D6.3. Innovation Screening Framework and Guidelines: LIST

Regions 4Climate

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List of Acronyms

EU	European Union
KEC	Key Enabling Conditions
KCS	Key Community Systems
IM	Innovation Model
IRL	Innovation Readiness Level
IV	Innovation Viability
LIST	Local Innovation Screening Tool
MACC	Mission on Adaptation to Climate Change
NbS	Nature-based Solutions
R4C	Regions4Climate
P2R	Pathways2Resilience
T	Task
CIF	Common Innovation Framework

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Keywords list

Local Innovation Screening Tool; Innovation; Nature-Based Solutions; Climate Resilience

Disclaimer

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Executive summary

This deliverable provides a comprehensive overview of the **Local Innovation Screening Tool (LIST),** designed to assist the 12 regions of Regions4Climate Project (R4C) in tracking and evaluating the innovations implemented during their resilience journey. The LIST is freely accessible to any user interested in analysing their innovation pathways over a specific period, making it a valuable resource for fostering regional innovation.

The report begins with a brief introduction to the objectives of the LIST, highlighting its role in supporting regions to systematically assess and enhance their innovation efforts. Following this introduction, the report delves into the conceptual foundations of the tool, detailing each of its core elements:

- *Key Enabling Conditions (KEC)*: These are the fundamental factors that must be in place to support innovation within a region.
- *Key Community Systems (KCS)*: This element focuses on the critical systems within a community that interact and contribute to the innovation process.
- *Innovation Readiness Level (IRL)*: This metric assesses the preparedness of a region to implement and sustain innovative practices.
- *Innovation Model (IM)*: This outlines the framework or approach that a region adopts to drive innovation.
- *Innovation Viability (IV)*: This evaluates the practicality and sustainability of the innovation initiatives.

The report then provides a step-by-step introduction to the LIST, describing each functionality in detail. This section ensures that any user can understand the steps to follow and the results to expect, making the tool accessible and user-friendly.

In the final section, the report offers a reflection on the next steps for the LIST. It discusses potential future exploitation, including how the tool can be refined and expanded based on user feedback and lessons learned from its initial implementation. The aim is to enhance the tool's effectiveness and promote its wider adoption, thereby supporting more regions in their innovation journeys.

In conclusion, the LIST tool emerges as a robust and adaptable instrument for regional innovation assessment. By providing a structured approach to evaluating innovation pathways, it empowers regions to achieve greater resilience and sustainability. The ongoing refinement and potential upscaling of the tool promise to extend its benefits to a broader range of users, fostering a culture of continuous innovation and improvement.

Although not within the scope of R4C or intended to be maintained within the project budget, the continuous development of the tool may be proposed in future EU funding opportunities. The tool could potentially be enhanced with specific regional innovations related to climate change adaptation, supporting any given region. In this case, we would propose including LIST as a tool in the *Pathways2Resilience*

Climate Toolbox, developed in the P2R project, aimed at supporting EU regions in their transition towards a more resilient territory through innovation identification. Figure 1 schematically shows the conceptual and methodological pillars of the LIST tool.

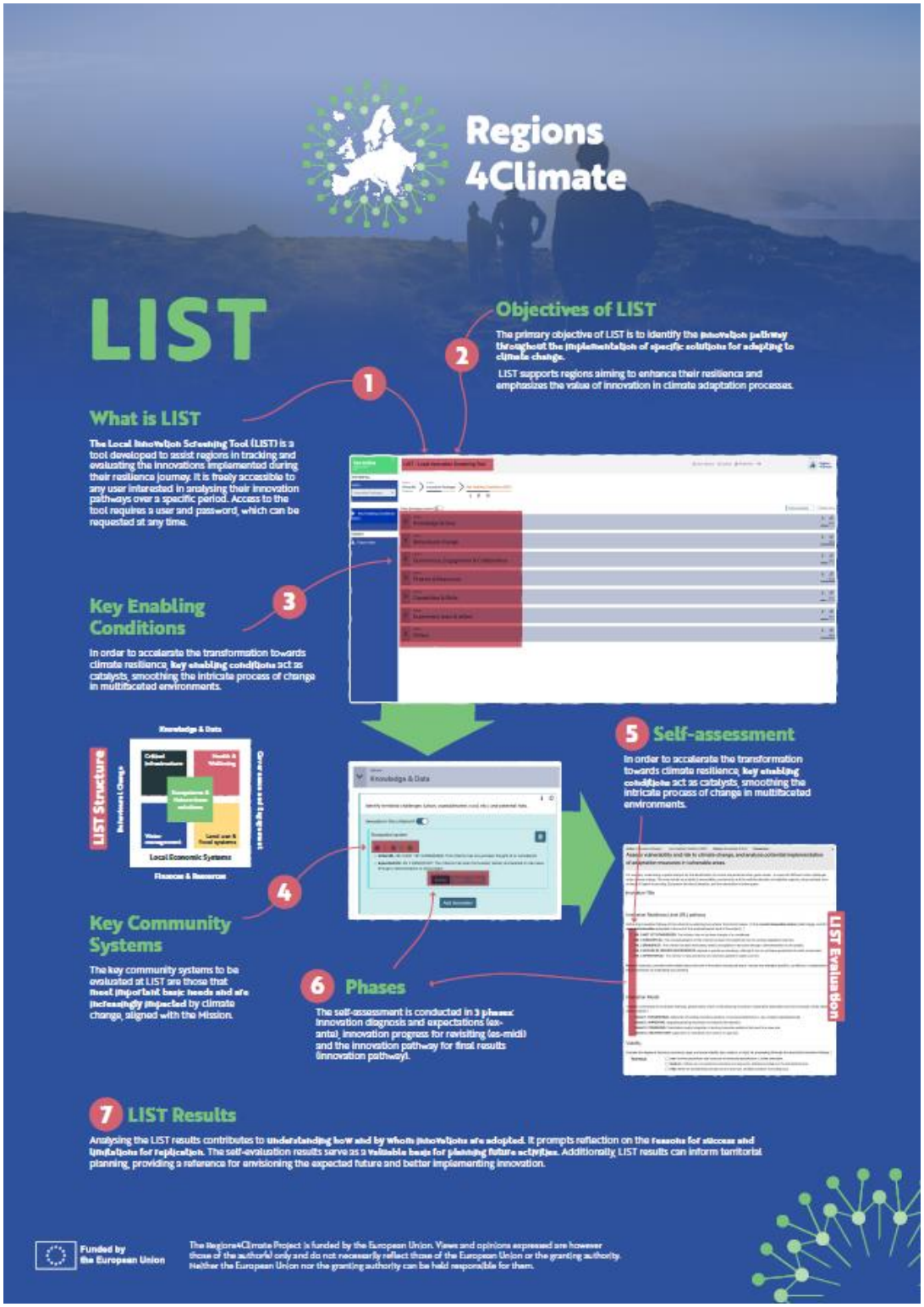


Figure 1. The LIST tool in a nutshell.

1. Introduction

1.1. Goal of the task

As described in the Regions4Climate (R4C) Grant Agreement, Task 6.3 “Innovation Screening” is led by Tecnalia and is planned to be developed and implemented between months 6 and 54. In collaboration with Task 5.1 “Cross-border Vision & Action Reconciliation,” this task aims to systematize the expected results of climate resilience innovations with respect to the type and scale of innovation and the challenges faced.

As part of the development of this task, these guidelines for innovation implementation in climate resilience (the present deliverable) have been created. The aim is to support R4C regional partners in conducting a self-assessment of innovation implementation using an Innovation Screening Tool. This tool evaluates the techno-economic, social, and legal feasibility of each innovation and its potential for upscaling and replication.

The main goal of the tool is to facilitate the assessment of the innovative character of interventions in different spheres (in this case, based on the Key Enabling Conditions). These spheres include elements such as co-design, spatial planning, policies, regulations, governance, financing and business models, stakeholder engagement, implementation, data gathering, and decision-making processes.

