

ECF4CLIM Project Overview

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- Objectives
- Team
- Approach
- Five main outcomes
 - The New conceptual framework
 - The Roadmap for Sustainability Competences
 - The hybrid participatory approach
 - The catalogue of interventions
 - The Digital tools and learning materials
- Challenges and opportunities

Through a multidisciplinary, transdisciplinary and participatory process, ECF4CLIM develops, tests and validates a European Competence Framework (ECF) for transformational change, which will empower the educational community to take action against climate change and towards sustainable development.

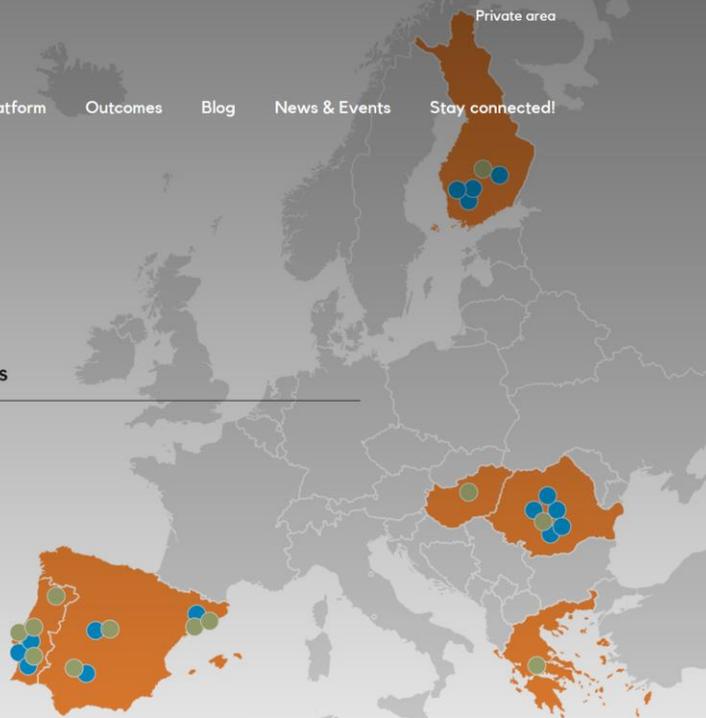


The ECF4CLIM project empowers the educational community to address climate change and promote sustainable development

We aim to create a **European Competence Framework** for transformative change through education



● Partners
● Demonstration sites



Consortium and Network

ECF4CLIM team

- ✓ 10 research partners
- ✓ 13 demonstration sites (schools & universities in Finland, Portugal, Romania and Spain)
- ✓ Advisory Board

Partners

Demonstration sites

Advisory board



Applying an **innovative hybrid participatory approach**, rooted in participatory action research and citizen science, ECF4CLIM co-designs the ECF in selected schools and universities, by:

- ✓ Elaborating an **initial ECF**, supported by crowdsourcing of ideas and analysis of existing ECFs.
- ✓ Establishing the **baseline** of sustainability competences, i.e., individual, collective, and technical-material competences.
- ✓ Implementing practical, replicable and context adapted technical, behavioural, and organisational **interventions** that foster the acquisition of competences.
- ✓ **Evaluating** the ability of the interventions to strengthen sustainability competences.
- ✓ **Validating** the ECF

The proposed Roadmap for Sustainability Competences is unique in that it systematically explores **individual, collective and technical material competences** that enable or constrain the desired change.

ECF4CLIM five main outcomes



A **new conceptual framework** to understand sustainability competences that goes beyond individual competences and includes collective and technical-material competences.



A **validated Roadmap for Sustainability Competences** that builds upon GreenComp and outlines the key drivers for sustainability competences in educational practice to empower educational communities to take action against climate change and promote sustainability.



A **novel hybrid participatory approach** designed to support the work of educational communities in the co-design, co-implementation and evaluation of interventions aiming to promote sustainability competences.



A catalogue of practical, replicable and context-adapted **showcase interventions** exemplifying successful sustainability competence-fostering practices, and providing a practical guide for their replication in other educational centres.



Various **digital tools and learning materials** designed to promote sustainability competences and support active learning through simulation, reflection and action-oriented experiences.

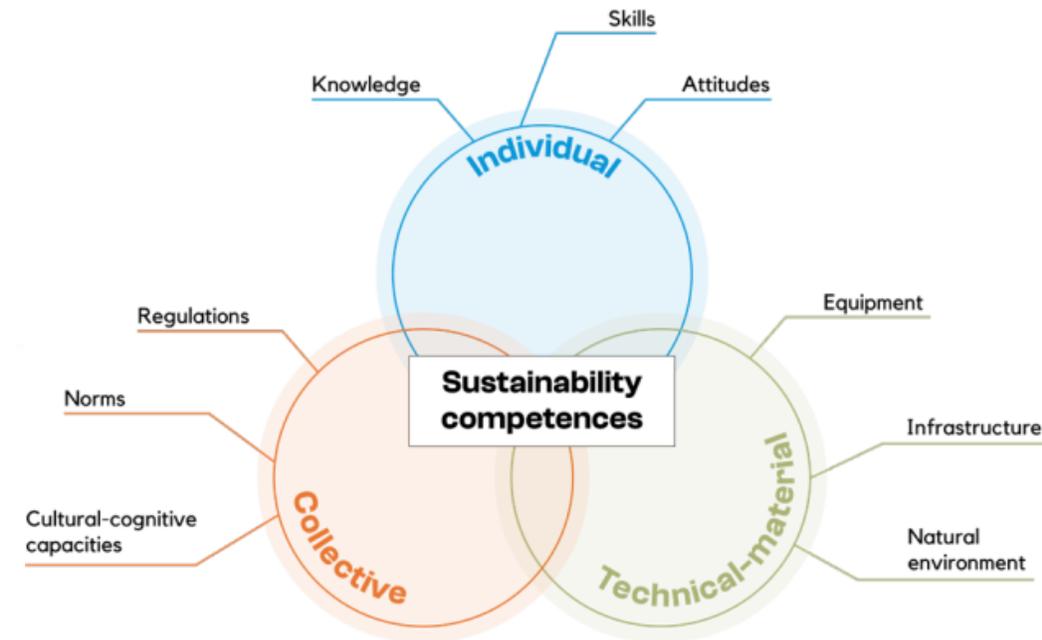
Outcome 1. ECF4CLIM new conceptual framework



