The Urban Lab of Europe!

PRACTICE
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# Re-designing urban spaces for climate adaptation

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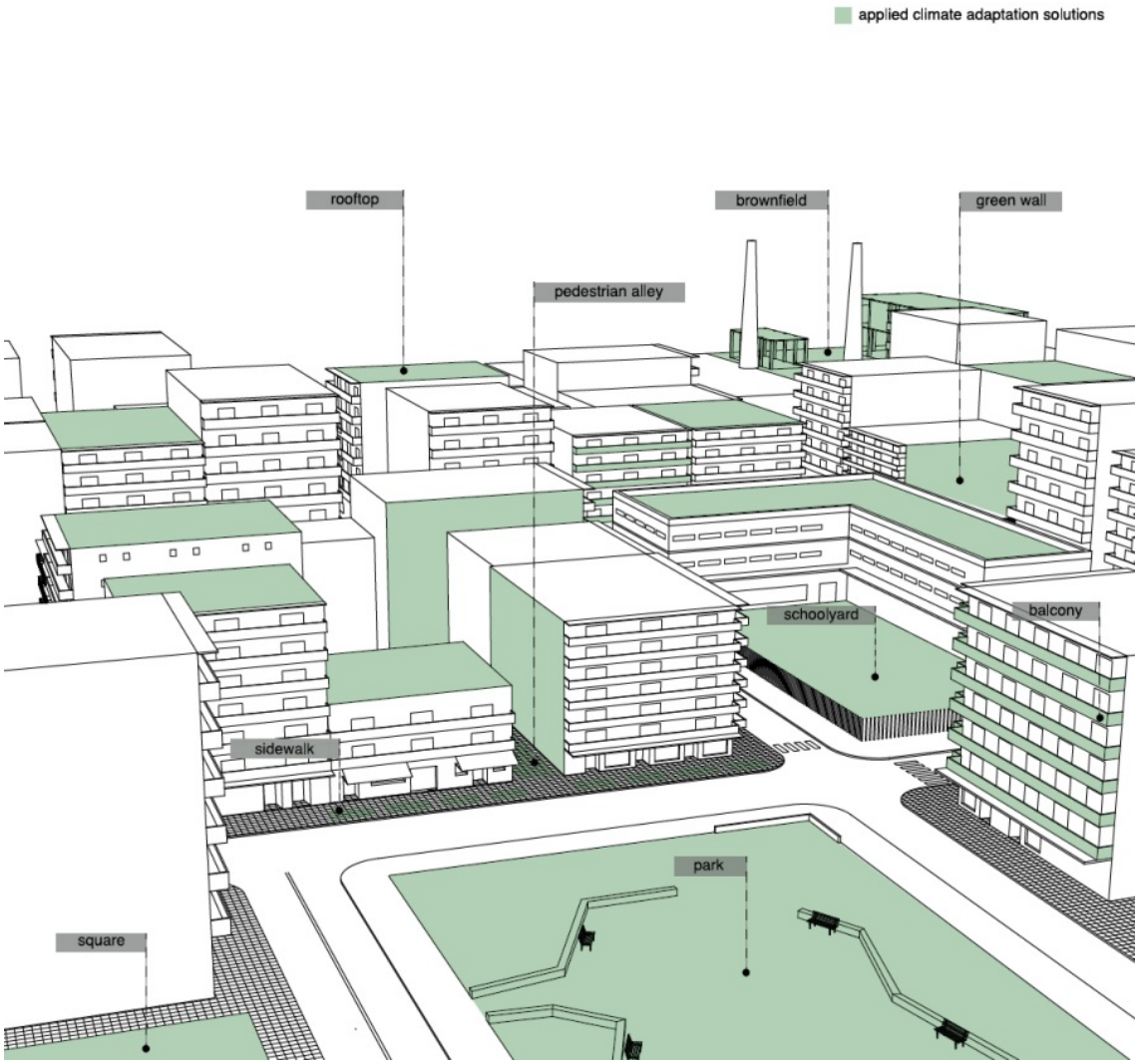


Various urban spaces have potential for climate adaptation transformation within the urban fabric. The types of the applied climate adaptation solutions can vary (nature-base solutions, smart stormwater management systems, sensors etc.) depending on the spatial characteristics, local climate change challenges and local needs and opportunities.