The task and related deliverable are contextualized within Work Package 6, “Innovation Management and Exploitation,” providing a clear link to innovation management at the regional level, which may potentially receive inputs from the reflections generated by the application of LIST. Additionally, the basis of D6.1 - Common Innovation Framework (CIF) was incorporated into the decision process of the LIST criteria, ensuring coherence between the outputs of both tasks, which focus on different territorial scales. Task 6.4 of this same work package can also be related to the LIST results, as the lessons learned by regions at different stages would improve the plans for upscaling and replication actions within the same or other regions of the project and beyond.

1.2. Purpose of the Tool

The Local Innovation Screening Tool (LIST) is developed by Tecnalia and adapted to the R4C project and aims to assist regions in **tracking and evaluating the innovation implemented during their resilience journey**. It is freely accessible to any user interested in analysing their innovation pathways over a specific period, although the access to the tool requires a username and password, which can be requested at any time.

The primary objective of LIST is to **identify the innovation pathway throughout the implementation of specific solutions for adapting to climate change**. To achieve this, it evaluates criteria classified by conditions that may enable the generation of expected impacts. Additionally, LIST provides inspiration and knowledge about various existing innovative elements that could be considered during the implementation of solutions, fostering a more resilient environment. Another goal is to **provide inspiration and knowledge about different types of existing innovative criteria** that could be considered in their resilience journey.

LIST supports regions aiming to enhance their resilience and emphasizes the value of innovation in climate adaptation processes.

LIST is based on a set of pre-established criteria **organized into six Key Enabling Conditions (KEC)**, as defined by the EU Adaptation Mission (knowledge & data, behavioural changes, governance & engagement, finance & resources, capability & skills, experiment, learn & reflect)[1]. The assessment of innovations in LIST can be either “absolute” (never previously implemented) or “relative” (novelty in relation to a more conventional solution used until then or a transfer of an idea’s implementation from a different place).

LIST relies on an **innovation pathway self-assessment**, with sections related to the following: Innovation Readiness Level (IRL), Innovation Model, and Innovation Viability (technological, economic, social, and legal feasibility). These emerge from a reflection process within each region. The tool considers Ex-Ante (at a given starting point), Ex-Midi (to revisit advances), and Ex-Post (at the end of the project) evaluations.

Analysing the LIST results contributes to understanding how and by whom innovations are adopted. It prompts reflection on the reasons for success and limitations for replication. The self-evaluation results serve as a valuable basis for planning future activities. Additionally, **LIST results can inform territorial planning, providing a reference for envisioning the expected future and better-implementing innovation**.

[1] European Missions. Climate Change Adaptation Mission. Implementation Plan Adaptation to Climate Change Support at least 150 European regions and communities to become climate resilient by 2030. Implementation Plan (2021).

1.3. Tool Background

LIST was first conceptualised in previous European Projects, however, the first version to be implemented was for CLEVER Cities H2020 project[2], as a webtool to support urban planners and municipal administrations in their ambitions to increase innovation in the context of Nature-based Solution (NbS) implementation. Although it was specifically designed for the CLEVER Cities project, LIST was meant to be useful for wider stakeholders to know and better understand what kind of innovation aspects they may consider in each part of the process of NbS implementation, e.g., in terms of material choices, methodologies applied, management and monitoring their impacts, as identified fields within which cities could potentially innovate.

In particular, LIST also proved to be a useful tool to - after establishing a given starting point and the expectations in terms of innovation - identify the pathway over which the innovation was traced, and then reflect on the levels of success related to the trajectory of the actions implemented.

In CLEVER Cities, LIST has provided support to its partner cities London, Milan, and Hamburg in moving towards a new and improved approach to urban regeneration through NbS. The tool also aided the partner cities of Malmö, Madrid, Larissa, Belgrade, Sfântu Gheorghe, and Quito in creating value by considering innovation in their designing of NbS and future NbS action plans.

Following the same structure, although within a different context and revised innovation criteria, LIST is a flexible tool to be adapted and implemented towards multiple goals. In the case of R4C, it was adjusted to the regional context (instead of cities), with the criteria reduced to approximately 30, compared to the 150+ developed in CLEVER Cities). The structure was defined according to the new target, this time being grouped by KEC, and considering the KCS (Key Community Systems) established by the Adaptation Mission. The tool was rebuilt on the lessons learned gathered in this previous project, which led to a more comprehensive, friendlier, and easier-to-use tool, still robust and complying with the established goals indicated by the project.

Results of the development and implementation of LIST in CLEVER Cities have been presented in different formats and through various communication channels. The final report[3] is available on the project website, as well as in the CLEVER Cities Guidance Platform[4], which made available a particular briefing5. Additional links to related material can be found on the project website.

[2] Potential to innovate through NbS implementation: Local Innovation Screening Tool (LIST)
[3] D4-4-III_InnovationPathway_LIST.pdf
[4] CLEVER Cities
[5] 05tec-innovation-potentialv1-1.pdf

2. LIST Conceptual Framework

2.1. Structure of LIST

2.1.1. Criteria tree

Impact Pathways

The objectives of the Climate Change Adaptation Mission include supporting regions and communities in co-creating innovation pathways and testing solutions. In line with the Horizon Europe monitoring and evaluation system, the Mission will define key impact pathways (Figure 2) to track progress in addressing three complementary impact categories:

- Scientific impacts, measured in terms of new knowledge, skills, technologies, and transformative solutions to climate change.
- Societal impacts, measured in terms of progress throughout local and regional transformative journeys and tangible achievements within the ten areas of innovation of the Mission.
- Economic impacts, related to all forms of innovation and their deployment.

Figure 2. Examples of potential key impact pathways. Source: Climate Change Adaptation Mission.

Figure 3 shows a conceptual diagram of the LIST tool. The tool is structured in three levels of evaluation (from the most general to the most specific), through which the user progresses. The first level of analysis is that of the Key Enabling Conditions (KEC); each region must evaluate only those KEC in which it intends to innovate. Once KEC are prioritised, they can be displayed to the second level, which are the Components. As explained below, each KEC has a specific number of Components (KEC A.1, KEC A.2, KEC E.n, etc.) on which the regions can innovate.

Within each Component, the region must identify the specific Criteria on which innovation is going to be assessed, and from that, start to evaluate its innovation by selecting:

- Key Community Systems
- Innovation Readiness Level
- Innovation Model
- Viability

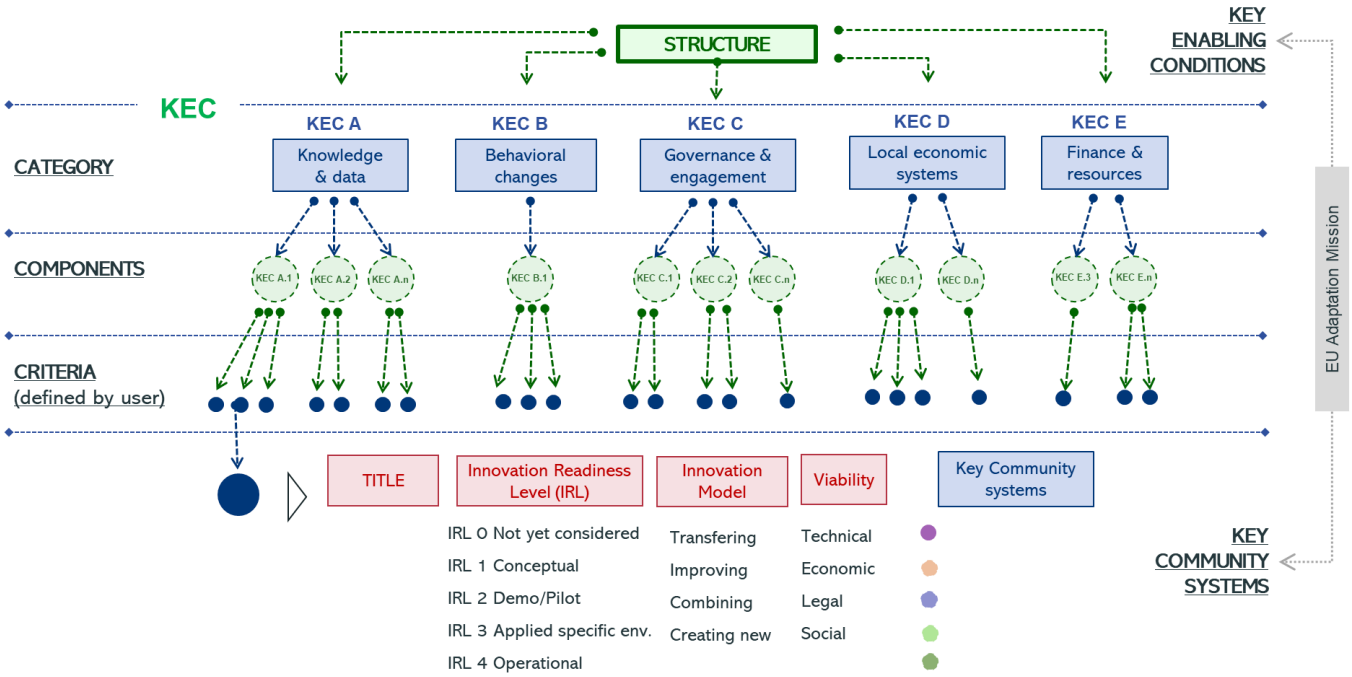


Figure 3. LIST conceptual scheme.