Unlike traditional approaches, which focus on the individual perspective, in ECF4CLIM we expand the concept of **sustainability competences** emphasizing the **importance of social, cultural, environmental and material contexts**.



- **Individual competences:** personal qualities and qualifications (**knowledge, skills and attitudes**) that individuals need to promote sustainability and planetary wellbeing.
- **Collective competences:** capacity of an organization to act in a coherent and meaningful way to promote sustainability (**regulatory, normative and cultural-cognitive competences**).
- **Technical-material competences,** role of **tools, infrastructures, technologies and physical environments** in enabling (or constraining) sustainability action.



The ECF4CLIM evidence: deeply intertwined and interdependent spheres of competences



The ECF4CLIM evidence shows that the three spheres are not isolated or hierarchical but deeply interrelated:



Triadic interplay (Individual ↔ Collective ↔ Technical):

- **Individual leadership can translate into institutional change, but rules and norms that promote sustainability, guide individuals in making sustainable personal choices**
- **individuals and communities need to understand how technical-material conditions must be improved, but collective norms, regulations, cultures and resources are also needed to support the implementation of new solutions**
- **Increased individual responsibility fuels group success, collaborative problem-solving makes technical outcomes more robust and relevant, and hands-on sustainability practices enhance both personal learning and community impact.**

- ✓ **Competences in educational practices rarely emerge from one of these domains alone, rather they are generated through their dynamic interaction.**
- ✓ **The three spheres face different barriers and facilitators and require different approaches to be promoted effectively.**



Outcome 2. ECF4CLIM Roadmap for Sustainability Competences



The Roadmap for Sustainability Competences developed in the ECF4CLIM project **outlines the key drivers for sustainability competences in educational practice**

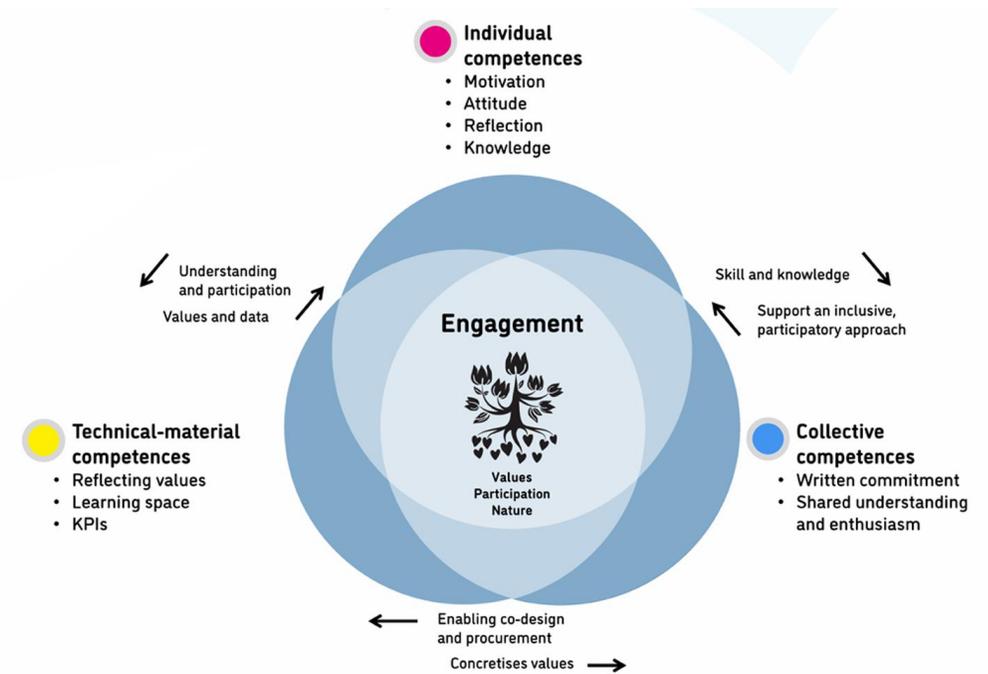
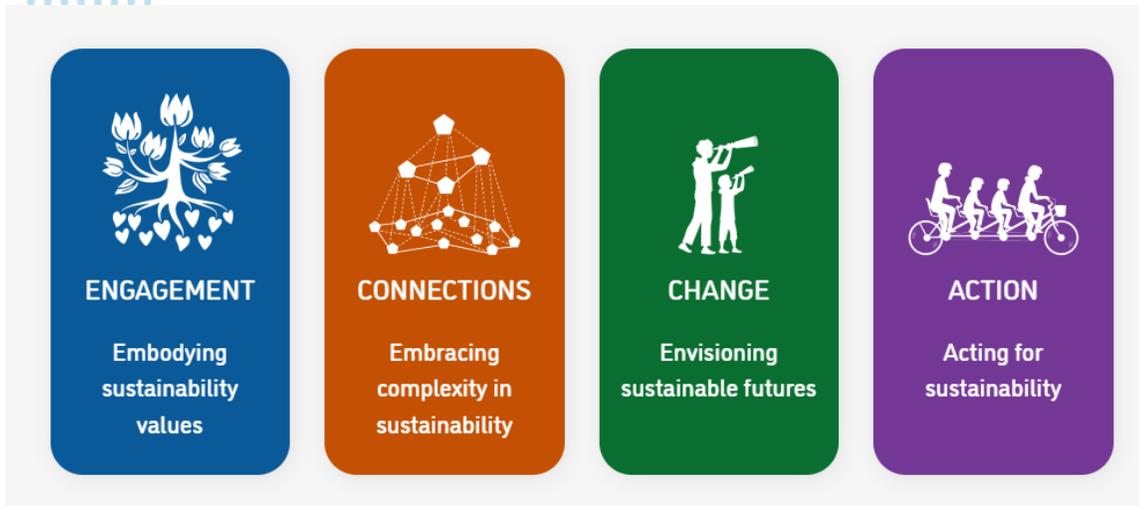
One essential starting point was the European sustainability competence framework, **GreenComp**.