## The relevance of the topic

In our densely built cities, the scarcity of available spaces for new uses adds another level of complexity to

implement solutions for climate adaptation. Although integrating such solutions within the urban fabric demands space, valuable opportunities arise when cities re-think the use and the design of their building stock and their open spaces. Nowadays, urban design is expected to invent new typologies of spaces that facilitate complementary uses and contribute to the city's resilience. It is crucial to integrate nature-based solutions as well as smart systems for stormwater management or disaster risk reduction into the existing urban fabric. In a nutshell, a key approach to creating resilient cities to climate change is to scrutinize the existing urban fabric, identify the opportunities, and re-design urban spaces as multi-purpose spaces capable to respond to a changing climate while ensuring the uninterrupted continuity of city services. Six UIA cities - Amsterdam, Barcelona, Manchester, Paris, Riba-Roja, and Seville - were invited to join the panel discussion of this policy lab and share insights on how they adapted their public spaces. All projects aim to tackle the impacts of climate change through different approaches but with a shared vision for shaping a more sustainable future for their cities by prioritizing their citizens' wellbeing and safety.

**Can the transformation of existing urban spaces help cities adjust to the changing climate?**

**In what ways can it maximize the impact of climate adaptation solutions?**

# Learnings from the projects and the policy-lab

## Identifying the appropriate urban spaces for transformation to maximize the impact of the climate adaptation solutions

Rooftops, schoolyards, and public squares are types of urban spaces where change can happen. Following a harsh summer of heatwaves, the city of Paris sought ways to increase the accessible green spaces for its citizens to enjoy and shelter during weather extremes. Considering that the schoolyards are open spaces located in the heart of every neighborhood, the city identified the opportunity that laid in their transformation. By unraveling the asphalt of the playground and substituting at least 20-30% of the total surface with vegetation, the city achieved to create an oasis in the heart of the selected neighborhoods, capable to enhance the microclimate and restore biodiversity at the local scale; the so-called OASIS Schoolyards. Moreover, the direct access to the schoolyard from the street, provided the opportunity to open access to the local community after school hours. Therefore, it is expected that the transformed schoolyards are not only more inviting and enjoyable spaces for their everyday users; the children, but they also become the neighborhood's pocket parks. The multiple co-benefits of these nature-based solutions go beyond the environmental domain to the children's developmental needs and wellbeing as the OASIS design approach includes natural playgrounds and vegetable gardens.

IGNITION has shown that a diverse range of nature-based solutions such as rain gardens, street trees, green roofs and living walls can be installed in existing urban fabrics. The sustainable urban drainage systems have not required any heavy digging, have been slightly heightened as to not touch existing underground pipeline systems. The living walls and green roof were adapted to be installed on an existing university building. The living walls stand thanks to a lightweight steel frame, adding no weight to the building, while the green roof has been carefully planned to limit the weight of monitoring devices, soil and plants species. The partner went to the extent of showing how trees can be installed on existing roofs by using a light-weight tree pit. All these solutions work in combination and create water system supporting wildlife and biodiversity at no extra cost.

However, public spaces are not the only spaces that cities can consider for transformation. The RESILIO project in Amsterdam moved beyond its public domain and explored the opportunity to utilize private spaces, for the installation of blue-green solutions. The vision of the RESILIO project is to transform the -otherwise empty- rooftops into an innovative system of stormwater management that mitigates the risk of flooding while also tackling important environmental challenges such as the Urban Heat Island phenomenon in the densely built urban fabric. The RESILIO project chose to pilot this system on the rooftops of social housing projects, given that social housing companies are public-private entities and therefore an optimal example to engage the private sector in this innovative concept. The opportunity that emerged with the project is the quadruple-helix collaboration[1] for the implementation and maintenance of the blue-green rooftops as well as the new legislation that is anticipated to lead to further innovation. The RESILIO blue-green solution contributes significantly to the enhancement of the local microclimate and prevents flooding risks while social housing companies benefit from the private use of the collected water. In fact, RESILIO has proven that multi-stakeholder collaboration with mutual benefits is a key element for successfully implementing the city's climate adaptation strategy.