The definition and content of each element that builds the conceptual structure of the tool are detailed below.

Key Enabling Conditions (KEC)

KECs are conditions for the Mission to be able to accelerate transformative change. A key enabling condition is an area of innovation and transformation for the Mission, part of a larger interdependent system. The Key Enabling Conditions act as catalysts to accelerate the transformation towards climate resilience, smoothing the intricate process of change in multifaceted environments. They are defined as areas of innovation and transformation, for which the Climate Change Adaptation Mission outlines possible targets, possible research and innovation actions, and relevant policy instruments, funding programs and partners. The Mission will also facilitate access to knowledge, data and digital services that are critical for better understanding and managing climate risks, enhancing adaptive capacities, and supporting transformative innovations. In addition, it will promote inclusive and deliberative governance through

meaningful engagement and dialogue between citizens and stakeholders. A strong focus on behavioural change, both on the individual as well as on the systemic level, to enable regions to take leadership on transformative adaptation is also key. Finally, the Mission will contribute to mobilising sustainable finance and resources towards adaptation at scale and closing the climate protection gap. The six KEC are detailed below.

- **KEC-A Knowledge & Data**: Ensure access to and utilisation of available knowledge and data that support the transition to climate resilience + Develop and provide a knowledge and data foundation to underpin the necessary transformation.
    - KEC-A-1 Identify territorial challenges (urban, coastal/marine, rural, etc.) and potential risks. For example, through the analysis of spatial information, climate threats and hazards, and potential vulnerability and risk. This may include the use of new approaches, methods, and tools (e.g. Remote Sensing, Artificial Intelligence, Digital Twins) to elaborate hazards and risk maps.
    - KEC-A-2 Assess vulnerability and risk to climate change and analyse potential implementation of adaptation measures in vulnerable areas: for example, undertaking a spatial analysis for the identification of current and potential urban green assets to cope with different urban challenges under climate change. This may include an analysis of accessibility, connectivity, and the multifunctionality of adaptive capacity, using methods such as Natural Capital Accounting, Ecosystem Services Evaluation, and the valorisation of urban green.
    - KEC-A-3 Identify adaptation solutions to climate change that address the territorial challenges in place: as a reference, examples of innovative solutions from different projects are described on open-access platforms, such as MIP4Adapt, OPPLA Network, and NetworkNature.
    - KEC-A-4 Integrate tools and methods for data collection: for example, developing a process for organizing and maintaining data using new techniques (e.g. standardized data models, artificial intelligence), or encompassing them into open-access, integrated, and collaborative platforms.
    - KEC-A-5 Use tools and methods to manage, organize, and maintain data from multiple sources: smart drip irrigation system is a precise technique based on determining the real-time irrigation needs of the green roof, that is activated when a threshold in the substrate water content is reached.
    - KEC-A-6 Others: this section is reserved for entries that do not align with the specific innovation criteria outlined regarding knowledge & data.

- **KEC-B Behavioural change**: Increase awareness and engagement in climate resilience efforts + Enhance the use of social tipping points and systemic leverage points to accelerate transformation.
    - KEC-B-1 Develop methods to raise awareness of the value of adaptation measures and their co-benefits: for example, by innovating in the stakeholder engagement process and strategies (during and after the project), e.g. through engaging researchers and educational institutions, co-designing innovative awareness campaigns, creating tailored events, using gamification solutions.

- KEC-B-2 Assess just transition, with special consideration of behaviour changes in vulnerable groups: for example, using a Responsible Research and Innovation approach for gender equality.
- KEC-B-3 Evaluate social, economic, and environmental impacts to inform decision-making: for example, including KPIs to measure different impacts (environmental, economic, and social), integrating the different dimensions (spatial, temporal, and thematic-sectoral), or implementing innovative monitoring techniques and devices to collect knowledge and information.
- KEC-B-4 Use Rapid Adoption principles for promoting and considering new ideas and behaviours: as a reference, some principles for Rapid Adoption are: observability (people can see the results and benefits of the behaviour), trialability (people can test out new behaviours in a safe environment), simplicity (people can easily understand and adopt the behaviour), compatibility (the behaviour is consistent with the existing values and norms of society), and relative advantage (the behaviour is perceived as better than others in terms of satisfaction, economic benefits, social prestige, and convenience). As a reference, check Pathways2Resilience project.
- KEC-B-5 Others: this section is reserved for entries that do not align with the specific innovation criteria outlined regarding behavioural change.

- **KEC-C Governance, Engagement & Collaboration**: establish structures for multilevel governance and mobilize local and regional ecosystems for change + Cultivate collaboration and promote diverse methods for stakeholder engagement and conflict resolution.
  - KEC-C-1 Use supporting planning tools and mechanisms that improve evidence-based decision-making: for example, using citizen science and observatories (via digital applications), digital urban planning concepts (such as e-planning and digital planning tools), adaptive planning methods (using objective and subjective data), digital tools for urban design.
  - KEC-C-2 Mainstream climate change adaptation into planning frameworks, enabling the implementation of adaptation measures: for example, by considering climate change adaptation in spatial planning strategies and urban planning regulations, which form the legal framework within which planning rules operate (e.g., zoning ordinances, building height restrictions, setback requirements, planning standards). Spatial development mediation and regulation can be integrated into different plans, such as urban master plans, urban general development plans, or implementation projects.
  - KEC-C-3 Establish governance models and structures for inclusive and adaptive planning: for example, by implementing innovative models based on evidence and outcomes that merge urban planning and environmental issues, by defining structures that promote active cooperation across government, market, and civil society to make decisions and take actions, by promoting a transparent and multilevel (horizontal and vertical) institutional governance, by establishing collaborative governance (co-creation process).
  - KEC-C-4 Consider vulnerable groups when planning decisions regarding adaptation: for example, by integrating different groups of social actors and local citizens (elderly, children, youth, persons with disabilities, etc.) into a decision-making process.

- KEC-C-5 Consider established parameters for designing climate-proof and climate-resilient adaptation measures: for example, by designing climate-proofed environments considering standards, urbanisation criteria, benchmarking, etc.
- KEC-C-6 Integrate climate adaptation considerations into alternative sectoral planning instruments and policies: as a reference, some potential planning instruments, and policies for that are: Urban Nature Plans, Biodiversity Strategies, Coastal Management Plans, Mobility Plans, Emergency Plans, etc.
- KEC-C-7 Others: this section is reserved for entries that do not align with the specific innovation criteria outlined regarding governance, engagement, and collaboration.