Our Roadmap **broadens GreenComp from an individual perspective to the spheres of collective competences and technical-material competences.**

ECF4CLIM Roadmap for Sustainability Competences

Our Roadmap for Sustainability Competences elaborates on **competences through four key focus areas** that are **important for promoting sustainability in educational practices: engagement, connections, change and action.**

We structure each area around **individual, collective and technical-material competences** in educational practice, and also describe their **intertwinedness**



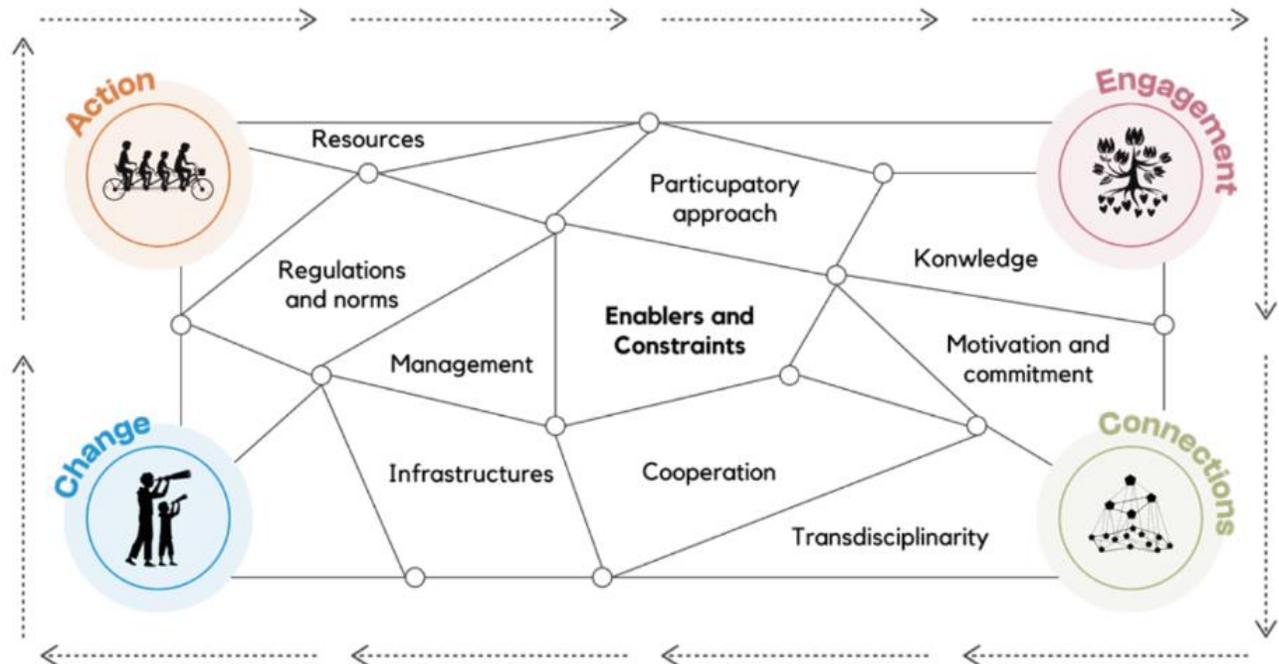
The ECF4CLIM evidence on the Roadmap for Sustainability Competences



The ECF4CLIM experience demonstrates that across all areas, the **main enablers** of sustainability and the promotion of sustainability competences include **management, participatory approaches, cooperation, resources, and the motivation and commitment of actors.**