Ultimately, small-scale interventions that are strategically located within the urban fabric can drive change on the large scale by transforming the urban context and strengthening the city's resilience to climate change impacts.

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[1] Government, private sector, research institutes and civil society

## Innovative ways to measure the effectiveness of climate adaptation solutions in urban spaces

Although the measuring process sounds like a straightforward procedure and it might seem hard to be innovative, there are ways to develop outside-the-box methods for monitoring and evaluating the progress and the impact of a project. The GBG_AS2C (Blue, Green & Grey_Adapting Schools to Climate Change) project in Barcelona established a multi-stakeholder collaboration for building a multi-factor strategy for measuring and monitoring. More specifically, the City collaborated with two Health Research Institutions - the Barcelona Public Health Agency (ASPB) and the Barcelona Institute of Global Health (ISGlobal)- to measure and assess the co-benefits of the transformed schoolyards to the wellbeing of their everyday users. ASPB designed and coordinated child-friendly evaluation activities, thus achieving the active involvement of the end users not only during the development of the project but throughout the evaluation phase as well. The ISGlobal used low-cost sensors to measure the thermal comfort of teachers and in parallel validated those measurements with traditional sensors. In doing so, it is anticipated that this validation will allow the reliable use of low-cost sensors for future interventions, which in turn is expected to reduce the cost of the measuring process. Pupils have participated in some of the indicator measures by either observing strawberry plants, which serve as monitoring devices since they accumulate air particles, or participating in CO2 measurement workshops, during which students measure the presence of CO2 and learn the need to ventilate indoor spaces. Additionally, ISGlobal used the systematic observation tool SOOPEN (System for Observing Outdoor Play Environments in Neighborhood Schools) to assess the impact of the spatial interventions on pupils' use of the redesigned schoolyard.

All innovative projects open up the opportunity for developing new monitoring methods informed by the specific focus of each project. A good starting point for a city to begin measuring the progress and impact of their projects is the various handy tools that are available online. Such as the SAT4SUD monitoring assessment tool provided by the Joint Research Center for sustainable urban strategies or the City prosperity Index (CPPI) developed by UN Habitat, which enable for collecting quantitative & qualitative data, perceptions and maps.

## Tackling challenges that arise from the implementation of sophisticated solutions

The implementation of innovative projects comes hand in hand with a set of challenges as it usually requires a change of mindset, procedures that usually require actions outside the existing frameworks, or overcoming bureaucracy bottlenecks and unknown technical barriers. The GUARDIAN project in Riba-Roja introduces an innovative hydraulic infrastructure for the management of the natural environment and the fire prevention in a high-risk area. The project faced various challenges; from ensuring the safe irrigation very close to residential areas to fine-tuning the various bureaucratic processes for granting permissions for the installation of the infrastructure. The key action that enabled the GUARDIAN project to complete the infrastructure was the tailored communication of the project to all different audiences. A communication and engagement strategy that manages to quantify the social benefits of the solution, provides transparency of the procedure and establishes the value of adaptation to climate change in the long term is likely to both secure the much-needed political will and attract the interest and support of the public.