- **KEC-D Finance & Resources**: ensure adequate financial support and resources to participate in a Regional Resilience Journey + Develop the necessary data, skills, policies, governance, and budgeting to support an investment plan.
  - KEC-D-1 Identify and manage available financial resources: as a reference, good initiatives to be aware of innovative funding and financing opportunities, including guides and tailored support, is the Mission Implementation Platform (MIP4Adapt).
  - KEC-D-2 Identify and improve the value proposition (value generation, delivery, and capture): for example, through using a natural capital account, basing finance on outcomes, identifying monetary value from monitoring data, identifying commercial value derived from private business models based on adaptation, boosting employment, etc.
  - KEC-D-3 Promote partnerships to deliver adaptation measures: for example, by using innovative resource mobilising and co-financing instruments in adaptation projects (e.g., revenue-generating instruments, green debt, grant funding and donations, environmental or social impact bonds, and market-based financing).
  - KEC-D-4 Consider the socioeconomic impacts throughout the implementation process to facilitate further cost-benefit analysis: for example, by promoting innovative procurement models based on criteria such: integrating technical support for NbS, including maintenance, considering the carbon footprint and life cycle, focusing on outcomes.
  - KEC-D-5 Others: this section is reserved for entries that do not align with the specific innovation criteria outlined regarding finance and resources.

- **KEC-E Capabilities & Skills**: build capabilities and capacities to facilitate and engage in transformational adaptation to climate change + Provide the re-skilling and up-skilling necessary to ensure a just transition to climate resilience.
  - KEC-E-1 Use mechanisms for building capacity to participate in adaptation planning and implementation (co-design, co-production, or co-implementation): for example, including processes and tools to help people acquire or strengthen skills through individual and community capacity building.
  - KEC-E-2 Use strategies, instruments, and methods to create, intensify, and maintain citizen participation: for example, by including innovative approaches for engaging local groups of stakeholders, developing methods for intensifying participation, using incentives for motivation

and engagement activities, creating, and maintaining a project network, utilizing ICT to improve citizen engagement during the project, involving citizens in project development.

- KEC-E-3 Use channels that facilitate open and clear communication between scientists, practitioners, and policymakers: as a reference, consider channels activated by the adaptation mission and other existing networks (C40 Cities,100 Resilient Cities, ICLEI).
- KEC-E-4 Promote capacity and capability building of multiple actors to address climate change challenges: for example, targeting public authorities and relevant stakeholders (industry, businesses, local associations, entrepreneurs, etc.).
- KEC-E-5 Others: this section is reserved for entries that do not align with the specific innovation criteria outlined regarding capabilities and skills.

- **KEC-F Experiment, learn & reflect** experiment, exchange, and learn together throughout the resilience journey + Pivot and adjust relevant components as needed.
  - KEC-F-1 Establish and set goals for apply adaptation measures at early stages of the implementation process: for example, through a Theory of Change, an innovative and widespread example of a visioning exercise.
  - KEC-F-2 Define KPIs to assess the performance of the action: for example, by considering different knowledge & data (future scenarios, unwanted impacts), dimensions (economic, social, environmental), focuses (ecosystem services, biodiversity), types of analysis (spatial, temporal, thematic), and territorial levels (local, regional, national).
  - KEC-F-3 Establish a regular assessment to promote continuous reflection, foster improvements and mitigate potential risks in the implementation process and generation of results: as a reference, this allows a timely adaptation of the implementation process (reflexive monitoring).
  - KEC-F-4 Propose pilot solutions to test the implementation of the action before upscaling, to validate and ensure the efficiency of the results: as a reference, open innovation labs have been proven to foster creativity, collaboration, experimentation, and risk-taking to generate innovative solutions. This supports the identification of potential limitations and activate the learning-by-doing.
  - KEC-F-5 Propose disruptive actions that generate new data and knowledge by creating tangible outcomes: for example, innovative approaches to assess effectiveness and climate risks include citizen science and maladaptation assessments.
  - KEC-F-6 Others: this section is reserved for entries that do not align with the specific innovation criteria outlined regarding experimentation, learning and reflection.

Key Community Systems (KCS)

A system that meets important basic societal needs but that is increasingly impacted by climate change. A key community system is an area of innovation and transformation for the Mission, part of a larger interdependent system.

As it is defined in the Mission, those areas of Innovation and Transformation are those that meet important basic needs and are increasingly impacted by climate change. Below is an overview of each of these systems:

Ecosystems and nature-based solutions providing the foundation of life and essential services to human wellbeing, with the Mission harnessing the power of nature for climate resilience by creating ecological connectivity, restoring nature and ecosystem services, and boosting nature-based solutions to achieve climate resilience also in other key community systems.
Land use and food systems, aiming to revive landscapes with diversified and climate-resilient practices, to foster climate resilience of secure and sustainable food systems. The Mission will support the transition to a climate resilient food system by increasing the understanding and prediction of the climate risks and vulnerabilities in the food system, developing, and testing new business models, promoting the use of new technologies, digitalisation, the upskilling of actors across value chains and the shift to more sustainable diets.
Water management, both to ensure availability of freshwater in the context of water scarcity as well as to reduce water-related risks from droughts and floods, are to be addressed by the Mission for example by rethinking water allocation, innovation in water saving practices, restoration of free-flowing rivers, and innovative coastal protection.
Critical infrastructure, ensuring that infrastructure is climate-proof. The Mission will foster the development of grey and green infrastructures and hybrid nature-based solutions. It will also contribute to the development of common standards for climate-proofing
Health and human wellbeing, the Mission will help communities to stay healthy in a changing climate, including long-term healthcare-related planning and early-warning and surveillance systems and solutions that help humans function in the warming world. The Mission will focus on resilience towards health risks caused by the effects of climate change, such as more intense extreme weather events (heat waves, floods) and the increased occurrence of infectious diseases. The objective is the protection of vulnerable people at higher risk such as children, senior citizens, people with disabilities or chronic diseases, socially disadvantaged groups, etc.
Local economic systems that underpin the above provisioning systems intend to increase their resilience in economic terms, including climate-resilient business models and value chains, and the re-skilling and up-skilling of professions that will have to undergo transitions.

Figure 4. KCS from the Implementation Plan Adaptation to Climate Change. Source: European Commission[6].

[6] European Missions. Climate Change Adaptation Mission. Implementation Plan Adaptation to Climate Change Support at least 150 European regions and communities to become climate resilient by 2030. Implementation Plan (2021).

2.1.2. Innovation assessment

2.1.2.1. Innovation at local level

When we think about how to assess innovation at the local level we must reflect on these four questions:

- **Why the innovation assessment?** There is a commitment to climate resilience, for that innovation will support regions through upscaling and replicating the local pilot actions identifying possible gaps and completing regional research agendas or improving policies to maximise their impacts. Also, it is important to expand knowledge and provoke bench learning about innovation criteria in terms of resilience.

- **What is innovation?** The main consideration is to evaluate innovation at the local level through a self-evaluation made by each region. It is important to state that this is not an audit tool, but a support for reflection, learning and improvement. It is understood that each region can start with a different innovation readiness level and that therefore they will be able to reach different levels once the actions have been implemented.

- **Who?** The Regions4Climate Challenge Suites. Each Challenge Suite decides how to proceed; if the assessment should be done for each region, for one representative, all together or by consensus approach.

- **How?** Considering the KEC as an entrance to classify the innovation criteria. In the R4C project there are 13 criteria, but not all are mandatory to be covered. Each region decides which criteria will be evaluated, to a minimum of 3.

- **When?** Three moments are expected for evaluating and measuring the level of innovation. These are:
    - Innovation Diagnosis and Expectations (ex-ante assessment, starting point)
    - Innovation Progress (ex-midi assessment, revisiting)
    - Innovation Pathway (ex-post assessment, final)

2.1.2.2. Innovation pathways

Innovation Readiness Level (IRL)

In terms of innovation, it is important to consider both *absolute* and *relative* innovation. Innovation can occur through the creation of something new and disruptive (absolute innovation), but it can also occur through the implementation of an innovation that has already been created but is going to be tested for the first time in a specific context different from the one of origin (relative innovation). At the territorial level, and concerning climate resilience policies, a region can be a pioneer in a technology or solution, but it is also considered innovative if it can implement climate change adaptation solutions that already exist, in local or regional environments with an incipient innovation readiness level.