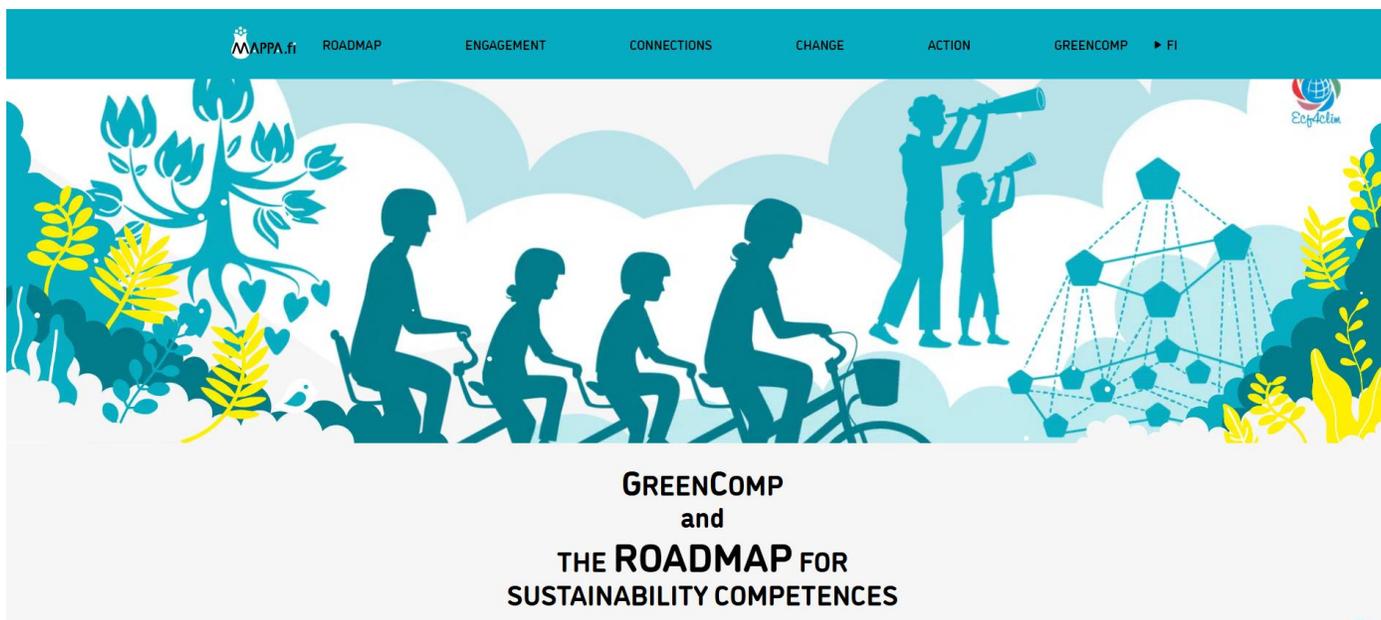
Supporting infrastructures, regulations and norms, and transdisciplinary knowledge are also important.

If these **enablers are missing, they become the main constraints** to sustainability in education.



ECF4CLIM Roadmap for Sustainability Competences

The Roadmap is also presented on the MAPPA.fi platform in a user-friendly format, making it easy to apply in educational practice and enabling the sharing of materials and tools related to the Roadmap also in the future.

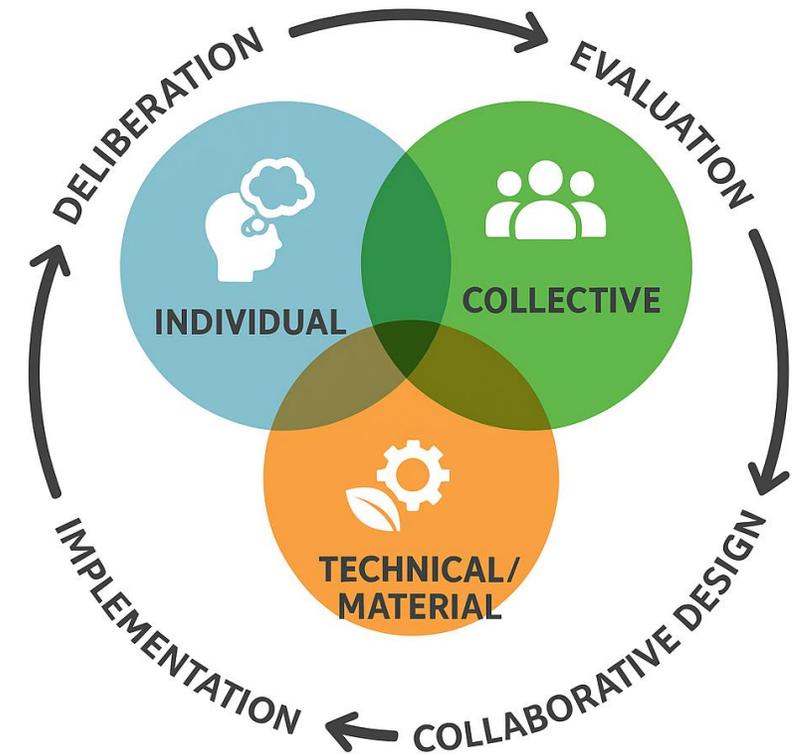


<https://mappa.fi/en/greencomp-roadmap/>

Outcome 3. ECF4CLIM novel hybrid participatory approach

What is this method for?

- A tool that supports the **development of sustainability competences** within educational communities.
- A strategy that encourages **reflection and deliberation about the nature of sustainability competences** and their three interconnected spheres: individual, collective, and technical/material.
- A series of processes and techniques that **raise awareness on the baseline** of sustainability competences, support the **collaborative design** of interventions to promote them, facilitate **joint deliberation on their implementation**, and enable **participatory evaluation** of their potential impacts.



