

UP2030



Ajuntament de
Barcelona

RESCCUE tool

Montse Martinez

 AQUATEC

Ajuntament de  Granollers



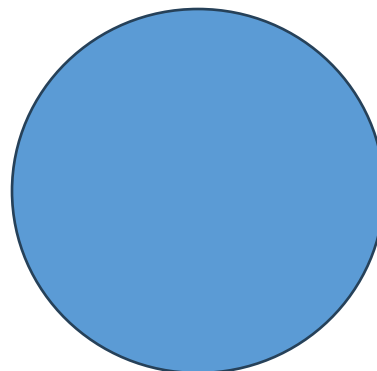
Panelist/speakers presentation



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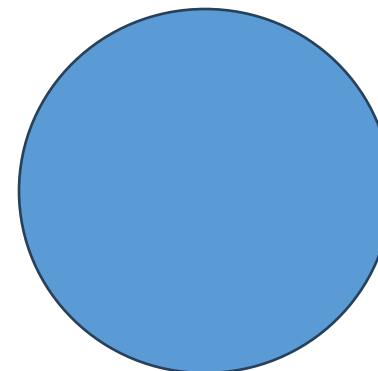


Speaker

Name

(Work:)

Focus:

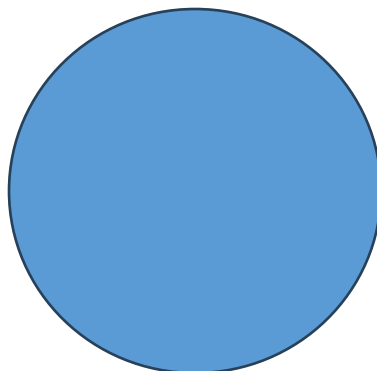


Moderator

Name

(Work:)

Focus:

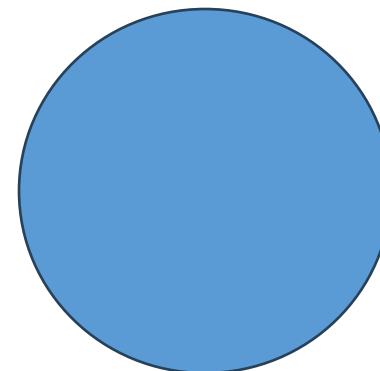


Speaker

Name

(Work:)

Focus:



Speaker

Name

(Work:)

Focus:

Tool description

- Developed within the framework of the H2020 RESCCUE project (Resilience to Cope with Climate Change in urban areas).

-Access at: adaptationstrategies.resccue.eu

-Updated at: icariastrategies.eu

- Methodology, database and support tool for decision-making to develop the optimal strategy to achieve a climate-resilient neighborhood/city, based on:

- Implementation costs (and other expenses)
- Efficiency of the measures
- Associated environmental, social and economic co-benefits



STORMWATER FLOODING IMPACTS REDUCTION					
CITY	COUNTRY	IMPLEMENTATION DATE			
Sample City	Spain	Not planned			
DESCRIPTION					
SAMPLE STRATEGY FOR INFORMATION PURPOSES					
This strategy is defined to cope with pluvial flood risks, present in RESCCUE city. A list of measures have been selected, in order to assess their potential to reduce those impacts. These measures have the capacity to improve the resilience of the city to cope with floods, as defined in their characteristics. Although not all of them will be the purpose and restrictions of our city, therefore a prioritization assessment is needed to understand which ones work better in each case.					
This strategy is designed to represent an European city of approximately 1.5 million inhabitants.					
Ranking					
RANK	MEASURE	CEA EA	ECONOMIC	SOCIAL	ENVIRON.
1	Install retention basins	802,782	21.42%	48.57%	52.73%
2	Install fixation pieces in waste containers	25,050	12.86%	2.86%	5.43%
3	Implement multi-hazard early warning systems	64,820	27.14%	11.42%	4.58%
4	Retention tanks and storage owners	504,205	18.57%	30%	24.55%
5	Provide flood storage areas with infiltration basins	7,884,240	20%	17.14%	26.36%
6	Install retention basins	947,447	10%	14.28%	24.55%
7	Install green roofs	5,565,595	22.86%	2.86%	10%



Methodology

1. Definition of a new strategy

NEW CLIMATE ADAPTATION STRATEGY

When creating a new strategy information about the place of implementation, climate impact to cope, the particular problem of the city and its implementation status has to be provided.