Starting from this approach of differentiating between absolute innovation and relative innovation, the tool considers five innovation readiness levels (Figure 5):

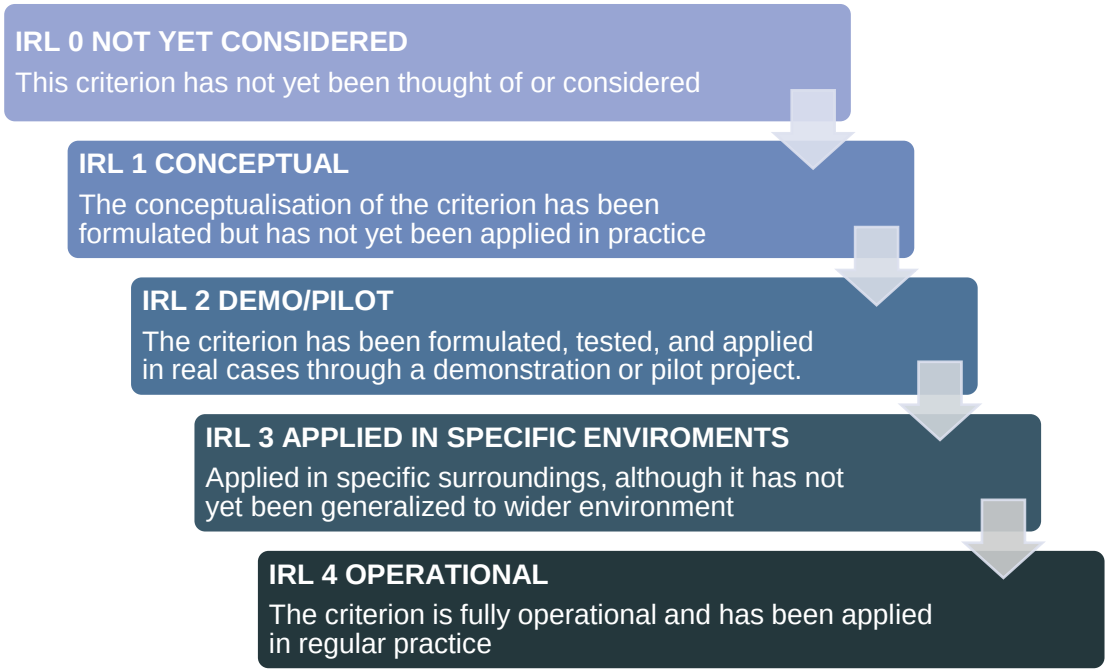


Figure 5. R4C Innovation Readiness Levels (IRL). Own source.

The tool helps in defining the Innovation Pathway of this criteria by selecting two options from the list below: (1) the current innovation status (initial stage), and (2) the expected innovation projected to the end of the analysed period (end of the project).

Innovation Model

To better understand the Innovation Pathway, there have been defined different ways to innovate, called innovation models, that are those that best describes how the innovation will be addressed:

- Model 1. TRANSFERING: Application of existing innovative solutions or processes/methods in a new context (spatial/sectoral).
- Model 2. IMPROVING: Upgrading existing innovations for improved functionality.
- Model 3. COMBINING: Combination and/or integration of existing innovative solutions that result in a new one.
- Model 4. CREATING NEW: Application of completely new solution or approach.

Viability

To Evaluate the degree of technical, economic, legal, and social viability for proceeding through the described Innovation Pathway and ranked in low, medium, and high.

Technical

- **Low**: Involves procedures and resources of advanced specialisation. Limited providers.
- **Medium**: Utilizes non-conventional procedures and resources. Multiple providers at the international level.
- **High**: Relies on standardized procedures and resources. Multiple providers, including local.

Economic

- **Low:** Implies a significant cost (>5%, but it depends on the case) relative to the available budget and/or relies solely on public funding.
- **Medium:** Entails a moderate cost (2-5%, but it depends on the case) relative to the available budget and/or involves only public-private funding.
- **High:** Requires a minimal cost (<2%, but it depends on the case) relative to the available budget and/or considers additional funding sources.

Legal

- **Low:** Implementation requires a series of procedures (e.g., personal data management, procurements).
- **Medium:** Involves a few requirements that must be followed to implement the criteria (e.g., administrative permissions).
- **High:** Implementation is not dependent on legal requirements.

Social

- **Low**: Previous attempts to implement the innovative criteria have failed (not socially accepted).
- **Medium**: The implementation has undergone persistent efforts (previous plans/projects not implemented for various reasons).
- **High**: The implementation need is already recognized by citizens.

3. LIST Operational Framework

3.1. Accessing the tool

Access to the tool, both by the administrator and by users, must be through the login screen, which can be accessed through the following URL: https://innovationtool-r4c.digital.tecnalia.dev/login.php.

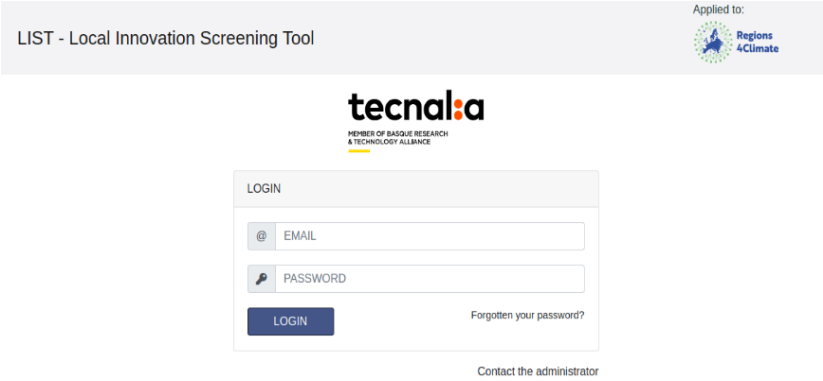


Figure 6. Tool login screenshot.

In case the user has forgotten his/her password, he/she can access the 'Forgotten your password?' function to start the password reset process. For each region, the administrator has created a specific user ID and password.

For testing reasons, a temporary user (*Reviewer*), with a simulated mail (*reviewer@r4c.com*), and an established password (*reviewer*) is available while R4C endures.

3.2. Interface

The different screens that the user navigates through, after having correctly accessed the tool, follow a common layout. Figure 7 shows the shared aspects in most of the screens of the tool.