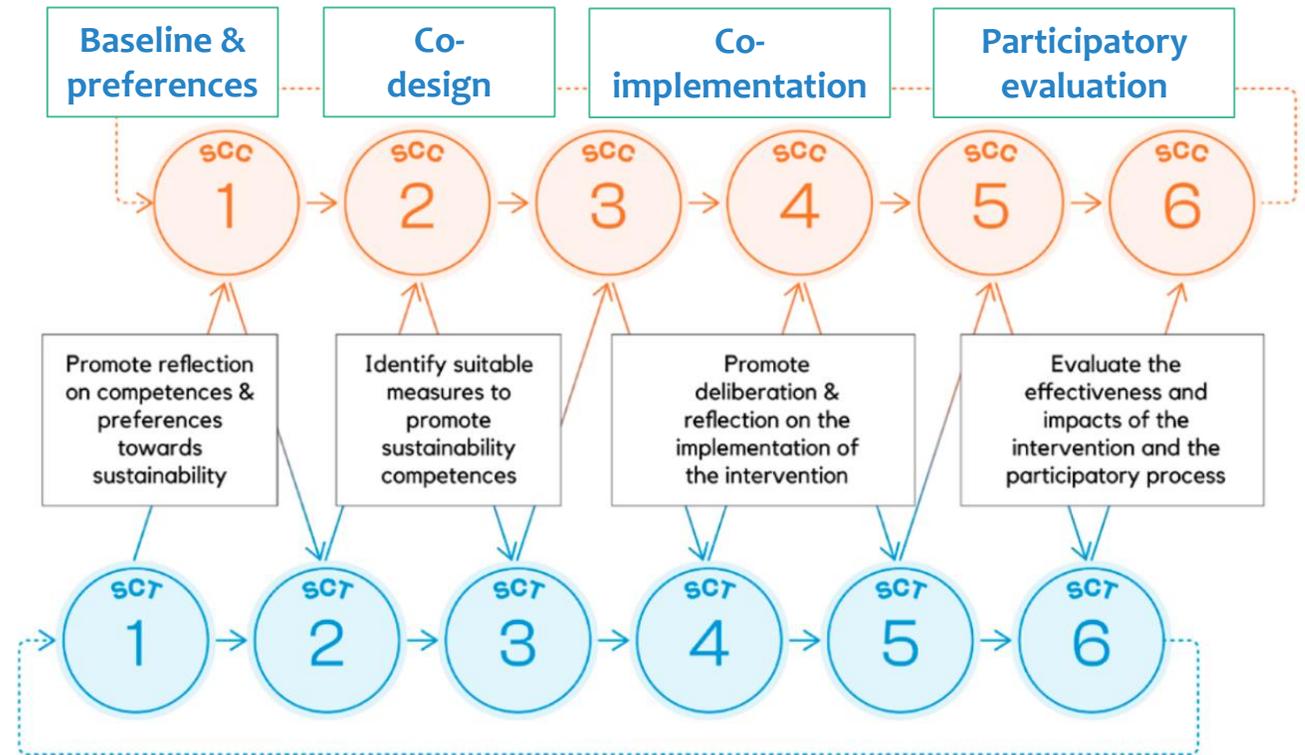
How the method works in practice?

Innovative organizational models of engagement & action for sustainability

(tailoring STAVE* to the educational community)

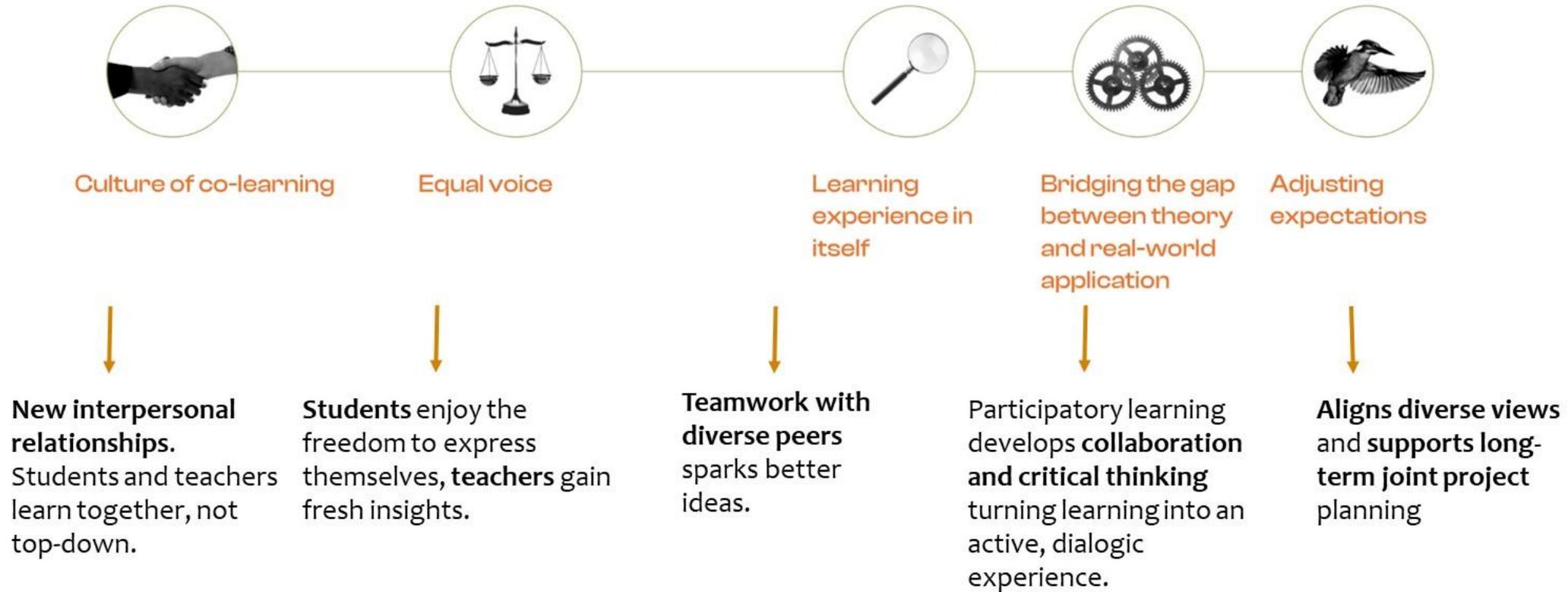
- ✓ **Sustainability Competence Teams:**
Students, Teachers, Administrative Staff
- ✓ **Sustainability Competence Committees:** SCT representatives + wider educational community

