

Summary

This research adopts a practice-based approach grounded in the principles of action research and situated knowledge production. The methodology combines empirical fieldwork with theoretical investigation to explore the real-world application of regenerative building techniques, with a specific focus on bio-based and geo-based materials in the Italian context.

The core of the research is the design and construction of two full-scale experimental pavilions – one using load bearing straw bales, and the other a light earth infilled timber frame structure – built on a site in the outskirts of Torino. These projects serve as living laboratories for testing and evaluating the performance, feasibility, and implications of regenerative building methods in practice.

Fieldwork includes direct involvement in the construction process through participatory workshops, close collaboration with craftsmen, and ‘coordination with suppliers and local stakeholders. This hands-on engagement allows for real-time observation and documentation of material behaviour, construction logistics, and practical challenges, revealing insights inaccessible through purely theoretical or detached observation.

Environmental performance is assessed through Life Cycle Assessment (LCA), focusing on material sourcing, embodied carbon, and local supply chains. Detailed data was gathered from procurement records, transport logistics, and interviews with manufacturers.

In parallel, a comparative study of selected case studies enriches the analysis, in light of the limited representativeness of prototype-scale assessments. The research also includes a reflection on reinforced concrete-free foundation systems, as a key experimental feature, to understand structural feasibility, environmental performance, and regulatory implications.

Finally, an investigation on the opportunities and challenges for the upscaling of regenerative building practices in the Italian market helps to position the fieldwork findings within broader trends.