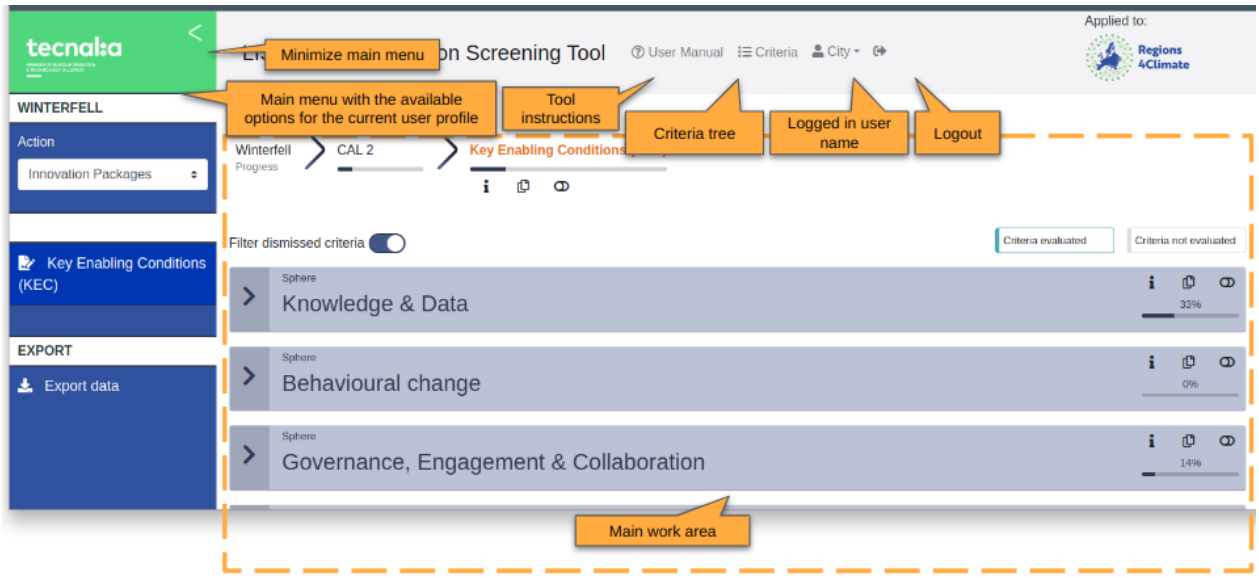
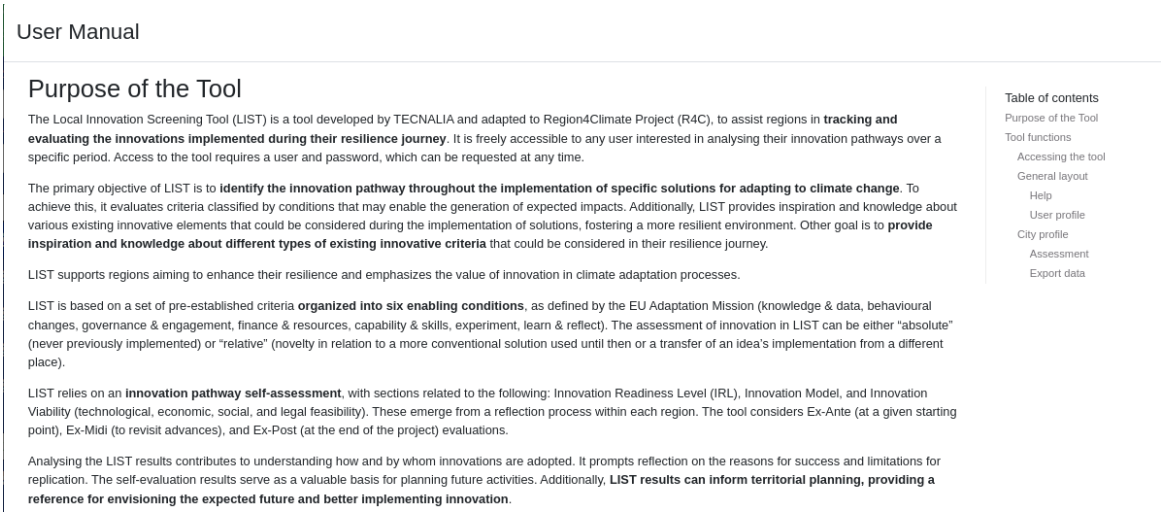


Figure 7. General layout.

3.2.1. Help

The help option displays a screen with information on how to use the tool (Figure 8).


User Manual

Purpose of the Tool

The Local Innovation Screening Tool (LIST) is a tool developed by TECNALIA and adapted to Region4Climate Project (R4C), to assist regions in **tracking and evaluating the innovations implemented during their resilience journey**. It is freely accessible to any user interested in analysing their innovation pathways over a specific period. Access to the tool requires a user and password, which can be requested at any time.

The primary objective of LIST is to **identify the innovation pathway throughout the implementation of specific solutions for adapting to climate change**. To achieve this, it evaluates criteria classified by conditions that may enable the generation of expected impacts. Additionally, LIST provides inspiration and knowledge about various existing innovative elements that could be considered during the implementation of solutions, fostering a more resilient environment. Other goal is to **provide inspiration and knowledge about different types of existing innovative criteria** that could be considered in their resilience journey.

LIST supports regions aiming to enhance their resilience and emphasizes the value of innovation in climate adaptation processes.

LIST is based on a set of pre-established criteria **organized into six enabling conditions**, as defined by the EU Adaptation Mission (knowledge & data, behavioural changes, governance & engagement, finance & resources, capability & skills, experiment, learn & reflect). The assessment of innovation in LIST can be either "absolute" (never previously implemented) or "relative" (novelty in relation to a more conventional solution used until then or a transfer of an idea's implementation from a different place).

LIST relies on an **innovation pathway self-assessment**, with sections related to the following: Innovation Readiness Level (IRL), Innovation Model, and Innovation Viability (technological, economic, social, and legal feasibility). These emerge from a reflection process within each region. The tool considers Ex-Ante (at a given starting point), Ex-Midi (to revisit advances), and Ex-Post (at the end of the project) evaluations.

Analysing the LIST results contributes to understanding how and by whom innovations are adopted. It prompts reflection on the reasons for success and limitations for replication. The self-evaluation results serve as a valuable basis for planning future activities. Additionally, **LIST results can inform territorial planning, providing a reference for envisioning the expected future and better implementing innovation**.

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Figure 8. Help guidance.

3.2.2. User profile

By clicking on the `username´, the user can access the user profile screen to manage their basic access data: name, email, and password (Figure 9).

Figure 9. User profile.

3.3. Functionalities for Regions Self-assessment

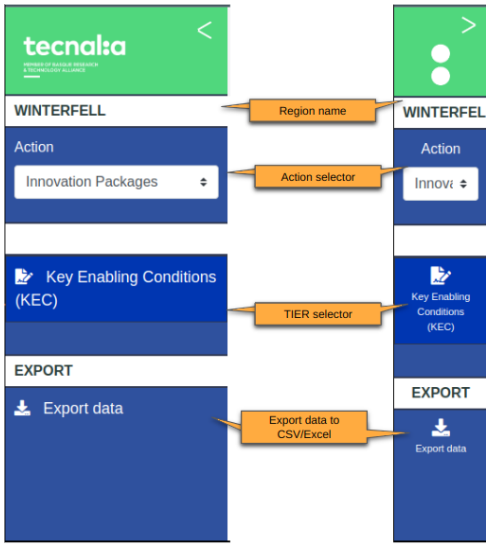

Figure 10. Regions' menu (full width / minified).

When a user logs in with a region profile, the options showed in Figure 10 becomes available in the main menu.

3.3.1. Assessment

To load the main working area (Figure 11), it is needed to select ENABLING CONDITIONS so that the different options are displayed on the right.

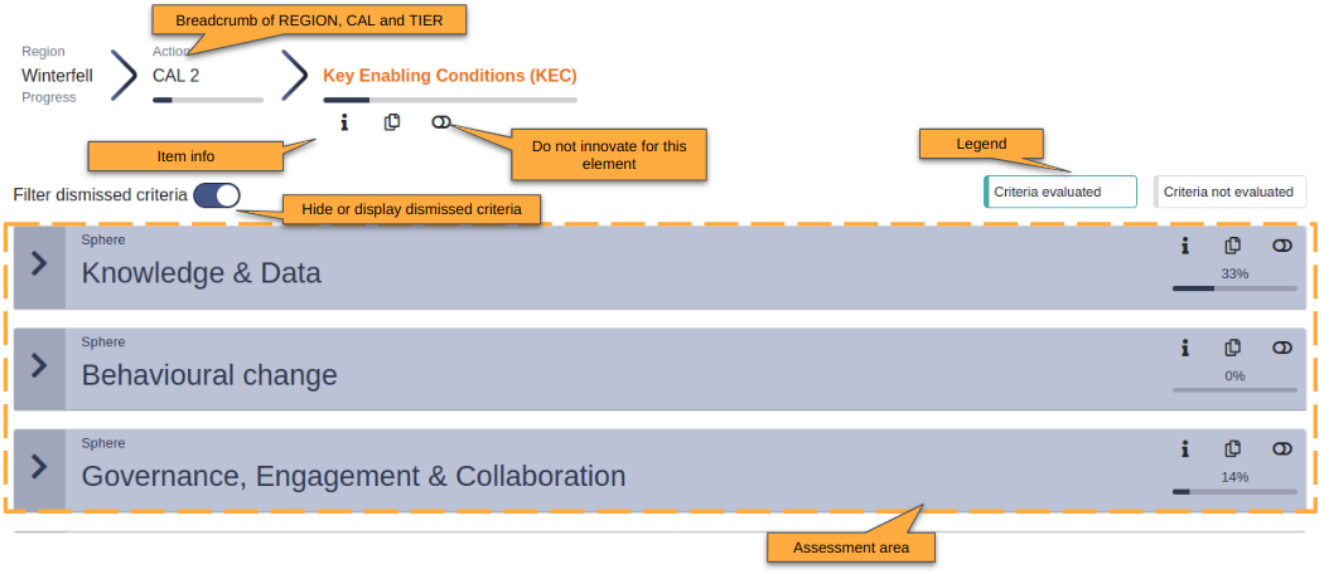

Figure 11. Main working area

Each group of assessment elements (enabling condition and criteria) has a progress bar, above or below, indicating the percentage of criteria completed (evaluated or marked as disabled), and the following controls:

- Item info: displays associated information (Figure 12).
- Copy assessment: copies the assessment of all criteria from the group to another action (available, but not applied to R4C, given the structure of the assessment).
- Do not innovate disables all the criteria that belong to the group, flagging them as do not innovate in this CRITERIA (Figure 12).