Over 500 students, teachers, staff and representatives from the wider educational communities at 13 DS actively involved in our SCT/SCCs (130 SCT/ 50 SCC meetings).



* www.pachelbel.eu

What users are saying



- ✓ The process fostered a **more integrated and holistic understanding of sustainability, embedding it as a frequent and visible topic in school life.**
- ✓ **Positive impact on students, educators and staff: for many, the experience exceeded their initial expectations and promoted shared learning.**

Outcome 4. ECF4CLIM catalogue of interventions

The ECF4CLIM project has co-designed, co-implemented and co-evaluated sustainability interventions to foster sustainability competences in our demonstration sites.

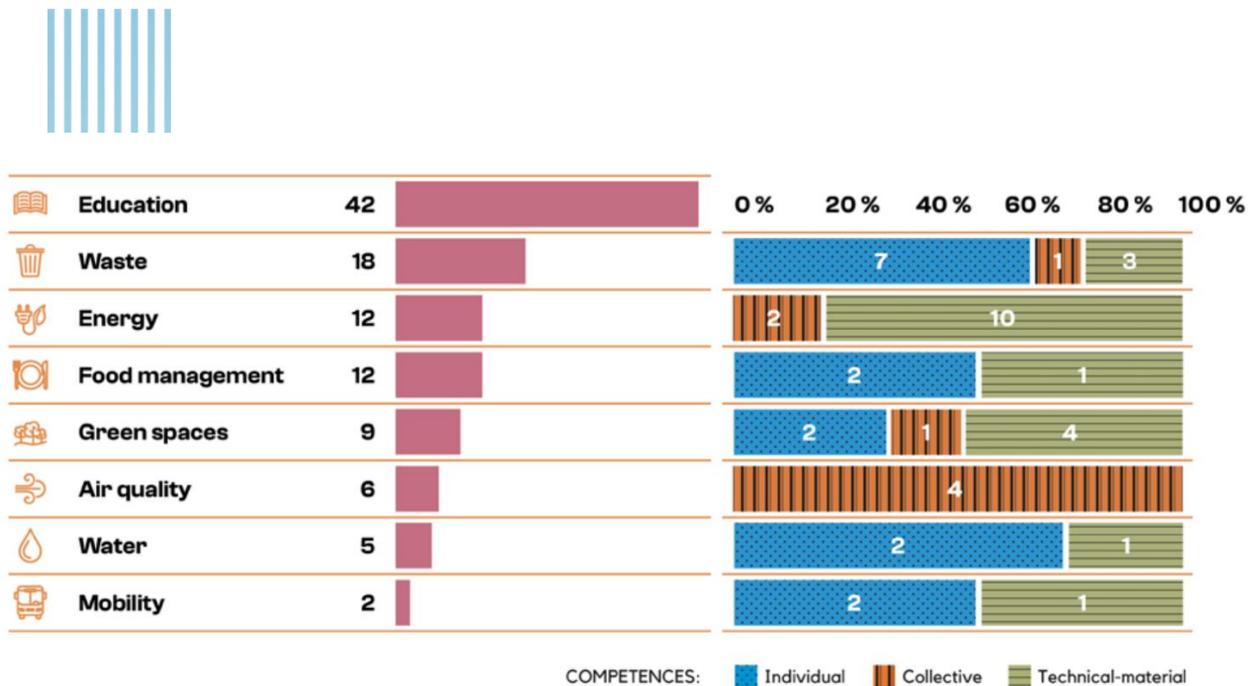
159 interventions were initially designed, 87 were selected for implementation, and 64 were implemented during the project lifetime

In close collaboration with the demonstration sites, we selected **22 showcase interventions** that exemplify successful practices in fostering sustainability competences and provides a **practical guide for replicating** the sustainability interventions developed in ECF4CLIM in other educational centers.

These interventions were chosen for their **impact, replicability, and alignment** with the Roadmap's **four dimensions**—Engagement, Connections, Change, and Action—and the **three competence spheres**: individual, collective, and technical-material



ECF4CLIM catalogue of interventions



The interventions addressed a wide range of sustainability topics, including **reducing energy and water use**, improving **food provision**, and creating **green spaces**. They also promoted better **waste management** through gamified recycling activities, **raised awareness** with campaigns, escape rooms, and digital tools, and **enhanced education through new curricular units, interdisciplinary learning**, and student-created materials. Finally, **hands-on visits** helped students engage directly with local environmental issues.

