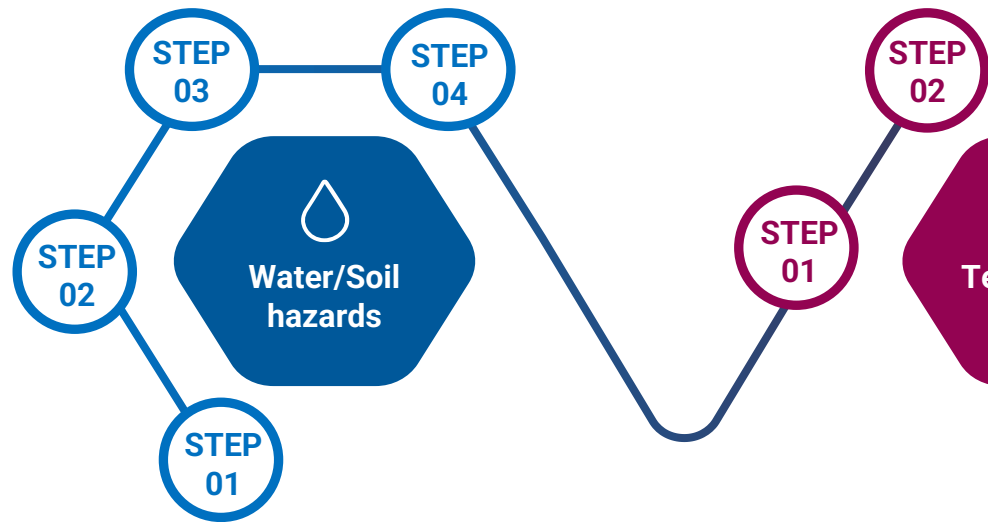
➤ Check Performance of Adaptation

	Building Shell	HVAC	IT equip.	Classrooms	Gym	Computer Labs	School yard
	High	High	Medium	Low	High	Medium	Medium
Foundation water-proofing	High				High	High	
Back-up generators		High	High				
Residual Risk	Low	Low	Low	Low	Low	Low	Medium

✓ Climate Proofing successful

TOOL NAVIGATOR

Assessment is performed in consecutive cycles & steps



OUTPUT

BEFORE

the implementation of Adaptation Measures

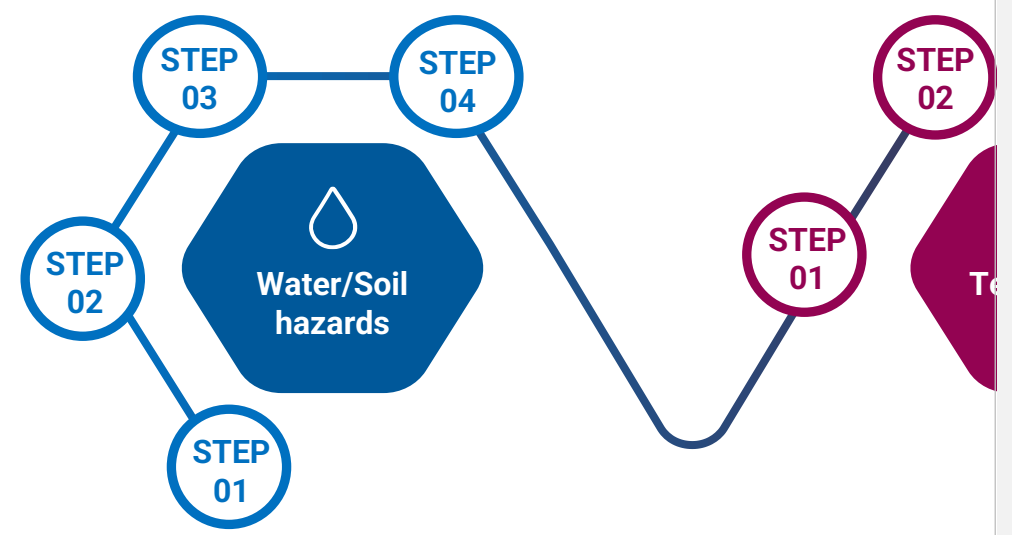
Climate Threats	Heatwaves	Wildfires	Extreme Cold	Flooding	Landslides	Extreme Wind
Average building Risk	Medium	Low	Medium	High	Low	Low



- For multiple-component assessments the tool provides a list of high-risk components for the various hazards examined.