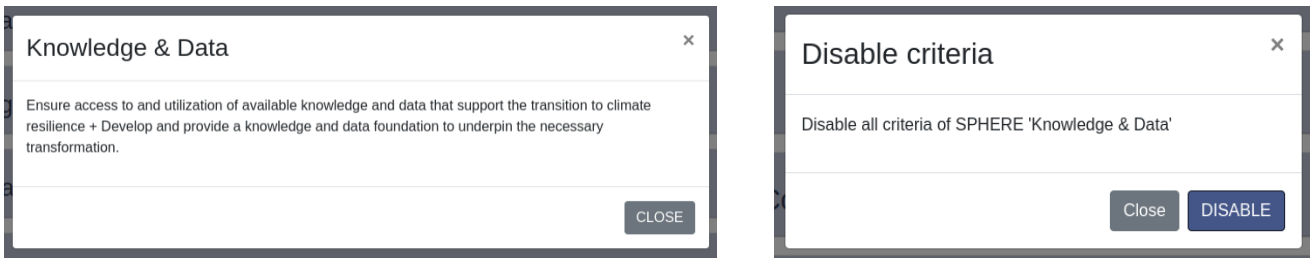

Figure 12. Item info (left) and Disable criteria (right).

The user can browse through the structure of the model (Figure 13) displaying all the elements that compose it (ENABLING CONDITION → COMPONENT → CRITERIA).

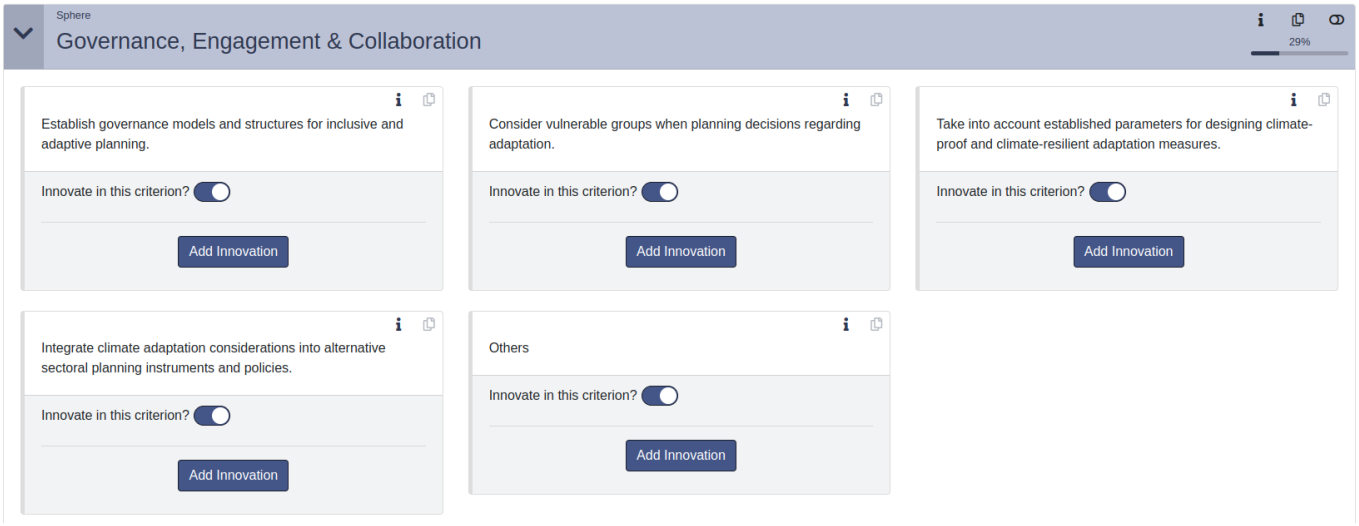

Figure 13. Browsing the model.

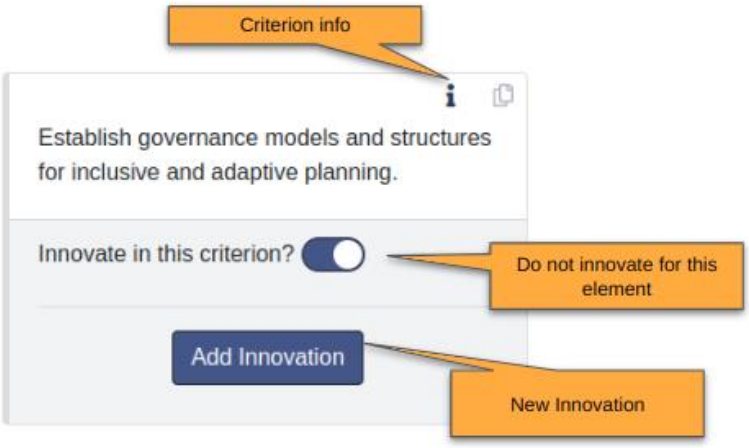

Figure 14. Criterion factsheet.

Each Criterion has its own factsheet (Figure 14) showing its name and state (evaluated or not evaluated), as well as the following controls to manage its evaluation:

- Criterion info: displays associated information (Figure 15).
- Copy evaluation: copies the assessment of this criteria to another action, following the same process (in R4C it does not apply).
- Add innovation: the user can add as many innovations as they wish under a specific criterion.
    - This can be done by using the button “add innovation”.

- Each new innovation criteria introduced is evaluated separately and independently.
- After clicking on Add innovation, it shows the form to be filled in to evaluate the INNOVATION (Figure 16).
- OBS: The user must complete all the required fields and click on the 'SAVE' button to register the filled in data. If any of the required fields is empty, an error will be displayed. Until everything is correct, none of the data will be saved.

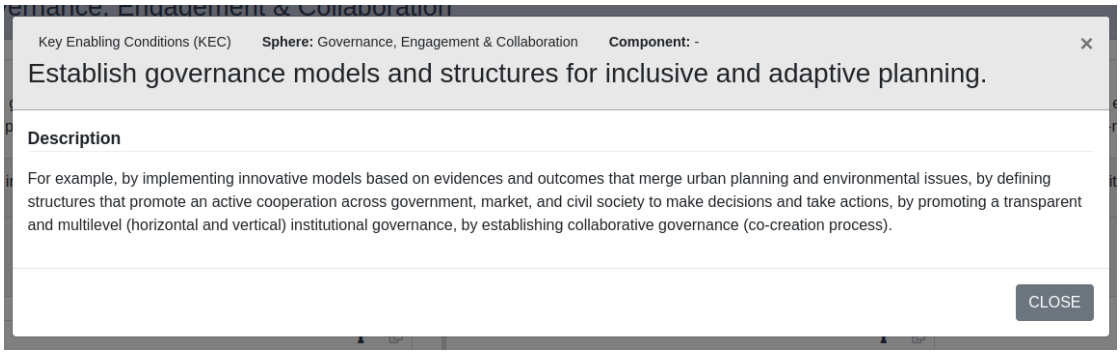

Figure 15. Criteria information.