0%

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Country	Spain
City	Granollers
Strategy name	La Bòbila sector resilient to flooding through NBS
Description	Implementation of Sustainable Urban Drainage Systems to adapt the future La Bobila neighbourhood to flooding episodes
Climate Hazard	☐ Combined Sewer Overflow (CSO) ☒ Flood ☐ Sea Level Rise ☐ Drought ☐ Heat wave ☐ Wide-ranging events
Problem description	Due to climate change, episodes of intense rain are expected to become more and more recurrent, with a consequent increase in the risk of flooding. It is therefore necessary to adapt urban areas to these climate risks, thus reducing the resulting
Strategy status	Not planned

Methodology

2. Pre-selection of measures from the RESCCUE database

CLIMATE ADAPTATION MEASURES

A set of measures forms each climate adaptation strategy. A list of more than 100 of adaptation measures is available for users, which can be selected to create a particular climate adaptation strategy. A filter in this step will ease you the measures selection. Moreover, if any of the available measures are suitable for your city, new ones can be created.

The interface features a search bar at the top with the placeholder text "Search by name" and a magnifying glass icon. Below the search bar is a row of six dropdown menus: "Climate Hazard", "Key Benefits", "Measure Type", "Spatial Scale", "Urban Sector", and "Target". Each dropdown menu has a downward arrow icon. Below the dropdown menus, there are seven filter tags, each with a green vertical bar on the left and a close button (X) on the right. The filter tags are: "Flood (Climate Hazard)", "Ecosystem-based (Measure Type)", "Neighborhood (Spatial Scale)", "City (Spatial Scale)", "Water (Urban Sector)", and "Adaptation (Target)".

Methodology

2. Pre-selection of measures from the RESCCUE database



Adding rain gardens before sewer inlet points

An additional point of connection from the roof drainage rain water down pipe. Removing the first few mm of rain before discharging to the sewage network via an overflow system.

- **Category:** Structural / Ecosystem-based
- **Application Scale:** Building
- **Sector:** Water / Social / Health / Environment
- **Target:** Adaptation

Select

More info



Install retentions basins

These type of basins store stormwater during heavy rainfall events, controlling the downstream flow and, consecutively, the flooding risk. Retention basins hold a permanent pool of water (wet basins), having a higher residence time and promoting physical-chemical and biological treatment processes through infiltration and vegetation and microbial activity (TSS, organic matter, nutrients and heavy metals). Both retention and detention basins have inlet and outlet structures and the water level drops slowly as the water flows out of the basin into a nearby water course or sewer.

- **Category:** Structural / Ecosystem-based
- **Application Scale:** River Basin
- **Sector:** Environment / Mobility / Social / Water
- **Target:** Adaptation

Select

More info



Install green roofs

Green roof belongs in the category of Sustainable Urban Drainage Systems (SUDS) and aims at source controlling. A green roof or living roof is a roof of a building that is partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. Primary objective is the reduction of storm-water runoff as part of a sustainable drainage system.

- **Category:** Structural / Ecosystem-based
- **Application Scale:** City
- **Sector:** Water / Social / Environment
- **Target:** Adaptation

Select

More info



Permeable paving

Permeable paving or pervious pavement is a range of sustainable materials and techniques that provide a pavement suitable for pedestrian and/or vehicular traffic, while allowing stormwater to infiltrate through the surface and into the underlying structural layers. Types of surfaces include: modular permeable paving, porous asphalt, grass reinforcement, porous concrete, etc. This measure is part of the called Sustainable Urban Drainage Systems (SUDS).

- **Category:** Structural / Ecosystem-based
- **Application Scale:** City
- **Sector:** Water
- **Target:** Adaptation

Select

More info

Methodology

3. Completion of data regarding cost and efficiency of measures

1/4

Install green roofs

Implementation cost ⓘ 8,573,520 €

Effectiveness indicator ⓘ 6,153 m3

Economic Social **Environmental**

Please specify the weight of each co-benefit as a number from 1 to 10, or leave it blank where it doesn't apply.