TOOL NAVIGATOR

Assessment is performed in consecutive cycles & steps



OUTPUT

BEFORE the implementation of Adaptation Measures

Climate Threats	Heatwaves	Wildfires	Extreme Cold	Flooding	Landslides	Extreme Wind
Average building Risk	Medium	Low	Medium	High	Low	Low

AFTER the implementation of Adaptation Measures

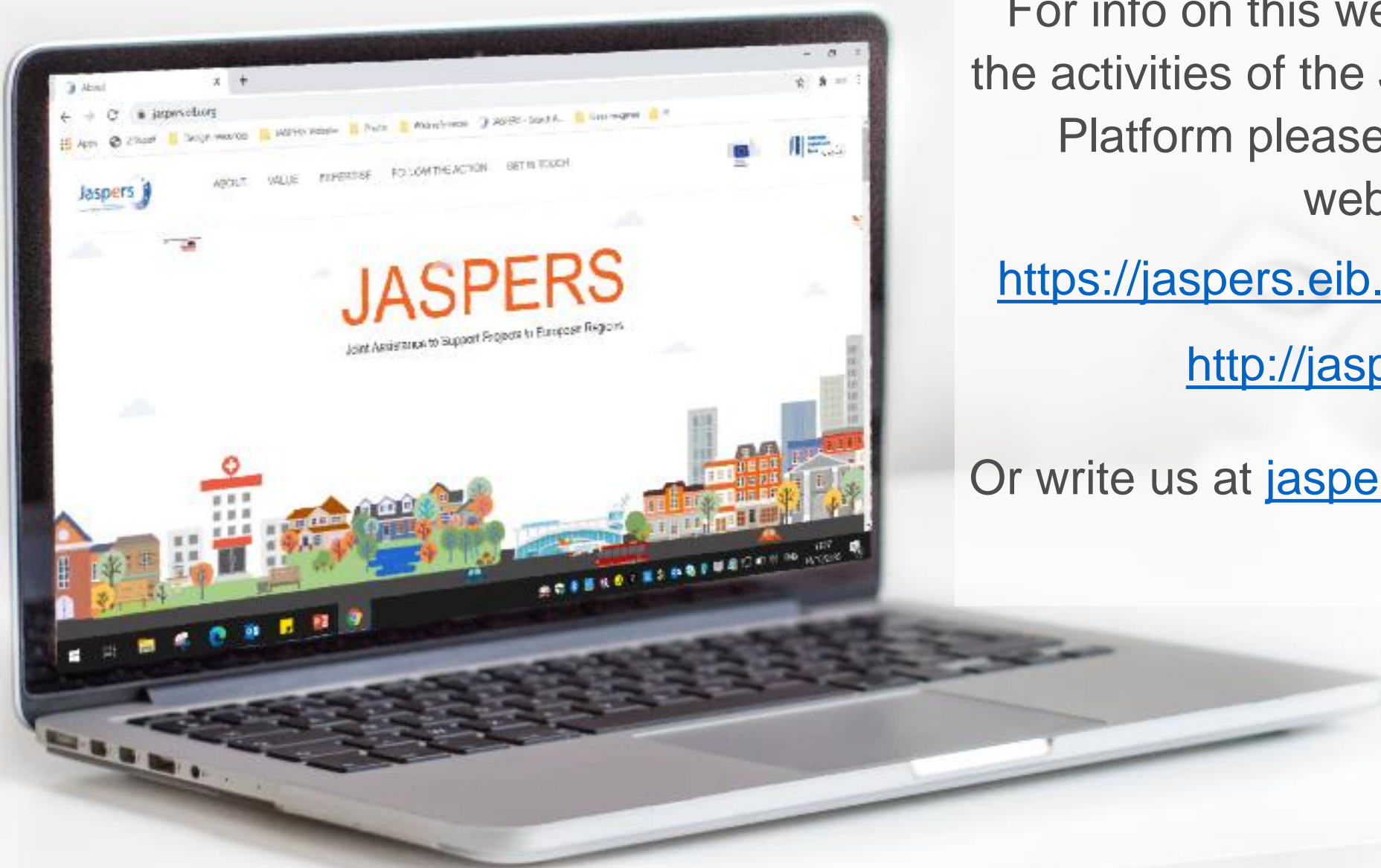
Climate Threats	Heatwaves	Wildfires	Extreme Cold	Flooding	Landslides	Extreme Wind
Updated Risk	Low	Low	Low	Low	Low	Low

Summary of implemented adaptation measures for each hazard considered

Demonstration Example

A year-round restaurant in Athens with indoor and outdoor seating

Thank you !



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