EGU25-3834, updated on 25 Nov 2025
https://doi.org/10.5194/egusphere-egu25-3834
EGU General Assembly 2025

ICARIA RAF App – A user-friendly and holistic web tool to strengthen climate resilience of critical urban and natural assets and services

Anabela Oliveira[1], Ana Mendes[1], Rita Salgado Brito[2], and Maria Adriana Cardoso[2]
[1]National Laboratory for Civil Engineering (LNEC), Scientific Instrumentation and Information Technologies Centre, Information technology and computer infrastructures unit, Portugal (amendes@lnec.pt,aoliveira@lnec.pt)
[2]National Laboratory for Civil Engineering (LNEC), Hydraulics and Environment Department, Portugal (rsbrito@lnec.pt, macardoso@lnec.pt)

To protect urban and natural environments and promote their transition towards climate resilience, the EU-funded ICARIA project is developing a suite of innovative and comprehensive tools, available as Web interfaces (Russo et al., 2023). This paper explores the IT challenges behind the ICARIA RAF App, a tool for holistic resilience assessment.

This comprehensive web application offers an integrated and forward-looking approach to climate change impact management. It draws upon the efforts of the RESCCUE project (RESCCUE RAF, Cardoso et al., 2019, and RAF App, Lopes et al., 2020), devoted to city climate resilience. This App extends previous work by integrating natural spaces and their climate change mitigation and adaptation capabilities and ecosystem services, by extending spatial scales from cities to regions, to address climate concerns at larger scales. Urban services and their interdependencies are still included. The usefulness of the App serves both management actions and capacity building, being used frequently in training actions. The App can be accessed at https://icaria.lnec.pt and registration is required before accessing the tool.

The use of technologies for quick and dynamic access to data and for producing instant results was necessary. The ICARIA RAF App relies on a web framework, developed in Django, a Python-based framework using HTML, JavaScript and Python for the web interface (Figure 1a). The Django framework supports various database management systems. In this application, the information made available in the interface is stored using PostgreSQL, a powerful, open source database with many features for securely storing and scaling complex data workloads.

The App allows for different user profiles, guaranteed through an authentication procedure. Users with administration permissions can manage regular users and app components, add new metrics and oversee and implement app deployments across distinct areas. Regular users can access their own studies but have several facilities to streamline new deployments, such as the cloning service, and technical support to assist with data input, such as the filtering of resilience metrics according to their typology or complexity.

The App is organized along the different resilience dimensions to be assessed, detailed according

to the resilience objectives, criteria and metrics (Figure 1b). The users can select the desired resilience objective and criterium and address the correspondent metrics (Figure 1c). As data is inserted, the information is processed instantly, and resilience development levels, from *incipient* to *progressing* and *advanced*, are automatically calculated to generate a report (Figure 1d), to identify resilience strengths and weaknesses and plan improvements.

Figure 1 – a) App architecture, b) menus for navigation, c) and d)) Selected results available at the App.

References

Cardoso, M.A., Brito, R.S., et al (2019) Resilience Assessment Framework – RAF. Description and implementation. RESCCUE project Deliverable D6.4.

Lopes; P., A. Oliveira; C. Pereira; R. S. Brito; M. A. Cardoso; et al., RESCCUE RAF App – Using Technology to Mitigate Climate Change Urban Impacts, 2020. 43rd MIPRO, 1651-1655, doi: 10.23919/MIPRO48935.2020.9245231

Russo, B.; de la Cruz Coronas, À.; Leone, M.; Evans, B.; Brito, R.S. et al 2023. Improving Climate Resilience of Critical Assets: The ICARIA Project. *Sustainability*, *15*, 14090. https://doi.org/10.3390/su151914090