According to the participants of the policy lab the major challenges for re-designing urban spaces for climate adaptation are the following, beginning from the most complex challenge (1) to the more straightforward one that could be easily resolved (6):

1. Political will / secure consensus for investing in climate adaptation solutions
2. Funding the design & maintenance of the solutions
3. Lack of the appropriate expertise by the city departments / difficulty in shifting to a more sustainable urban design mindset
4. Finding the right allies for the project: Managing a multi-stakeholder collaboration for the implementation & maintenance
5. Citizen awareness and engagement in the design and maintenance phase
6. Identifying the appropriate urban spaces for transformation

## Financing the implementation of innovative solutions

A major barrier that cities currently face when attempting to implement an innovative solution is identifying the appropriate funding resource. This issue is rather multi-dimensional as multiple challenges arise including the alignment of the political will to the SDGs, strict timeframes, lack of data or unexpected costs (e.g. overheads, project coordination). The IGNITION project in Greater Manchester aimed to develop viable business models that would secure the funding for the implementation of nature-based solutions. The project tested multiple approaches to engage private investors and concluded that a combination of actions is required in order to

attract funding. A key action for convincing investors but also increasing the public interest was the setup of a Living Lab, where various nature-based solutions were demonstrated and also their performance was being measured live with sensors. Moreover, IGNITION managed to raise the citizens' awareness and support by showcasing the monetary benefits of the implemented nature-based solutions in their utility bills. Therefore, the three steps to follow for securing support and funding for an innovative solution would be to adjust the project goals to the local context, clearly communicate the benefits and monetize them, if possible. Cities that seek to develop a business model for financing the implementation of innovative solutions should begin from profiling their audience (investors, involved stakeholders), understanding local needs (citizen surveys) and develop a communication strategy accordingly, in order to secure the acceptance and sustainability of their investments by building the pride of citizens for their spaces.

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The Quartuja Quanat project will provide adapted urban spaces to Sevillians.

# Lessons learnt

- **There is no one solution that fits everything.**

All concepts need to be adjusted and informed by the local context and cultural identity in order to be successful. A solution that is implemented on rooftops in one case could be more applicable to balconies in another place, similarly, a schoolyard could become a community park or in another case, a park could function as the missing schoolyard of a small sized school. The selection of the appropriate spaces needs to be a data-driven decision that is based on a multi-criteria matrix that manages to secure political will.

- **New techniques and tools allow to intervene in most urban fabrics.**

The diversity of methodologies and solutions demonstrate that there are climate friendly solutions that can be applied to various urban contexts and that can be integrated in existing buildings and urban fabrics with limited intervention.  without heavy digging, or risk to underground utilities.

- **Use adaptation projects to make urban spaces more inclusive**

Intervention in urban spaces for climate adaptation purposes must be seen as an opportunity to adapt our cities to all citizens, ensuring that spaces are accessible, gender-neutral and polyvalent.

- **Speak the language of your audience**

Altering the traditional use of a space or introducing a smart/innovative technology can be provoking for the users and the policy and decision makers as such actions usually require the disruption of "business as usual" procedures or the change of habits or mindsets. Therefore, defining the appropriate way to communicate the project to stakeholders as well as the citizens can be a true game changer in securing acceptance and sustainability of the city's investment in such solutions. A set of various approaches need to be used when engaging different audiences (stakeholders, decision makers, diverse citizen groups etc).

- **Measuring the expectations before and after the project can be eye-opening.**

Measuring should be an iterative process that exceeds the lifecycle of the project. It is quite common that measuring impact is almost impossible during a project's timeframe as change takes time to be visible and measurable. However, an informative process that offers a qualitative measurement of the project's success is to measure the expectations of all involved actors before and after the implementation. Such an approach can provide valuable insights for the sustainability as well as the potential upscaling of the project in the long-term or a re-adjustment of the initial vision.

- **Explore and combine diverse resources for funding**

Until recently, the climate adaptation solutions were primarily considered experimental projects that were piloted in cities as testbeds within the frame of research programs (e.g. Eu-funded Horizon projects). Today, there is a larger diversity of available funding resources for the implementation of climate adaptation solutions, such as the European Investment Bank, private funds, sponsorships or even crowdfunding from the local community. Moreover, seeking co-funding opportunities and merging budgets for complementary projects can maximize the impact of the investment as well as ensure the feasibility of implementing innovative projects.

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