Monitoring these interventions involved various methods and tools, such as the SCTs and SCCs sessions, the intervention templates, and a monthly reporting procedure.

Outcome 5. ECF4CLIM tools and learning materials



Monitoring & Data Tools

The IoT Ecosystem functions as a data aggregator, collecting information, including energy consumption and temperatures, from various schools and universities participating in the ECF4CLIM project. **The tool provides dynamic calculation and visual analytics over key performance indicator (KPI) measurements** and helps the educational community to test different interventions aimed to improve the KPIs.

[More info](#)



Learning Space

It gives access to educational resources designed to improve citizens' awareness, learning and capacity for climate actions and sustainability.

These educational materials are divided into **materials for students, for teachers and games.**

[More info](#)



Tools for Environmental Assessment

It gives access to a set of user-friendly tools for educational communities and citizens: the **Environmental footprint calculator**, the **retrofitting toolkits 1 & 2**, and the **Sustainability Interventions Evaluation**.

[More info](#)

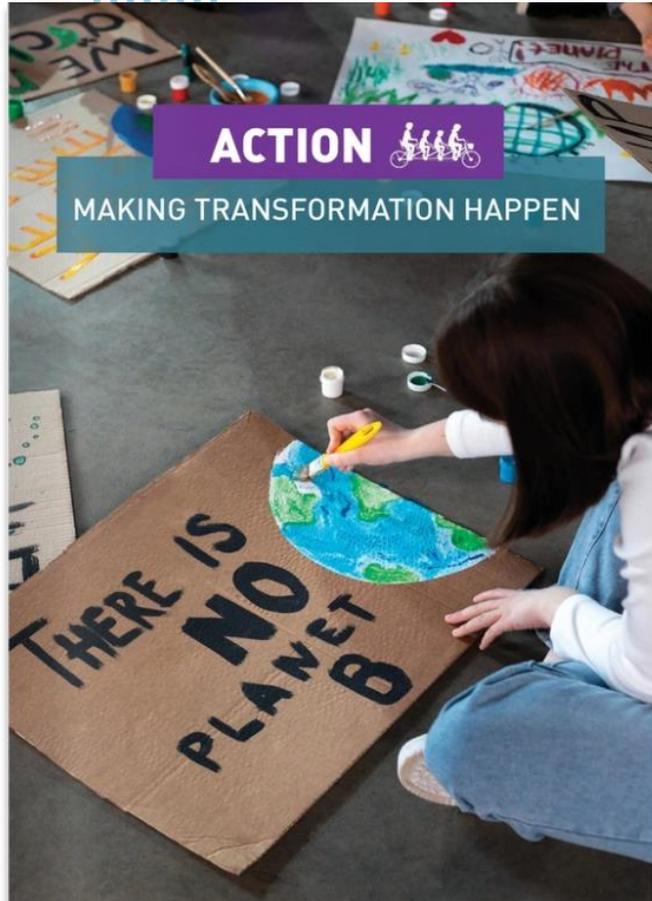


We have developed **digital tools and learning materials** to promote sustainability competences and support active learning through simulation, reflection and action-oriented experiences.

- **Environmental Footprint Calculator** tailored for educational communities,
- **Retrofitting Toolkit** for assessing building energy efficiency
- **Sustainability Intervention Evaluation Tool** for improving sustainability competences at educational settings
- **IoT Ecosystem** for acquiring indoor air quality, ambient conditions (temperature and humidity) and energy consumption data.

All of these tools are hosted on the project's digital platform

ECF4CLIM tools and learning materials



We have developed **interactive flipbooks** and the **learning game** with the aim of fostering the pedagogical and motivational dimensions of sustainability education.

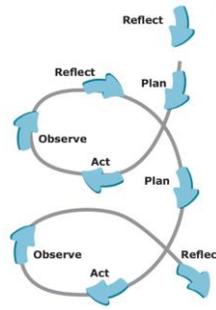
Both make **explicit reference to the ECF4CLIM Roadmap**, helping educators and students understand and apply its principles in practice.

They include concrete **examples of ECF4CLIM sustainability interventions**, which serve as inspiration and practical guidance for implementing the Roadmap in other educational institutions



Of participatory action research in educational settings

- Substantial time & resource limitations (different across DS)
- Changes in participants (not similar across DS)
- Need to adapt the methodological designs to the educational dynamics
- Flexibility in the application of the methods and impacts on the nature of the evidence



Challenges & opportunities

Adaptive and iteratively constructed methodological strategy throughout the project

- Cross-country dialogues & collective reflection (e.g. GA)
- Mitigation measures to fit the school contexts
- New methodological insights
- Fine-tuning of evaluation strategy

Of inter and transdisciplinary research

- Lack of skills and tradition in interdisciplinary research
- Risk of running in parallel: each expert doing its own work