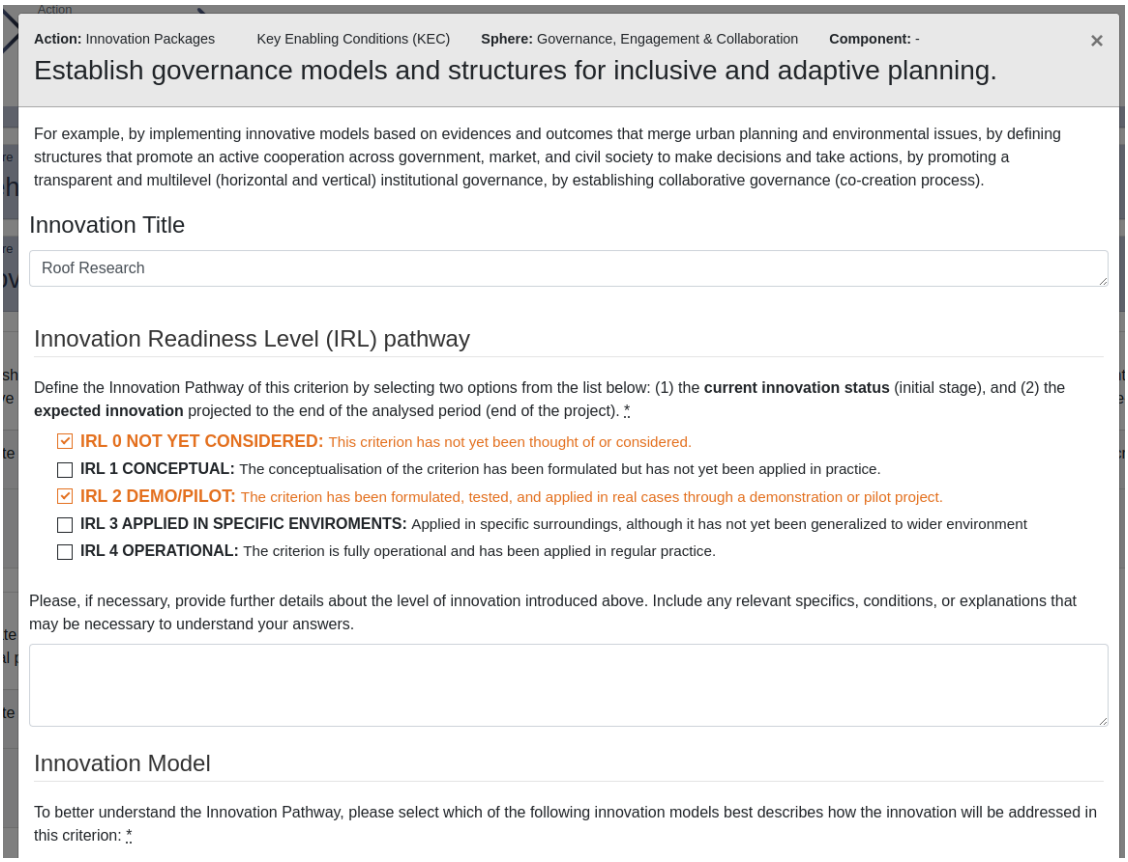

Figure 16. Information evaluation form.

Within the innovation object form (Figure 17), you can find the following functions:

- Key Community Systems buttons: enables (clicking on them) if the category belongs to the innovation.
- ExAnte: open innovation evaluation formulary.
- ExMidi: stage that allows to choose current IRL with description (not enabled at the ex-ante analysis).
- ExPost: stage that allows to choose final IRL with description (not enabled at the ex-ante or ex-midi analysis).
- Delete: removes the selected innovation.

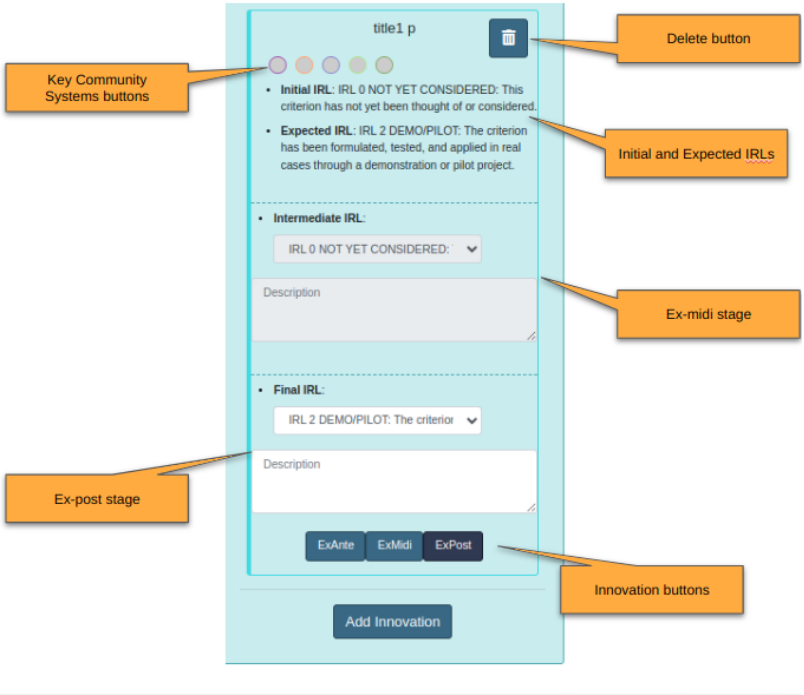

Figure 17. Innovation Object Form.

3.3.2. Export data

The function ´export data` allows the user to export the data of the evaluations to a file that will be downloaded. The following export options are available (Figure 18): Criteria (includes only the data of the evaluated criteria or include all available criteria) and Format (download the information in an Excel or CSV file).

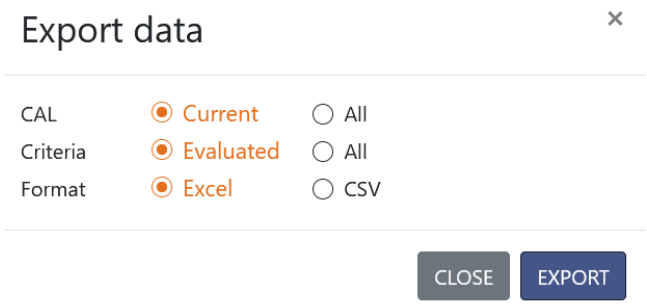

Figure 18. Export data.

4. Conclusions

The LIST tool has proven to be a highly useful and flexible instrument, capable of adapting to the unique realities of each region. It not only strengthens existing innovation but also facilitates the initiation of new innovation pathways that may not have been previously considered. This tool promotes collaborative reflection among various stakeholders involved in the processes of urban and territorial innovation.

A key feature of the LIST tool is its ability to adapt to the relative and contextual realities of each territory. It recognizes that innovation is both possible and viable across any geographical scope and at any level of innovation maturity. This adaptability ensures that the tool can be effectively used in diverse settings, enhancing its overall impact.

For regions, the LIST tool offers the opportunity to self-evaluate the level of innovation in the actions they have implemented on their journey towards climate resilience. This self-evaluation is designed to be dynamic, allowing for measurement at different stages of the process: at the beginning (ex-ante), during the process (ex-midi), and after achieving the objectives (ex-post). This dynamic approach ensures that regions can continuously monitor and assess their progress, making necessary adjustments to improve outcomes.

The added value of this self-evaluation lies in the content introduced by each region according to their specific innovation expectations and implementation strategies. Currently, the ex-ante analysis has been completed, and its results will be included in the upcoming Regional Status Report. Although reflections are conducted individually, an exchange session is planned for the coming months to share common results and impressions of the process. This session will provide a channel for regions to learn from each other and enhance their innovation strategies. During the development of the project, the LIST tool will be continuously revisited to conduct both ex-midi and ex-post analysis, and to interpret and reflect on the results. This way, the regions can maximize the benefits of using the tool.

After being tested by the 12 participating regions, the LIST has the potential to be refined further. Improvements and suggestions derived from the lessons learned during its application can be incorporated to create an enhanced version of the tool. This refined tool will aim to promote replication and upscaling, ensuring that more regions can benefit from its capabilities and contribute to broader climate resilience efforts.

In conclusion, the LIST tool stands out as a versatile and dynamic instrument that supports regions in their innovation journeys. By fostering collaborative reflection and enabling continuous self-evaluation, it helps regions navigate the complexities of urban and territorial innovation, ultimately contributing to more resilient and sustainable futures.

5. References

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