Environmental	Weight [1-10]
Effective/uninterrupted water collection and security	4
Erosion control	2
Improved air quality	7
Improved biodiversity and ecosystems	6
Improved water quantity	
Increased biodiversity and ecosystem services	4
Maintained and increased green space	8
Reduced aquifer depletion	
Reduced environmental impacts through associated awareness	
Reduced land contamination	
Reduced water pollution	5

Supporting data or tools should be needed to provide this information

Methodology

4. Preliminary results based on cost-effectiveness

PRELIMINARY ASSESSMENT: Climate Adaptation Measures Ranking

The ranking of the entire set of measures that form this strategy is presented here. This ranking is based on four parameters: 1) Ratio Investment over effectiveness indicator, and co-benefits 2) economic, 3) social, and 4) environmental. The weight of each parameter is adjustable according to your specific interests.

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		Change weights	25%	25%	25%	25%
RANK	MEASURE	CEA €/m3 ⓘ	ECONOMIC ⓘ	SOCIAL ⓘ	ENVIRON. ⓘ	
1	Provide flood storage areas with infiltration basins	188	7.14%	11.43%	42.73%	
2	Install green roofs	11,477	25.71%	12.86%	32.73%	
3	Install filter trenches	3,538	8.57%	5.71%	30.91%	
4	Permeable paving	3,296	7.14%	4.29%	13.64%	
5	Construction of anti-flood retention tanks	3,425,000	0%	0%	6.36%	

Methodology

5. Multi-criteria analysis

Final multi-criteria ranking results

Order by: ☐ Criterion ☒ Scenario

[DOWNLOAD DATA](#)

SCENARIO		COSTS (ESTIMATED)		QPEAK REDUCTION		RUNOFF VOLUME REDUCTION	
A	La Bobila_green roofs	8,573,520 €	5	240 L/s	4	747 m3	3
B	La Bobila_infiltration trenches	1,256,774 €	2	2,060 L/s	2	2,535 m3	1
C	La Bobila_pervious pavement	6,976,462 €	4	1,440 L/s	3	2,438 m3	2
D	La Bòbila_infiltration basins	105,750 €	1	190 L/s	5	562 m3	4
E	La Bòbila_stormwater retention tank	3,425,000 €	3	2,740 L/s	1	m3	5

Application in Granollers pilot

Simulations for quantifying the efficiency indicators (Runoff volume and Peak flow) per scenario:

- Target base scenario (diagnosis): current natural scenario
- Business as Usual scenario (prognosis BAU): urbanization + conventional drainage system
- Resilience scenarios: urbanization + flood resilience solutions
 - Stormwater retention tanks
 - Green roofs
 - Pervious pavements
 - Infiltration trenches
 - Infiltration basins



Contribution to the Granollers' prototype

Guidelines for a greener city with opportunities for everyone

Guide of standards in urban planning including a set of usable criteria and a toolbox of resources and strategies to be applied in the development of new liveable urban areas, with the perspective of decarbonization, **climate-resilience** and social cohesion.

Contribution to the recommendations related to the promotion of sustainable urban drainage systems as cost-efficient measure to:

- Increase urban resilience to flooding episodes
- Manage stormwater in a decentralized way
- Increase pervious surfaces and green areas



A més, les recomanacions de la Primera Conferència d'Experts sobre Canvi Climàtic i Territori al Mediterrani Ibèric, celebrada el gener de 2025, subratllen la necessitat de revisar la delimitació de les zones inundables i del domini públic hidràulic, amb l'objectiu de redifinir oficialment les zones d'inundació utilitzant dades reals d'esdeveniments històrics.

