

La ricerca in 3 minuti | Giornata verde del dottorato @DISTAL multicampus



Skills for sustainable, resilient, and socially fair communities



3-11 June 2023

**#EUGreenWeek
PARTNER EVENT**



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA
DIPARTIMENTO DI
SCIENZE E TECNOLOGIE AGRO-ALIMENTARI

Life cycle assessment of green walls system

Research Topic and Goals

Phase 1: Life Cycle Assessment of plastic-based and felt-based green wall systems

- Assessing the overall environmental performances of two types of green walls in a life cycle perspective.



Phase 2: Design choices of green walls based for materials combination and plants

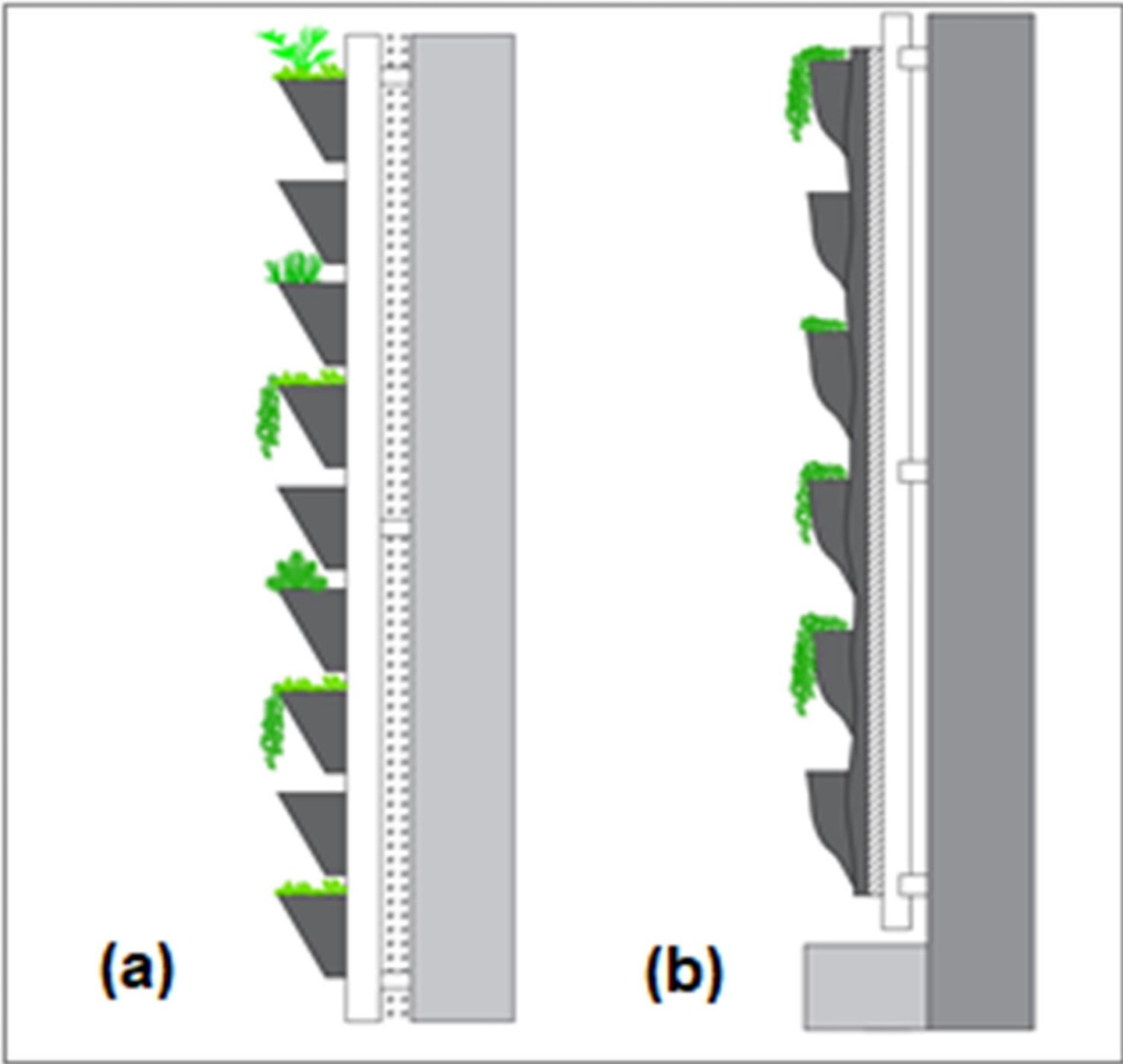
- Identifying the various parts of the studied green walls, focusing on the contribution of materials and components to their environmental performance.



Phase 3: Life Cycle assessment of a green wall system in Australia.

- Life cycle assessment of a green wall in Australia and comparing its environmental performance with the studied systems in Italy.





System A

Module

Soil mix

Plant

Polypropylene

HDPE

Peat moss,
vermiculite,
and sand

Perlite,
compost, and
sand

Hedera

Pteropsida

System B

Fertilizer

Panel

Supporting
system

Organic

Inorganic

PVC

HDPE

Aluminum

Steel



Life cycle assessment of green walls system

Main outcomes and novel aspects of the research

Phase 1

- The type of materials used in producing these systems can play a key role in their sustainability.
- A more sustainable design can be achieved by changing both systems' structures.
- Changing the growing medium composition and fertilization can improve the life cycle of the green wall.
- Most previous studies evaluated green walls' energy efficiency and performance only during the use phase.
- LCA underlines production stage as largest responsible of impact for both systems.

Phase 2

- Improving systems' ecological performance by altering their initial design while keeping their functions unchanged.
- A better design can be achieved by doing an environmental assessment.
- LCA can play a critical role as a decision-making tool during the design processes of green walls system.
- Considered scenarios' results show the potential to improve the environmental performance of systems in all impact categories.
- The results highlight the importance of the green wall systems design, material selection and maintenance methods.

Life cycle assessment of green walls system

Impact on the production world and society

- Integrating the LCA method into the design stage makes it possible to produce more sustainable systems.
- Applying this method can lead to extending insights for fewer environmental effects.
- A proper balance can be struck between the environmental benefits and burdens of the green wall systems.
- Understand the materials and technologies used in producing green wall systems in other markets.
- Exchanging knowledge in the green infrastructure industry.
- Increasing the number of case studies with specific data and results will help improve the sustainable development of these systems.
- Helping to find new nature-based solutions in the construction sector.
- Increasing consumer confidence by proposing a more efficient green wall system.
- Reducing the costs associated with the production and maintenance of green systems.