Our transdisciplinary strategy

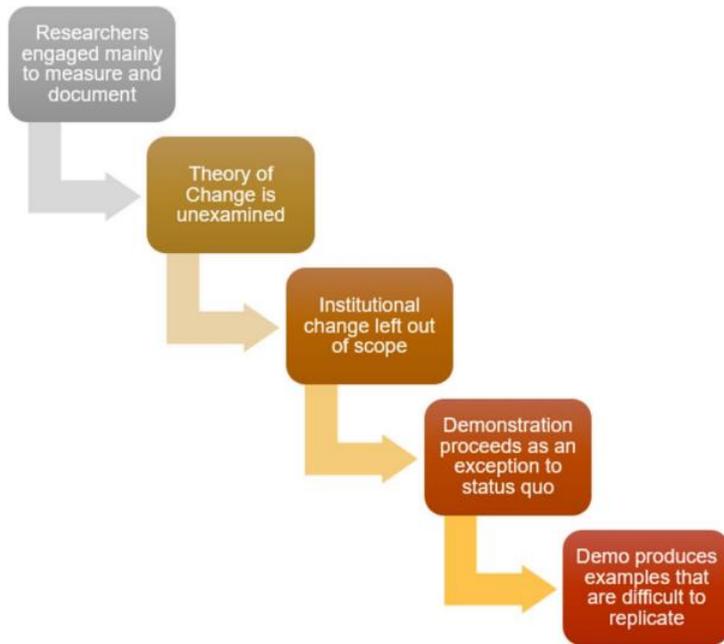
- Time and space for transdisciplinary dialogues: creative activities at GA, multidisciplinary dialogues, webinars...
- Meaningful empirical evidence on transdisciplinary work in EU projects (i.e., interviews with EU coordinators)



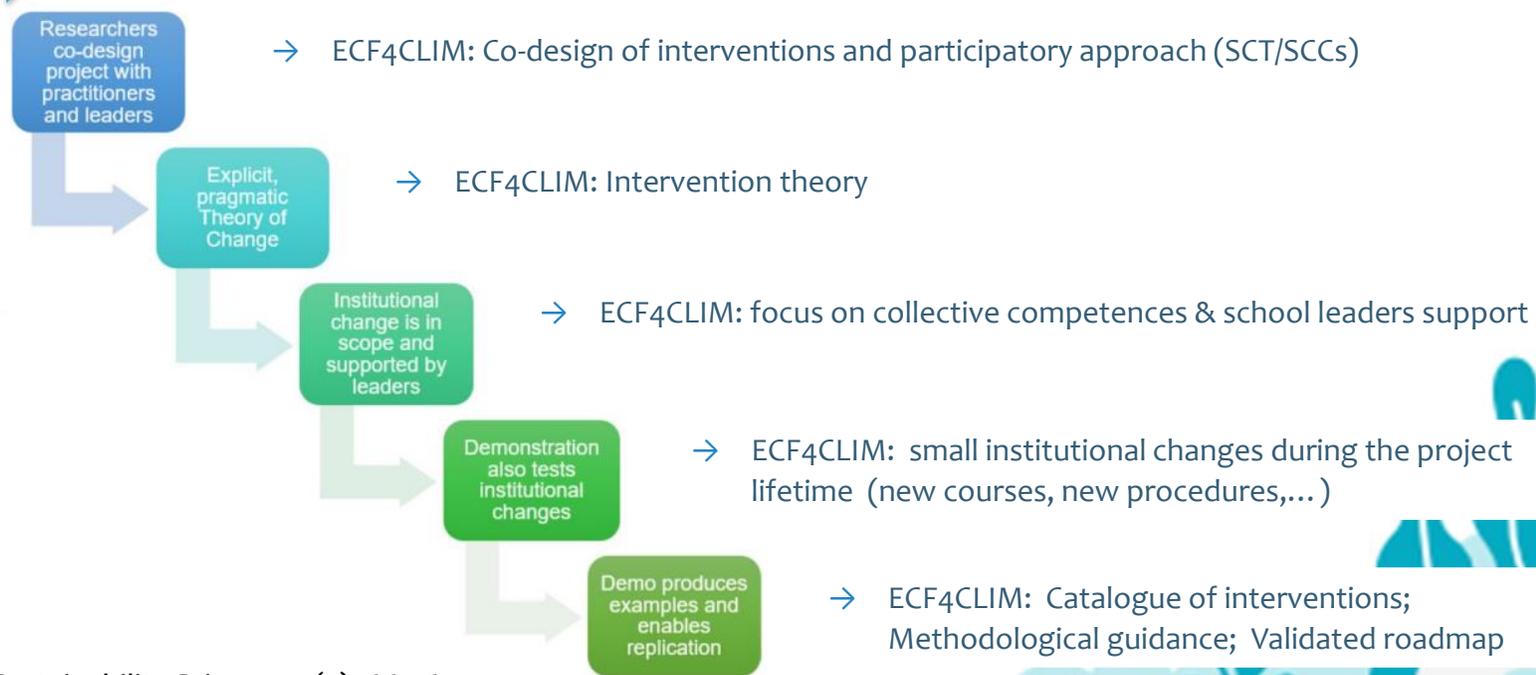
Of sustainability and scaling up of project results



Demonstration projects with incomplete Action Research



Action Research for transformative change



→ ECF4CLIM: Co-design of interventions and participatory approach (SCT/SCCs)

→ ECF4CLIM: Intervention theory

→ ECF4CLIM: focus on collective competences & school leaders support

→ ECF4CLIM: small institutional changes during the project lifetime (new courses, new procedures,...)

→ ECF4CLIM: Catalogue of interventions; Methodological guidance; Validated roadmap

Croeser et al (2024) *Sustainability Science*, 19(2), 665-670.