Anàlisi del rendiment dels diferents SUDS:

Segons l'informe elaborat per AGUA4TIC, en el marc del projecte UP2030, utilitzant l'eina **RESOLVE** i un model de drenatge urbà, una gestió efectiva de l'aigua urbana en els nous desenvolupaments requereix la implementació de diversos SUDS per tal de mantenir bones condicions de drenatge similars a les de l'estat preexistent a la urbanització. Present la creixença de la ciutat com a cas d'estudi, l'anàlisi compara el rendiment:

- Tot i que les **basins d'infiltració** s'identifiquen com la intervenció més rendible a nivell urbà, el seu impacte global es limita per la manca d'espai – només poden instal·lar-se en zones verdes concretes i efectives una petita part del volum de l'aigua. Per tant, són insuficients com a solució única.
- En canvi, les **reses d'infiltració** i els paviments permeables redueixen significativament els volums d'aigua i presenten costos benefici favorables. L'eina **RESOLVE** identifica les trinxeres d'infiltració com la solució més eficient en cost per al sector de la ciutat.
- Les **cobertes verdes**, tot i ser l'opció més costosa, ofereixen un benefici addicional, com el refredament urbà, millora de la biodiversitat i valor estètic.
- Els **dispositius de retenció**, tot i ser efectius per atenuar els cabals punta, tenen un baix rendiment en la reducció del volum total d'aigua i aporten pocs beneficis ambientals o socials. Per tant, el seu ús s'hauria de limitar a casos específics de control hidràulic, i no com a solució generalitzada.



Basins d'infiltració



Reses d'infiltració



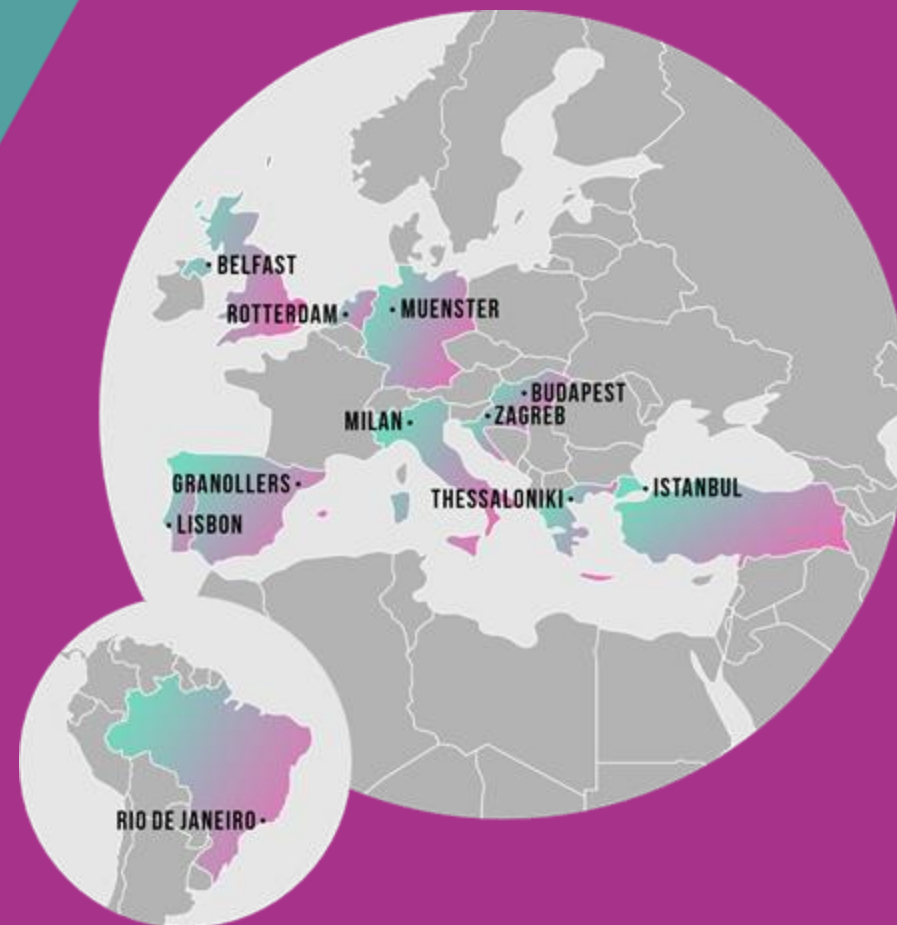
Cobertes verdes



Dispositius de retenció

Figura 47: Diferents elements utilitzats en el sistema de gestió integrada de l'aigua per a l'UP2030 de l'Àrea.

THANK YOU!



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